Remedial Action Plan

Project

195-213 Fitzgerald Avenue & 40-64 Yorktown Parade, Maroubra

Prepared for

New South Wales Land and Housing Corporation (ABN 24 960 729 253)

Date

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Document Control

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The findings presented in this report are based on specific data and information made available during the course of this project. To the best of Alliance's knowledge, these findings represent a reasonable interpretation of the general condition of the site at the time of report completion.

No warranties are made as to the information provided in this report. All conclusions and recommendations made in this report are of the professional opinions of personnel involved with the project and while normal checking of the accuracy of data has been conducted, any circumstances outside the scope of this report or which are not made known to personnel and which may impact on those opinions is not the responsibility of Alliance.

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Data and/or information presented in this report must not be redrawn for its inclusion in other reports, plans or documents, nor should that data and/or information be separated from this report in any way.

Should additional information that may impact on the findings of this report be encountered or site conditions change, Alliance reserves the right to review and amend this report.

Maroubra Project Summary

The following project summary has been provided by the client.

Project Overview

This remedial action plan (RAP) has been prepared by Alliance Geotechnical Pty Ltd (Alliance) on behalf of Homes NSW for a State Significant Development Application (SSD-71454960) for the redevelopment of existing social housing (the Project) at 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Maroubra (the Site). The Project involves the replacement of the 33 social housing units across eight 2 storey apartment buildings and a single storey dwelling with 144 units across four 3 storey buildings and two part 3/part 4 storey buildings.

The purpose of this RAP was to provide:

- A remediation objective to facilitate making the site suitable for the proposed land use scenario;
- A methodology for supplementary contamination assessment (SCA) works to address the identified data gaps;
- A preferred and/or conceptual remediation and validation strategy to address plausible unacceptable land contamination risks that could reasonably be identified during SCA works; and
- address the Secretary's Environmental Assessment Requirements (SEARs) for the project issued on 6 June 2024 which identified the following specific assessment requirements:
    - Condition 16 – **Contamination and Remediation** – In accordance with Chapter 4 of SEPP (Resilience and Hazards) 2021, assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable (or will be suitable, after remediation) for the development.

SEARs Requirement 16 Contamination and Remediation	**Section Addressing SEARs Requirement**
In accordance with Chapter 4 of SEPP (Resilience and Hazards) 2021, assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable (or will be suitable, after remediation) for the development.	Addressed throughout the reports

Site Information

The Site is located within the Randwick City Council local government area (LGA) and is zoned R3 Medium Density Residential under the Randwick Local Environmental Plan (LEP) 2012.

The Site has a total area of approximately 9,596 square metres (sqm) with frontages to Fitzgerald Avenue to the north and Yorktown Parade to the south. Refer to **Figure 1** and **Figure 2**.

The existing buildings on the Site are currently occupied. There are street trees located along the Fitzgerald Avenue frontage and a series of trees within the Site between the buildings and along both street frontages. The site is accessible by public transport with services that run along Fitzgerald Avenue with frequent services to Maroubra town centre and Bondi Junction, with connecting services to Sydney CBD.

Proposed Development

The proposed development comprises demolition of existing buildings and the construction of four 3 storey and two part 3/part 4 storey residential flat buildings to accommodate 144 social and affordable housing apartments, a communal room and a single level basement car park including bulk earthworks, tree removal and associated landscaping and public domain works.

Executive Summary

Alliance Geotechnical Pty Ltd (Alliance) was engaged by New South Wales Land and Housing Corporation (herein referred to as 'HNSW' or 'the client') to prepare a remedial action plan (RAP) for 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Maroubra NSW (refer **Figure 1,** with the 'site' boundaries outlined in **Figure 2**)**.**

At the commencement of the project, Alliance had the following project appreciation:

- The site is currently owned by the client;
- The site is occupied with eight residential two-storey buildings, one residential single-storey building, unsealed areas around the buildings, hardstand pavement driveways and footpaths;
- The site is proposed for redevelopment, comprising the demolition of existing buildings and the construction of six 3 storey residential flat buildings to accommodate 144 social and affordable housing apartments, a communal room and a single level basement car park, including bulk earthworks, tree removal and associated landscaping and public domain works. A copy of the proposed development plans is presented in **Appendix F**;
- In the context of NEPC (2013a), this is considered to be a land use scenario[1] comprising a combination of:
    - For ground floor units with outdoor courtyards and communal space including the children's playground and herb gardens - Residential with accessible soil, including garden with home grown produce contributing less than 10% fruit and vegetable intake (excluding home grown poultry and/or eggs), and includes children's day care centres, preschools and primary schools;
    - For high density residential building footprints - Residential with minimal opportunities for soil access including dwellings with fully and permanently paved yard space such as high rise buildings and flats;
- Subject to final landscaping plans for the proposed redevelopment scheme, consideration may need to be given to the less conservative 'Public open space' land use scenario for communal areas (as set out in Section 3.2.3 of NEPC (2013f);
- The proposed development is a state significant development (ref: SSD-71454960);
- The proposed land use scenario assumes a reticulated potable water supply will be available at the site;
- A preliminary site investigation (PSI) of the site was reported in Alliance (2023);
- A detailed site investigation (DSI) of the site was reported in Alliance (2024a). It was identified in the DSI that:
    - Unacceptable land contamination human health and ecological exposure risks have not yet been identified for the site in the limited number of AECs assessed, however there are data gaps that need to be addressed in order to draw conclusions regarding site suitability for the proposed land use scenarios.

[1] Adopted from Section 2.2 of NEPC (2013a) and Section 3 of NEPC (2013f)

- Louise Walkden of Ramboll has been engaged to provide NSW EPA accredited site auditor services for the project; and;
- This RAP is required to assist the client to address:
    - data gaps identified in Alliance (2024a) requiring a SCA;
    - validation of management / remedial works; and
    - development consent decision making processes set out in State Environmental Planning Policy (SEPP) Resilience and Hazards 2021[2] and relevant sections of the Planning Secretary's Environmental Assessment Requirements (SEARs) for in-fill Affordable Housing, dated 6 June 2024;
- The client's preference at the completion of the remedial works set out in the RAP, is to not have a:
    - a covenant registered on the land title;
    - a notation on a planning certificate for the site; and
    - an environmental management plan (EMP) for the site.

The following scope of works was undertaken address the project objectives:

- A desktop review of previous reports;
- A data gap analysis; and
- Data assessment and reporting.

The nominated scope of works was primarily undertaken with reference to relevant sections of NEPC (2013), NSW EPA (2020a), NSW EPA (2020b), and WA DOH (2009), as well as other references presented in **Section 18**.

The extent of remediation at the site is unknown, as the previous investigation results in Alliance (2024a) do not necessarily support a need for management or remediation of the site based on the proposed land use scenario. Remedial options are conceptual only until the SCA is completed and an assessment on whether remediation is necessary.

It is also noted that the results of the supplementary assessment may also require a change to the preferred management / remediation strategy, or even potentially remove the need for management / remediation. Should the inferred extents, preferred strategy or need for management / remediation change, based on supplementary assessment works, these changes would be presented in either an addendum to this RAP, or in the site remediation and validation report (SRVR) prepared at the completion of the site remedial works.

Based on the assessment undertaken by Alliance of site history information, fieldwork observations and data, and laboratory analytical data, in the context of the proposed land use scenario and objectives of this project, Alliance considers that the remediation objective can be achieved, and the site made suitable for the proposed land use scenario, subject to the:

- Implementation of the strategies, methodologies, plans and procedures set out in this remediation action plan, if required, following the completion of the SCA proposed in **Section 8**; and

[2] 'SEPP55 – Remediation of Land' was repealed on 1 March 2022

- Preparation of a site remediation and validation report (if required).

In the event that the proposed development scheme changes from that which was considered during preparation of this RAP, then the SCA and remedial strategies must be reviewed, which may result in addendums to the RAP being required. The addendums will be reviewed by the appointed NSW EPA site auditor for the purpose of obtaining endorsement, before implementation of the addendum.

Specific assumptions that apply to the adopted land use scenario, are presented in **Section 6** of this report.

This report must be read in conjunction with the ***Important Information About This Report*** statements at the front of this report.

TABLE OF CONTENTS

FIGURES

APPENDICES

1 Introduction

1.1 Background

Alliance Geotechnical Pty Ltd (Alliance) was engaged by New South Wales Land and Housing Corporation (herein referred to as 'HNSW' or 'the client') to prepare a remedial action plan (RAP) for 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Maroubra NSW (refer **Figure 1,** with the 'site' boundaries outlined in **Figure 2**)**.**

At the commencement of the project, Alliance had the following project appreciation:

- The site is currently owned by the client;
- The site is occupied with eight residential two-storey buildings, one residential single-storey building, unsealed areas around the buildings, hardstand pavement driveways and footpaths;
- The site is proposed for redevelopment, comprising the demolition of existing buildings and the construction of four 3 storey and two part 3/part 4 storey residential flat buildings to accommodate 144 social and affordable housing apartments, a communal room and a single level basement car park including bulk earthworks, tree removal and associated landscaping and public domain works. A copy of the proposed development plans is presented in **Appendix F**;
- In the context of NEPC (2013a), this is considered to be a land use scenario[3] comprising a combination of:
    - For ground floor units with outdoor courtyards and communal space including the children's playground and herb gardens - Residential with accessible soil, including garden with home grown produce contributing less than 10% fruit and vegetable intake (excluding home grown poultry and/or eggs), and includes children's day care centres, preschools and primary schools; and
    - For high density residential building footprints without outdoor courtyards - Residential with minimal opportunities for soil access including dwellings with fully and permanently paved yard space such as high rise buildings and flats;
- Alliance notes that subject to final landscaping plans for the proposed development scheme, consideration may need to be given to the less conservative Public open space' land use scenario for communal space areas (as set out in Section 3.2.3 of NEPC (2013f);
- The proposed development is a state significant development (ref: SSD-71454960);
- The proposed land use scenario assumes a reticulated potable water supply will be available at the site;
- A preliminary site investigation (PSI) of the site was reported in Alliance (2023);
- A detailed site investigation (DSI) of the site was reported in Alliance (2024a). It was identified in the DSI that:
    - Unacceptable land contamination human health and ecological exposure risks have not been identified for the site in the limited number of areas of environmental concern (AECs)

[3] Adopted from Section 2.2 of NEPC (2013a) and Section 3 of NEPC (2013f)

assessed, however there are data gaps that need to be addressed in order to draw conclusions regarding site suitability for the proposed land use scenarios.

- Louise Walkden of Ramboll has been engaged to provide NSW EPA accredited site auditor services for the project; and;
- This RAP is required to assist the client to address:
    - data gaps identified in Alliance (2024a) associated with areas below buildings and hardstand following demolition requiring a supplementary contamination assessment (SCA);
    - validation of management / remedial works; and
    - development consent decision making processes set out in State Environmental Planning Policy (SEPP) Resilience and Hazards 2021[4] and conditions 13 (acid sulfate soils) and 17 (contamination and remediation) of the Planning Secretary's Environmental Assessment Requirements (SEARs) for development within identified sites and precincts issued on the 6 June 2024;
- The client's preference at the completion of the remedial works set out in the RAP, is to not have a:
    - a covenant registered on the land title;
    - a notation on a planning certificate for the site; and
    - an environmental management plan (EMP) for the site.

1.2 Objectives

The objective of this project was to prepare a remedial action plan (RAP) for the site that contains:

- a remediation objective to facilitate making the site suitable for the proposed land use scenario;
- a methodology for supplementary contamination assessment (SCA) works to address the identified data gaps;
- a preferred and/or conceptual remediation and validation strategy to address plausible unacceptable land contamination risks that could reasonably be identified during SCA works.

1.3 Scope of Work

The following scope of works was undertaken to address the project objectives:

- A desktop review of previous reports;
- A data gap analysis; and
- Data assessment and reporting.

The nominated scope of works was primarily undertaken with reference to relevant sections of NEPC (2013), NSW EPA (2020a), NSW EPA (2020b), and WA DOH (2009), as well as other references presented in **Section 18**.

[4] 'SEPP55 – Remediation of Land' was repealed on 1 March 2022

2 Site Identification

2.1 Site Details

Site identification details are presented in **Table 2.1**.

Table 2.1 Site Identification Details

Cadastral Identification	Portion of lot 1 in DP668769, Lot 248-249 in DP36345
Geographic Coordinates (Google Earth)	33°56'47" S and 151°14'47" E
Site Area	9,596m^2 by survey
Local Government Authority	Randwick City Council
Current Zoning	R3 – Medium Density Residential

A copy of Section 10.7 planning certificates for the site presented in Alliance (2023) indicates that proposed development is permitted with consent on land zoned as R3 – Medium Density Residential.

2.2 Site Layout

The layout of the site is present in **Figure 2**. The layout plan includes locations of:

- Site access points;
- Current buildings / structures;

A copy of a detail and level survey of the site is presented in **Appendix E.**

During the site walkover reported in Alliance (2024a), the following site surfaces were observed during the walkover:

- Concrete driveways on all properties, that appeared in moderate to good condition with minor cracking;
- Concrete patio walkways within properties along Fitzgerald Avenue, that appeared in good condition; and
- Unsealed areas vegetated with grass, unsealed soils, established shrubs and trees.

The following buildings were observed during the walkover:

- Eight two-storey brick and tile roofed residential dwellings located along both Yorktown Parade and Fitzgerald Avenue, with many of the properties containing an adjoining outbuilding in the rear garden that was used as a laundry room and/or storage area for general household materials;
- A single storey (bungalow-type) residential dwelling located in the west / south-western corner of the site, identified as 40 Yorktown Parade;
- Various sheds in rear gardens, constructed of metal cladding / timber framed, used for storage of various items including motorcycles, bicycles and general household items; and
- A metal and timber clad garage with concrete hardstand surfacing located in the rear garden of 213 Fitzgerald Street, identified as being used for vehicle storage / repair / workshop activities.

There was no visual or olfactory evidence detected of significant widespread staining or odours at the site, with the exception of the garage located at 213 Fitzgerald Avenue noted to be used for vehicle servicing / maintenance. Within this garage, evidence of surface staining and a weak petroleum hydrocarbon odour was noted. The staining was on a concrete surface, was generally minor, and likely associated with minor oil leaks/spills.

There was no visual evidence observed to suggest widespread or significant phytotoxic impact in the form of plant stress and/or dieback in vegetation present on the site. Similar observations were made of vegetation on land immediately beyond the site boundaries.

3 Site Environmental Setting

3.1 Geology

The Department of Mineral Resources Geological Survey of NSW Sydney 1:100,000 Geological Series Sheet 9130 (Edition 1) 1983, indicated that the site is likely to be underlain by medium to fine grained 'marine' sand with podsols.

Observations made of the soils encountered during previous intrusive investigation works on site, were recorded on field logs. A copy of those logs is presented in **Appendix A**.

A summary of those observations, in the context of subsurface conditions at the site, is presented in **Table 3.1.**

Table 3.1 Site Specific Geology

Unit	Description	Depth (m bgs)
Fill	SAND, with trace silt, dark, greyish brown to brownish grey, fine to coarse grained, with some to trace roots and rootlets, moist to dry. HA02 between 0.00 and 0.30m, trace gravel of brick and concrete and rock aggregate. HA03 between 0.00 and 0.35m, trace gravel of timber. HA06 between 0.00 and 0.20m, trace gravel of timber and plastic. HA12 between 0.00 and 0.25m, trace gravel of charcoal and glass.	0.15 – 0.6
Natural	SAND, trace silt, grey to pale brownish grey occasionally dark grey, fine to medium occasionally coarse grained, dry to moist.	0.6-0.9

3.2 Site Topography and Elevation

A detail and level survey plan of the site indicated that:

- The northwest of the site was located at an elevation of approximately 20.50m AHD;
- The northeast of the site was located at an elevation of approximately 18.50m AHD;
- The central portion of the site was located at an elevation of approximately 17.50m AHD;
- The southwest of the site was located at an elevation of approximately 16.50m AHD; and
- The southeast of the site was located at an elevation of approximately 14.95m AHD.

Based on this, it is considered that the site is sloping in a northwest to southeast direction.

3.3 Acid Sulfate Soils

A review of the NSW Department of Land and Water Conservation's Acid Sulfate Soil Risk Map for Botany Bay (Edition 2, 1997), indicated that:

- the site is located in a map class description of 'no known occurrence' where acid sulfate soils are not known or expected to occur in these environments; and
- land management activities are not likely to be affected by acid sulfate soil materials.

Further assessment of acid sulfate soils, in the context of this project is considered not warranted.

3.4 Hydrogeology and Hydrology

A review of readily available online maps indicated that surface water bodies located on or near the site included:

- An unnamed watercourse feeding into the Pacific Ocean at Maroubra Beach located approximately 940m to the east / southeast;
- Pacific Ocean at Maroubra Beach, located approximately 1km to the east / southeast; and
- Pacific Ocean at Malabar Beach located approximately 2km to the south / southeast.

Based on the location of the identified surface water bodies and the site surface topography, the inferred groundwater flow direction at the site is considered likely to be towards the east / southeast.

Based on site surface topography and site elevation, the inferred surface water flow direction at the site is considered likely to be towards the southeast.

A search of https://www.environment.nsw.gov.au/eSpade2WebApp was undertaken by Alliance, however no hydrogeological landscape information was available for the locality of the site.

A search of https://realtimedata.waternsw.com.au/water.stm indicated that:

- there were eleven registered groundwater features located within a 500m radius of the site; and
- authorised uses of these groundwater features include:
    - domestic; and
    - recreational.

Information presented in records obtained for these registered groundwater monitoring wells, indicated that:

- boreholes were drilled to depths of between 3.7m and 10m below ground level;
- the geology encountered during drilling (using solid flight auger, hand drill, jetted water methods) included sand, silty sand and coffee rock;
- rock was not logged on the online search record documentation in the eleven groundwater features assessed;
- depth to standing water level in those wells ranged from 1.5m to 3.9m; and
- one of the wells (well GW25656) has been discontinued.

Six (6) domestic wells (GW025707, GW101679, GW107621, GW107337, GW109143 and GW114846) were located in an inferred downgradient location of the site. The closest well to the site was GW107621 located approximately ~50m to the east of the site.

The remaining 4 wells were located in an inferred upgradient and cross-gradient position of the site.

A copy of the online search record is presented in **Appendix B**.

3.5 Meteorology

The Bureau of Meteorology website (http://www.bom.gov.au/climate/data/index.shtml?bookmark=200) was accessed and a search conducted for climatic information measured by the nearest bureau station to the site. A summary of data obtained from that search is presented in **Table 3.5**.

Table 3.5 Local Meteorology Data Summary

Weather Station Location and Identifier	Mean Annual Temperature (ºC)		Mean Annual Rainfall (mm)
	Maximum	Minimum	
Sydney Airport AMO - 066037	22.4	13.6	1096.2

4 Previous Contamination Assessments and Results

A copy of the following reports held by Alliance were reviewed for the site:

- Alliance 2023, 'Preliminary Site Investigation, 195-213 Fitzgerald Avenue & 40-64 Yorktown Parade, Maroubra' dated 1 15 May 2023, ref: 16364-ER-2-1.
- Alliance 2024a, 'Detailed Site Investigation, 195-213 Fitzgerald Avenue & 40-64 Yorktown Parade, Maroubra' dated 4 October 2024, ref: 17716.2-ER-1-1 Rev 2.
- Alliance 2024b, 'Preliminary Waste Classification Report, 195-213 Fitzgerald Avenue & 40-64 Yorktown Parade, Maroubra' dated 12 July 2024, ref: 17716.2-ER-2-1.

4.1 Alliance (2023)

The objectives of Alliance (2023) were to:

- Assess the potential for land contamination to be present at the site as a result of current and previous land use activities; and
- Provide recommendations for further investigations, and management or remediation of land contamination (if warranted).

The scope of work undertaken to address the Alliance (2023) project objectives included:

- A desktop review of site history;
- A site walkover limited to readily accessible portions of the site boundary; and
- Assessment of data and reporting.

The nominated scope of works was undertaken with reference to relevant sections of NEPC (2013), NSW EPA (2020b), HEPA (2020) and WA DOH (2009).

Based on the assessment undertaken by Alliance of site history information and observations made of the site during the kerbside site visit, Alliance made the following conclusions:

- There is a potential for unacceptable land contamination to be present at the site as a result of current and previous land use activities; and
- There is a site walkover related data gap associated with the areas of environmental concern (AEC) and associated contaminants of potential concern (COPC) identified for the site. The data gap has arisen as a result of a client-imposed constraint which limited site walkover observations to be made only from the site boundary.

Based on those conclusions, Alliance made the following recommendations:

- A stage 2 detailed site investigation (DSI) should be undertaken to address identified potentially unacceptable human health and ecological risks in this PSI. The DSI should include a site walkover inside the site boundary, to facilitate addressing the data gap identified in the conclusions of that report, and to facilitate refinement of the AEC and COPC for the site, prior to undertaking DSI related intrusive investigations; and
- The stage 2 DSI, and associated walkover should be undertaken by a suitably experienced environmental consultant.

4.2 Alliance (2024a)

The objectives of Alliance (2024a) were to:

- Assess the potential for land contamination to be present in the areas of environmental concern (AEC) identified in Alliance (2023), taking into consideration the site walkover data gap reported in Alliance (2023);
- Assess whether identified potential land contamination would present an unacceptable human health or ecological exposure risk, based on the proposed land use scenario;
- Assess whether the site is suitable, in the context of land contamination, for the proposed land use scenario; and
- Provide recommendations for further investigations, and management or remediation of land contamination (if warranted).

The scope of work undertaken to address the Alliance (2023) project objectives included:

- A desktop review of previous reports;
- Preparation of a sampling and analysis quality plan;
- Intrusive investigations on site;
- Laboratory analysis; and
- Assessment of data and reporting.

The nominated scope of works was primarily undertaken with reference to relevant sections of NEPC (2013), NSW EPA (2020b), HEPA (2020) and WA DOH (2009), as well as other references presented in **Section 18**.

Alliance (2024a) proposed the following recommendations:

- A SCA should be undertaken to address the identified data gaps. The supplementary contamination assessment should be undertaken following controlled demolition and removal of the structures and hardstand areas.
- A hazardous building materials survey of those structures should be undertaken, and a clearance certificate obtained following hazardous building materials removal, prior to demolition of the structures.
- A remedial action plan (RAP) should be prepared to address unacceptable human health and ecological exposure risks (if identified). The RAP should include a methodology for
    - undertaking an SCA to address identified data gaps requiring a SCA; and
    - validation of management / remedial works.
- Further assessment, management or remedial planning works for the site, should be undertaken by a suitably experienced environmental consultant; and
- Preparation of hazardous building material surveys and clearance certificates should be prepared by a suitably experienced hazardous materials consultant and/or occupational hygienist.

4.3 Alliance (2024b)

The objective of this project was to provide a preliminary waste classification assessment of the materials assessed with the testing and sampling locations being the same data as within Alliance (2024a);

The following scope of work was undertaken to address the project objective:

- Preparation of a sampling and analysis quality plan;
- Intrusive investigations on site;
- Laboratory analysis; and
- Assessment of data and reporting

Based on an assessment of desktop review data, fieldwork observations and laboratory analytical data, the report considered that the material assessed would preliminarily classify as General Solid Waste (Non-Putrescible).

5 Results and Site Characterisation

The results of the previous assessments (refer **Section 4**) have been reviewed. Characterisation of site contamination risks, in a tabular and plan format, is discussed below.

A plan showing the location of sampling point locations at the site from Alliance (2024a) and (2024b), is presented in **Figure 3**.

Sample descriptions of the media assessed on the site, including soil, are presented in copies of the logs presented in **Appendix A** associated with fieldwork for Alliance (2024a) and Alliance (2024b).

A copy of tabulated results from previous contamination assessments that include:

- sample identification numbers and sampling depths; and
- adopted contamination assessment criteria;

is presented in **Appendix C** for Alliance (2024a) and **Appendix D** for Alliance (2024b).

An updated areas of environmental concern (AEC) plan is presented in **Figure 4**

Alliance notes that the aforementioned plans, descriptions and tables do not include data which may be obtained during the supplementary contamination assessment works proposed **Section 8**.

6 Conceptual Site Model

The conceptual site model takes into consideration the results of previous investigations reported in **Section 4** and the data gaps present in **Section 7**.

6.1 Preamble

A conceptual site model (CSM) is a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM is constructed from the information obtained during the preliminary site investigation (PSI) and detailed site investigation (DSI).

The pre-remediation CSM identifies complete (or potentially complete) pathways between the known source(s) and the receptors. In that scenario, management or remediation is needed to break the source-pathway-receptor linkage.

6.2 Land Use

6.2.1 Adopted Land use Scenario

For the purpose of this project, Alliance understands that the proposed land use scenario for the site includes:

- For ground floor units with outdoor courtyards and communal space including the children's playground and herb gardens - Residential with accessible soil, including garden with home grown produce contributing less than 10% fruit and vegetable intake (excluding home grown poultry and/or eggs), and includes children's day care centres, preschools and primary schools;
- For high density residential building footprints without outdoor courtyards - Residential with minimal opportunities for soil access including dwellings with fully and permanently paved yard space such as high rise buildings and flats; and

Subject to final landscaping plans for the proposed redevelopment scheme, consideration may need to be given to the less conservative 'Public open space' land use scenario for communal areas (as set out in Section 3.2.3 of NEPC (2013f).

6.2.2 Assumptions for Adopted Land Use Scenario

Section 3 of NEPC (2013i) advises that the residential with accessible soil land use scenario includes a variety of building densities, ranging from separate low-density dwellings to high-density unit blocks. The residential land use scenario considered in this investigation is low-density residential, including a sizeable garden (referring to the presence of sufficiently large areas of soil in a garden that may be accessible on a daily basis by young children and adults).

This land use scenario assumes typical residential properties, consisting of single storey dwellings supported by ground-level slabs or multistorey dwellings where living areas are on the ground floor and there is accessible soil in the front and backyard areas.

These residences may have private gardens, consisting of lawns, garden beds and small vegetable gardens and areas of fruit trees, but no poultry.

Section 3 of NEPC (2013i) advises that the residential with minimal access to soil land use scenario includes high-density residential, not including a private garden. This land use scenario assumes typical residential unit blocks, consisting of multistorey buildings where living areas are on the ground floor (constructed on a ground level slab or above subsurface structures including basement car parks or storage areas).

Occupants of the buildings would have access to yard spaces that are largely covered by permanent paving, with some small areas of landscaping or lawns. Opportunities for direct access to soil by residents of these buildings are therefore minimal but there may be some potential for residents to inhale, ingest or come into direct dermal contact with dust (particulates) derived from the soil on the site.

The scenario does not include landscaped/playground (including sandpit) areas used for recreation within a high-density development. These are considered a 'public open space' land use scenario.

6.3 Sources of Contamination

A number of potential land contaminating activities have been identified for the site, based on the results of previous contamination assessments. These include:

- Uncontrolled filling;
- Uncontrolled demolition;
- Termite treatment of current and former structures; and
- Use of hazardous building materials.

Since the preparation of Alliance (2024a), the development plans for the site have been amended (refer **Appendix F**). Alliance reviewed these plans, and the development scheme now includes a basement, across the northern portion of the site, for car parking comprising an area of 2,029m^2. Given this change in design, there is likely to be significant excavation to facilitate the basement within the northern portion of the site, based on the following:

- The northwest of the site is located at an elevation of approximately 20.50m AHD;
- The northeast of the site is located at an elevation of approximately 18.50m AHD; and
- The central portion of the site is located at an elevation of approximately 17.50m AHD;

The proposed floor plan shows a finished floor level of the basement of between 14.55-16m AHD. Based on this the following is considered to be clear:

- The northern portion of the site is proposed to have a (single level) basement;
- Based on the current site level (see **Appendix F**) a significant amount of excavation within the northern portion (greater than 1m bgl) will be required to construct this basement;
- A number of identified sources of potential contamination are located within the proposed basement excavation footprint. These sources include:
    - Uncontrolled filling within the extent of the basement structure as shown in **Figure 5**;
    - Uncontrolled demolition within the extent of the basement structure as shown in **Figure 5**;
    - Termite treatment of current and former structures within the extent of the basement as shown as **Figure 5**; and

- Use of hazardous building materials within the extent of the basement as shown in **Figure 5**.

See **Figure 5** for the proposed extent of the basement parking plan.

Alliance notes that based on observations made on site, and significant experience on similar land, potential sources of land contamination such as uncontrolled fill (not yet encountered beyond 0.6m thick, and conservatively estimated to be up to 0.3m thick in areas of the site not yet intrusively assessed), hazardous building material residues and termite treatment are highly unlikely to extend to depths greater than 1m below ground level, yet alone beyond the inferred depths of the proposed basement (14.55-16.0m AHD). Based on the detail and level survey plan (refer **Appendix E**), current ground level at the lowest point of the proposed basement level is approximately 14.55-16.0m AHD. This represents an excavation of up, at a minimum, of to 1.5m AHD below the current level.

It is therefore reasonable to assess that these potential sources of contamination within the proposed basement footprint would be removed from site during the basement excavation works (and prior to occupation by receptors identified in **Section 6.4** of this investigation).

If a source is not present, then the linkage between source, pathway and receptor cannot be completed, and an unacceptable human health exposure risk cannot therefore exist. On this basis, further assessment of the identified potential sources of land contamination in soil within the footprint as shown within **Figure 5**, is considered not warranted, subject to the soils excavated for the basement construction being removed from site and not retained.

Table J1 in Appendix J of AS 4482.1-2005[5], Table B1 in Appendix B of WA DWER (2021) and Table B1 and Table B2 in Appendix B of HEPA (2020) provides guidance on chemicals associated with land uses activities. That guidance provides a basis for deciding on contaminants of potential concern (COPC) for each relevant land use activity. Information on COPC adopted for this project is presented in **Section 6.6** of this report.

6.4 Receptors

6.4.1 Identified Receptors

Based on the adopted land use scenario in **Section 6.2**, receptors at the site may include residents, intrusive maintenance workers, ecological (terrestrial and/or aquatic) ecosystems.

[5] Alliance understands this standard has been withdrawn, however, guidance on the Aged Standards Review process at https://www.standards.org.au/standards-development/aged-standards, indicates that it is still possible for a withdrawn standard to be used within an industry or reference by a government if chosen to do so. On the basis that this standard is referenced in NEPC (2013b), it is considered reasonable to still refer to it, within the context of this project.

6.4.2 Assumptions for Identified Receptors

For residential with accessible soil, this project considers the preliminary assessment of potential risks at sites where children are likely to be the most sensitive human receptors, including childcare centres, kindergartens, preschools and primary schools and their integral playgrounds. The scenario is designed to represent a typical residential land use. The scenario also considers circumstances where less exposure to soil would be likely (for example, older people, or without fruit and vegetable gardens).

The occupants of the dwellings include adults, children and infants, who spend the majority of their time on the residential properties and use the outdoor areas of the residences on a frequent basis, for activities such as gardening or recreation.

It is noted that for people within sensitive sub-populations; for example, the immunosuppressed, those with pre-existing illness, or those with pica behaviour, the scenario may not be sufficiently protective of health and a site-specific risk assessment (or criteria) or management strategies may be required.

The human receptors at a residential with minimal access to soils site, would typically include adults, children and infants who spend the majority of their time indoors within the residential properties, with some limited use of communal outdoor areas on site. The residents that are considered to be most susceptible to health risks associated with soil contaminants are the residents of ground floor units, due to the greatest potential for outdoor soil to be tracked indoors and vapour intrusion occurring with residences immediately overlying contaminated soil.

Intrusive maintenance workers are assumed to be adult workers who carry out work in shallow trenches (maximum depth of 1m). The work may include work related to telephone, electricity, gas, water and sewer. It is also assumed that the workers will follow industry accepted procedures in relation to health and safety. The assumptions do not extend to work in deep trenches (such as deep sewers), on the basis that deep trench work would usually require confined space health and safety procedures to be followed, including the use of personal protective equipment.

In the context of petroleum hydrocarbons, exposure[6] may occur through:

- inhalation of volatiles from contaminants at any depth (soil and groundwater); and
- direct contact (dust inhalation, ingestion and dermal contact) for contaminated soils from surface to 2m below ground surface (i.e. trench walls for surface to 1m, trench floor 1 to 2m below ground surface).

Potential acute exposure risks or explosion hazards associated with very high concentrations of vapours are not considered in this scenario.

[6] Section 2.1.4 of Friebel, E & Nadebaum, P 2011

6.5 Exposure Pathways

6.5.1 Human Health

6.5.1.1 Dermal Contact / Ingestion / Dust Inhalation

Based on information in Alliance (2024a), further assessment of dermal contact, ingestion and dust inhalation risk to human health was considered warranted within identified data gaps due to inaccessible buildings and hardstand footprints.

Based on the revised proposed development plans, further assessment of these pathways is still considered warranted within portions of AECs outside of the proposed basement excavation footprint as discussed in **Table 6.6**. This assessment is also conditional on soils excavated to facilitate the excavation of the basement being removed from site and not reused onsite.

6.5.1.2 Vapour Intrusion / Inhalation

Based on information in Alliance (2024a) assessment of vapour intrusion / inhalation risks is considered not warranted. Based on the revised proposed development plans, Alliance do not consider this previous assessment of these pathways to change.

6.5.1.3 Asbestos Inhalation

Site history information and observations made during the site walkover reported in Alliance (2024a), indicated a potential for ACM, FA and/or AF to be present in soils at the site.

The proposed land use scenario is likely to include unsealed and open space areas, where a pathway between identified receptors and asbestos in soils, may be complete.

Based on information in Alliance (2024a), further assessment of asbestos exposure risk was considered warranted, after demolition and removal of hardstand materials overlying site soils.

Based on the revised proposed development plans, further assessment of the asbestos inhalation pathway is still considered warranted within portions of AECs outside of the proposed basement excavation footprint as discussed in **Table 6.6**. This assessment is also conditional on soils being excavated to facilitate the construction of the basement, being removed from site and not reused onsite.

6.5.2 Management Limits for Petroleum Hydrocarbons

Site history information and walkover observations reported in Alliance (2024a), indicated a potential for management limit policy considerations to be associated with relevant identified areas of environmental concern (AEC) within the existing data gaps at the site due to inaccessible buildings and hardstand footprints, in the context of the proposed future land use scenarios. On that basis, further assessment of petroleum hydrocarbons in soils in the context of those policy considerations, was considered warranted.

Based on the revised proposed development plans, further assessment of this pathway is still considered warranted within portions of AECs outside of the proposed basement excavation footprint as discussed in **Table 6.6**. This assessment is also conditional on soils excavated to facilitate the construction of the basement, being removed from site and not reused onsite.

6.5.3 Hazardous Ground Gases

Based on information in Alliance (2024a), Alliance considers that further assessment of hazardous ground gases in the context of this project, is considered not warranted.

6.5.4 Aesthetics

Based on information in Alliance (2024a), further assessment of aesthetic risk was considered warranted within relevant areas of environmental concern (AEC) within the existing data gaps at the site due to inaccessible buildings and hardstand footprints, in the context of the proposed land use scenarios. On that basis, further assessment of aesthetics was considered warranted.

Based on the revised proposed development plans, further assessment of aesthetics is still considered warranted within portions of AECs outside of the proposed basement excavation footprint as discussed in **Table 6.6**. This assessment is also conditional on soils excavated to facilitate the construction of the basement, being removed from site and not reused onsite.

6.5.5 Terrestrial Ecosystems

Based on information in Alliance (2024a), further assessment / management / remediation of terrestrial ecosystem exposure risks was considered warranted within data gaps due to inaccessible buildings and hardstand footprints.

Based on the revised proposed development plans, Alliance consider it likely that there will be some retention of existing flora species and open space areas to the southern portion of the site, where an ecological exposure pathway may be complete. On that basis, further assessment of terrestrial ecosystems is still considered warranted within portions of AECs outside of the proposed basement excavation footprint where existing flora species and open space areas are to be retained as discussed in **Table 6.6**. This assessment is also conditional on soils excavated to facilitate the construction of the basement, being removed from site and not reused onsite.

6.5.6 Groundwater

Based on information in Alliance (2024a), Alliance considers that further assessment of:

- Ecosystem protection;
- Aquaculture and human consumers of food;
- Agricultural water (irrigation and stock water);
- Recreation and aesthetics;
- Drinking water; and
- Industrial water.

as groundwater values, is not warranted.

6.6 Source, Pathway and Receptor Links

Based on:

- The identified sources of contamination associated with the locations of where potential land contaminating activities have been undertaken at the site (areas of environmental concern or AEC), and assessment works to attempt to delineate the extent of the source;
- The identified contaminants of potential concern (COPC) associated with those land contaminating activities;
- The receptors identified for the site, based on the proposed land use scenario;
- The exposure pathways between the identified sources and receptors that have been assessed as being potentially or actually complete,

a conceptual site model (CSM) that identifies plausible source-pathway-receptor linkages for the site, is presented **Table 6.6**. The areas of environmental concern, have been updated based on updated plans provided by the client, highlighting the addition of a (single level) basement, and that fill material excavated during the construction of this basement will be removed from site. If the plans are amended, further reassessment in the context of the objectives of this project will be required. As such, only areas outside the basement excavation footprint require consideration.

The locations of the AECs after consideration of the basement extent are presented in **Figure 6** and the proposed basement plan is presented in **Figure 5**.

Table 6.6 Source, Pathway and Receptor Links

ID	AEC	Land Contaminating Activity (Source)	COPC	Exposure Pathway	Receptor
AEC01	Site footprint (~7,618m^2 and ~0.6m thick)	Uncontrolled filling	Petroleum hydrocarbons, polycyclic aromatic hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos, anthropogenic materials	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Management limits Aesthetics Ecosystem uptake	Residents with accessible soil Residents limited access to soil Intrusive maintenance workers Terrestrial ecosystems
AEC02	Historical sheds (~3,322m^2 and ~0.6m thick)	Uncontrolled demolition; Use of hazardous building materials; and Historic termite treatment.	Pesticides, polychlorinated biphenyl, metals and asbestos.	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents limited access to soil Intrusive maintenance workers Terrestrial ecosystems
AEC08	Building 06 footprint (~200m^2 and ~0.3m thick)	Use of hazardous building materials; and Historic termite treatment.	Pesticides, polychlorinated biphenyl, metals and asbestos.	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents with limited access to soil Intrusive maintenance workers Terrestrial ecosystems
AEC09	Building 07 footprint (~200m^2 and ~0.3m thick)	Use of hazardous building materials; and Historic termite treatment.	Pesticides, polychlorinated biphenyl, metals and asbestos.	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents with limited access to soil Intrusive maintenance workers Terrestrial ecosystems

Table 6.6 Source, Pathway and Receptor Links

ID	AEC	Land Contaminating Activity (Source)	COPC	Exposure Pathway	Receptor
AEC10	Building 08 footprint (~200m^2 and ~0.1m thick)	Use of hazardous building materials; and Historic termite treatment.	Pesticides, polychlorinated biphenyl, metals and asbestos.	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents with limited access to soil Intrusive maintenance workers Terrestrial ecosystems
AEC11	Building 09 footprint (~120m^2 and ~0.3m thick)	Use of hazardous building materials; and Historic termite treatment.	Pesticides, polychlorinated biphenyl, metals and asbestos.	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents with limited access to soil Intrusive maintenance workers Terrestrial ecosystems
AEC12	Vehicle workshop footprint located in the rear of 213 Fitzgerald Avenue (65m^2)	Handling of petroleum storage Spills and leaks Use of hazardous building materials; and Historic termite treatment.	Petroleum hydrocarbons, BTEX, chlorinated hydrocarbons, PFAS. Metals, pesticides, asbestos, polychlorinated biphenyls	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents limited access to soil Intrusive maintenance workers Terrestrial ecosystems
AEC13	Shed Structure footprint (<10m^2)	Use of hazardous building materials; and Historic termite treatment.	Pesticides, polychlorinated biphenyl, metals and asbestos.	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents limited access to soil Intrusive maintenance workers Terrestrial ecosystems

Table 6.6 Source, Pathway and Receptor Links

ID	AEC	Land Contaminating Activity (Source)	COPC	Exposure Pathway	Receptor
AEC14	Shed Structure footprint (<10m^2)	Use of hazardous building materials; and Historic termite treatment.	Pesticides, polychlorinated biphenyl, metals and asbestos.	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents limited access to soil Intrusive maintenance workers Terrestrial ecosystems
AEC15	Shed Structure footprint (<10m^2)	Use of hazardous building materials; and Historic termite treatment.	Pesticides, polychlorinated biphenyl, metals and asbestos.	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents limited access to soil Intrusive maintenance workers Terrestrial ecosystems
AEC16	Shed Structure footprint (<10m^2)	Use of hazardous building materials; and Historic termite treatment.	Pesticides, polychlorinated biphenyl, metals and asbestos.	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents limited access to soil Intrusive maintenance workers Terrestrial ecosystems
AEC17	Shed Structure footprint (<10m^2)	Use of hazardous building materials; and Historic termite treatment.	Pesticides, polychlorinated biphenyl, metals and asbestos.	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents limited access to soil Intrusive maintenance workers Terrestrial ecosystems

Table 6.6 Source, Pathway and Receptor Links

ID	AEC	Land Contaminating Activity (Source)	COPC	Exposure Pathway	Receptor
AEC18	Shed Structure footprint (<10m^2)	Use of hazardous building materials; and Historic termite treatment.	Pesticides, polychlorinated biphenyl, metals and asbestos.	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents limited access to soil Intrusive maintenance workers Terrestrial ecosystems
AEC19	Shed Structure footprint (<10m^2)	Use of hazardous building materials; and Historic termite treatment.	Pesticides, polychlorinated biphenyl, metals and asbestos.	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents limited access to soil Intrusive maintenance workers Terrestrial ecosystems
AEC20	Shed Structure footprint (<10m^2)	Use of hazardous building materials; and Historic termite treatment.	Pesticides, polychlorinated biphenyl, metals and asbestos.	Dermal contact Soil Ingestion Dust inhalation Inhalation (asbestos) Aesthetics Ecosystem uptake	Residents with accessible soil Residents limited access to soil Intrusive maintenance workers Terrestrial ecosystems

7 Data Gap Analysis and Uncertainty

Based on a desktop review of previous reports referred to in **Section 4** and the development of the conceptual site model (CSM) presented in **Section 6.6**, Alliance has assessed that the following data gaps, in the context of site contamination characterisation and management, are present and need to be addressed prior to management or remediation:

- Previously inaccessible sampling points and AECs not completed due to access constraints and buildings and hardstand footprints need to be completed following demolition and removal of existing structures across the site; and
- Asbestos in soils assessment in accordance with guidance in NEPC (2013b) and WA DOH (2009) was not carried out due to soil sampling methods constrained by site accessibility.

Provision for addressing these data gaps is presented in **Section 8** of this RAP.

Figure 6 show the revised areas of environmental concern and **Figure 7** shows the location of proposed supplementary contamination assessment points (as set out in **Section 8.3.7**).

8 Supplementary Contamination Assessment (SCA)

8.1 Preamble

Supplementary contamination assessment (SCA) works will be undertaken, to address the data gaps identified in **Section 7** of this RAP. It is noted that some or all demolition works may need to be completed, before the proposed SCA works can be undertaken.

8.2 Objectives

The objectives of the SCA are to:

- Assess the potential for land contamination to be present in the areas of environmental concern (AEC) which contain data gaps;
- Assess whether identified potential land contamination in those data gap AECs, would present an unacceptable human health or ecological exposure risk, based on the proposed land use scenarios;
- Assess whether the site is suitable, in the context of land contamination, for the proposed land use scenarios; and
- Provide recommendations for further investigations, and management or remediation of land contamination (if warranted).

The work required to address these objectives, will be undertaken in the context of the proposed land use scenarios adopted for the site.

8.3 SCA Data Quality Objectives

The data quality objectives (DQO) and associated sampling and analysis quality plan (SAQP) for the SCA are presented in the following sub sections.

8.3.1 SCA - Step 1: State the problem

The reason the SCA works are being undertaken, is set out in **Section 8.1** of this report.

The objective of these SCA works is set out in **Section 8.2** of this report.

The project team and technical support experts identified for the project include the Alliance project director, Alliance project manager, Alliance field staff and Alliance's subcontractors.

The design and undertaking of these SCA works will be constrained by the client's financial and time budgets.

The regulatory authorities associated with these SCA works include NSW EPA, the local planning authority, NSW Department of Planning and Environment, and SafeWork NSW.

8.3.2 SCA - Step 2: Identify the decision / goal of the study

The decisions that need to be made during these SCA work, to address the project objectives, include:

- Is the data collected for the SCA works, suitable for assessing land contamination exposure risks?
- Do the detected concentrations of contaminants of potential concern identified in the CSM, present an unacceptable exposure risk to the receptors identified in the CSM, based on the proposed land use scenarios?
- Is the site suitable, in the context of land contamination, for the proposed land use scenarios?

8.3.3 SCA - Step 3: Identify the information inputs

The information inputs required to make the decisions for the project set out in **Section 8.3.2**, include:

- Data obtained during the site history review and site walkover;
- Field and laboratory analytical data from previous contamination assessments at site;
- Identification of sample media that needs to be collected, as set out in **Section 8.3.7.2**;
- Parameters that will be measured in each relevant sample, as set out in **Section 8.3.7.7**;
- The analytical methods required for each identified COPC, so that assessment can be made relative to adopted site criteria. These are set out in **Section 13.7** of this report; and
- The site criteria for the media of concern. These criteria are set out in **Table 13.3** and will be adopted based on the proposed land use scenario[7], identified receptors, and site specific soil conditions (where relevant).

8.3.4 SCA - Step 4: Define the boundaries of the study

The spatial extent of the project will be limited to:

- The boundaries of the site as set out in **Section 2**; and
- Physical constraints or infrastructure on site or on land adjacent to the site, that prevents safe and reasonable access for project team members and/or typical and readily available equipment used for projects of this nature.

The scale of the decisions required (as set out in **Section 8.3.2**) will be based on the boundaries of the site set out in **Section 2**.

The extents of SCA works will be limited to the distribution of contamination assessed in the CSM in **Section 6.6** (associated with the data gaps identified in **Section 7**), which are likely to be:

- The inferred vertical extent of the relevant, nominated AECs likely to be:
    - to the base of fill material in the relevant AECs; and

[7] The land use scenarios in Section 2.2 of NEPC (2013a) will be considered when adopting human health assessment criteria. The land use scenarios in Section 2.5 of NEPC (2013a) will be considered when adopting ecological assessment criteria.

  - to ~0.3m depth, below ground level (below building and structural footprints).
- The inferred lateral boundaries of each identified AEC.

The time and budget constraints of the SCA works will be as per those set out in the contract (and any subsequent variations to that contract) between the client and Alliance.

The temporal boundaries of the SCA works will include:

- Availability of project team members (including subcontractors and subconsultants) to collect and assess relevant project data;
- The availability of site access to undertake fieldwork; and
- Meteorological conditions including heat, cold, wind and rain, which may constrain undertaking of fieldwork, or may affect the quality of the data being collected.

8.3.5 SCA - Step 5: Develop the analytical approach

8.3.5.1 Field Duplicates and Triplicates

Field duplicates and triplicates will be collected and assessed in accordance with the procedures set out in **Section 13.5**.

8.3.5.2 Trip Spikes and Trip Blanks

Trip spikes and trip blanks used and assessed in accordance with the procedures set out in **Section 13.5**.

8.3.5.3 Equipment Rinsate Blanks

Equipment rinsate blanks will be collected and assessed in accordance with the procedures set out in **Section 13.5**.

8.3.5.4 Field Blanks

Field blanks will be collected and assessed in accordance with the procedures set out in **Section 13.5**.

8.3.5.5 Analytical Laboratory Quality Assurance and Quality Control

The primary analytical laboratory will:

- be NATA accredited for the methods used; and
- use a quality assurance and quality control (QA/QC) program that will typically include analysis of method blanks, matrix spikes, surrogate spikes, laboratory control samples and laboratory duplicates.

The primary analytical laboratory will report on whether the analytical results of the QA/QC program are within the criteria set out in the laboratory's adopted data quality objectives.

8.3.5.6 Data Quality Indicators

A set of data quality indicators (DQI) will be adopted for assessing the completeness, comparability, representativeness, precision and bias (accuracy) of data collected during fieldwork, the analytical data produced by the laboratory. Each of these DQI are set out in **Table 8.3.5.6**.

Table 8.3.5.6 Data Quality Indicators and Target Criteria

Completeness			
Field Considerations	***Target Criteria***	***Laboratory Considerations***	***Target Criteria***
Experienced sampling team used	Yes	Complete sample receipt advice and chain of custody attached	Yes
Sampling devices and equipment set out in sampling plan were used (refer **Section 8.3.7.2**).	Yes	Critical samples identified in sampling plan, analysed	Yes
Critical locations in sampling plan, sampled (refer **Section 8.3.7.2**).	Yes	Analysis undertaken addresses COPC in sampling plan (refer **Section 8.3.7.7**)	Yes
Critical samples in sampling plan, collected (refer **Section 8.3.7.2**).	Yes	Analytical methods reported in laboratory documentation and appropriate limit of reporting used	Yes
Completed field and calibration logs attached	Yes	Sample holding times met (refer **Section 8.3.7.8**)	Yes
Completed chain of custody attached	Yes		

Comparability			
Field Considerations	***Target Criteria***	***Laboratory Considerations***	***Target Criteria***
Same sampling team used for all work.	Yes	Same laboratory used for all analysis (refer **Section 8.3.7.6**).	Yes
Weather conditions suitable for sampling.	Yes	Comparable methods if different laboratories used (refer **Section 8.3.7.8**).	Yes
Same sample types collected and preserved in same way (refer **Section 8.3.7.2**).	Yes	Comparable limits of reporting if different laboratories used.	Yes
Relevant samples stored in insulated containers and chilled (refer **Section 8.3.7.5**).	Yes	Comparable units of measure if different laboratories have been used (refer **Section 8.3.7.8**).	Yes

Representativeness			
Field Considerations	***Target Criteria***	***Laboratory Considerations***	***Target Criteria***
Media identified in sampling plan, sampled (refer **Section 8.3.7.2**).	Yes	Samples identified in sampling plan, analysed.	Yes
Samples required by sampling plan, collected (refer **Section 8.3.7.2**).	Yes		

Precision			
Field Considerations	***Target Criteria***	***Laboratory Considerations***	***Target Criteria***
Minimum 5% duplicates and triplicates collected and analysed (refer **Section 8.3.5**).	Yes	All laboratory duplicate RPDs within laboratory acceptance criteria (refer **Section 8.3.5**).	Yes

Table 8.3.5.6 Data Quality Indicators and Target Criteria

Minimum 10% duplicates and triplicates collected and analysed where PFAS is a contaminant of concern (refer **Section 13.5)**.	Yes		
RPD unlimited where detected concentrations are <10 times the limit of reporting.	Yes		
RPD within 50% where detected concentrations are 10-20 times the limit of reporting.	Yes		
RPD within 30% where detected concentrations are >20 times the limit of reporting.	Yes		

Bias (Accuracy)			
Field Considerations	***Target Criteria***	***Laboratory Considerations***	***Target Criteria***
Trip blank analyte results less than limit of reporting (refer **Section 8.3.5**).	Yes	Laboratory method blank results within laboratory acceptance limits (refer **Section 8.3.5**).	Yes
Trip spike analyte results less between 60% and 140% (refer **Section 8.3.5**).	Yes	Laboratory control sample results within laboratory acceptance limits (refer **Section 8.3.5**).	Yes
Rinsate blank analyte results less than limit of reporting (refer **Section 8.3.5**).	Yes	Laboratory spike sample results within laboratory acceptance limits.	Yes
Field (PFAS) blank analyte results less than limit of reporting (refer **Section 8.3.5**).	Yes		

8.3.5.7 If / Then Statements

If the SCA field and laboratory analytical dataset meets the DQI target assessment criteria, then the data may be considered adequately complete, comparable, representative, precise and unbiased, for the purpose of addressing the decisions / goals of this project as set out in **Section 8.3.2**.

If the SCA field and laboratory analytical dataset does not meet the DQI target assessment criteria, then additional data may need to be collected to address gaps identified in the data.

If the SCA field and laboratory analytical results are within the adopted land contamination assessment criteria (refer **Section 13.3**), then it may be assessed that identified land contamination at the site does not present an unacceptable human health and/or ecological exposure risk.

If the SCA field and laboratory analytical results are outside adopted land contamination assessment criteria (refer **Section 13.3**), then it may be assessed that identified land contamination at the site presents an unacceptable human health and/or ecological exposure risk, or that supplementary site specific qualitative / quantitative risk assessment may be required.

If the statistical assessment of the relevant previous contamination assessment and SCA data indicate that the arithmetic average concentration of a specified contaminant, is unlikely to exceed an adopted screening criterion, then it may be assessed that the identified land contamination does not present an unacceptable human health and/or ecological exposure risk.

8.3.6 SCA Step 6: Performance and Acceptance Criteria

8.3.6.1 If / Then Decisions

There are two types of decision error:

- Sampling errors – these occur when the sampling program does not adequately detect variability of a contaminant from point to point across a site. That is, the samples collected are not representative of site conditions (e.g. an appropriate number of representative samples have not been collected from each stratum, to account for estimated variability in that contaminant); and
- Measurement errors - these occur during sample collection, preparation, analysis and reduction of data.

During land contamination assessment, these errors can result in either:

- a Type I error, where land contamination human health and/or ecological exposure risks are considered to be acceptable, when they are not acceptable; or
- a Type II error, where land contamination human health and/or ecological exposure risks are considered to be unacceptable, when they are acceptable.

For decision rules to be sound, they should be designed to mitigate risk of decision errors occurring. The risk of decision error on this project will be mitigated by:

- Ensuring fieldwork is undertaken by suitably experienced field staff and sub-contractors, with reference to the DQO adopted for this project;
- Ensuring laboratory analysis is undertaken by NATA accredited laboratories; and
- Ensuring assessment of field and laboratory analytical data is undertaken by suitably experienced environmental consultants and/or outsourcing assessment to technical experts (if warranted).

8.3.7 SCA Step 7: Develop the plan for obtaining data

8.3.7.1 Sampling Point Densities and Locations

Section 5.1 in NSW EPA (2022) provides guidance regarding probabilistic sampling and judgement sampling.

A probabilistic sampling design uses random selection that when properly applied, results in unbiased and independent data. For an optimal design, using probabilistic sampling, an accurate CSM is required, including a clear definition of the population to be sampled. Systematic grid based sampling is a probabilistic method.

A judgemental sampling design requires decisions on where and/or when to collect samples and relies on good site histories and/or site features being clear and distinct. The method can be efficient for assessing areas of worse case impacts and can be useful where site history is inadequate, or the features of concern are obscured or not discernible. Targeted sampling is a judgemental method. Section 6.2.1 in NEPC (2013b) advises that judgemental sampling and the selection of samples (number, location, timing, etc) should be based on knowledge of the site and professional judgement. In these instances, sampling would be expected to be localised to known or potentially contaminated areas identified from knowledge of the site either from the site history or an earlier phase of laned contamination assessment. Judgemental sampling can be used to investigate sub-surface contamination issues in site assessment.

Stratified sampling comprises a combination of systematic and judgemental sampling, for sites with different uses, features and complex contaminant distributions, where a site is divided into various non-overlapping sub areas, according to geological and geographical features. Each sub area can then be treated as an individual decision area with different sampling patterns and sampling densities applied. For example, on area might require targeted sampling while a neighbouring one might need systematic sampling.

A stratified sampling strategy requires reliable prior knowledge of the site. NEPC (2013b) notes that stratified sampling can provide

- potential for achieving greater precision in estimates of the mean and variance where the measurement of interest is strongly correlated with the variable used to define the strata; and
- calculation of reliable estimates for subgroups of special interest.

Table 2 in NSW EPA (2022) provides guidance on minimum sampling point densities required for characterising a site, based on detecting circular hot spots, by using a systematic sampling pattern.

Section 4.1 and Table 1 of WA DOH (2009) provides guidance on asbestos in soil sampling densities (in-situ and stockpiles), relative to the likelihood of asbestos being present on the site, based on assessment of site history.

Section 5.3 of HEPA (2020) requires site specific PFAS related sampling to take into account:

- the features of the surrounding land;
- that some environmental media act as temporary or permanent PFAS sinks, for example, PFAS concentrations in sediments in surface water bodies (including drainage lines) are important to consider when assessing contaminant transport via wastewater and surface water pathways; and
- other known or potential sources of PFAS contamination.

The scope of this project has included collection of data that provides an understanding of:

- site history;
- the locations of potentially contaminated areas;
- the identified COPC;
- laydown mechanisms for COPC in each AEC;
- the likely lateral and vertical extent of potential contamination in each AEC; and
- constraints on site which may restrict the use of certain sampling techniques.

On that basis, it is considered reasonable to adopt a combination of:

- systematic grid based sampling pattern; and
- a judgemental sampling pattern,

using the sampling point densities set out in **Table 8.3.7.1** and presented in **Figure 7.**

Sampling point densities for AEC01 and AEC02 are mainly to conclude on data gaps around asbestos in soils assessment at previous sampling locations undertaken within Alliance (2024a). Sampling point densities for all remaining AECs is to target footprints of structures following demolition and removal of hardstand areas.

A visual inspection of the ground surfaces will be completed following demolition of the structures and removal of hardstand to confirm if localised areas of impacted fill or sources of contamination are present.

The requirement for field screening for asbestos and analytical sampling of fill as detailed in **Table 8.3.7.7** should consider field observations and may be unnecessary in areas where minimal fill is encountered or is consistent with material encountered within adjacent sample locations.

Table 8.3.7.1 SCA Works Sampling Point Densities and Locations

ID	AEC	Sampling Point ID	Method	Target Depth (m bgl)
AEC01	Site footprint (~7,618m^2 and ~0.6m thick)	TP01-TP22	Test pit	0.9m, 0.3m into natural, or practical refusal
AEC02	Historical sheds (~3,322m^2 and ~0.6m thick)	TP01-TP11	Test pit	0.9m, 0.3m into natural, or practical refusal
AEC08	Building 06 footprint (~200m^2 and ~0.3m thick)	TP23-TP26	Test pit	0.6m, 0.3m into natural, or practical refusal
AEC09	Building 07 footprint (~200m^2 and ~0.3m thick)	TP17-TP27-TP29	Test pit	0.6m, 0.3m into natural, or practical refusal
AEC10	Building 08 footprint (~200m^2 and ~0.3m thick)	TP30-TP33	Test pit	0.6m, 0.3m into natural, or practical refusal
AEC11	Building 09 footprint (~120m^2 and ~0.3m thick)	TP34-TP35	Test pit	0.6m, 0.3m into natural, or practical refusal
AEC12	Vehicle workshop footprint located in the rear of 213 Fitzgerald Avenue (65m^2)	TP36-TP37	Test pit	0.6m, 0.3m into natural, or practical refusal
AEC13	Shed structure footprint (<10m^2)	TP38	Test pit	0.6m, 0.3m into natural, or practical refusal
AEC14	Shed structure footprint (<10m^2)	TP39	Test pit	0.6m, 0.3m into natural, or practical refusal
AEC15	Shed structure footprint (<10m^2)	TP40	Test pit	0.6m, 0.3m into natural, or practical refusal
AEC16	Shed structure footprint (<10m^2)	TP41	Test pit	0.6m, 0.3m into natural, or practical refusal
AEC17	Shed structure footprint(<10m^2)	TP42	Test pit	0.6m, 0.3m into natural, or practical refusal
AEC18	Shed structure footprint (<10m^2)	TP43	Test pit	0.6m, 0.3m into natural, or practical refusal
AEC19	Shed structure footprint (<10m^2)	TP44	Test pit	0.6m, 0.3m into natural, or practical refusal
AEC20	Shed structure footprint (<10m^2)	TP45	Test pit	0.6m, 0.3m into natural, or practical refusal

8.3.7.2 Sampling Methods

8.3.7.2.1 Soils

Soil samples will be collected from each relevant sampling point, at the surface at 0.0-0.1m or 0.0-0.15m, unless there is evidence of a thin surficial layer of contamination. Samples will then be collected at regular intervals thereafter (typically at depth intervals of no more than 0.5m), or where there is a change in lithology, or where there is visual/olfactory evidence of potential contamination. Samples will also typically be collected beneath the point where fill meets the underlying natural soil.

Samples requiring asbestos gravimetric screening for asbestos containing material (ACM) and fibrous asbestos (FA) will be 10L in volume and will be collected and screened with reference to Table 5 in WA DOH (2009), including but not limited to, separate samples for each stratum of fill material encountered during in-situ soil sampling.

Samples requiring asbestos fines (AF) and fibrous asbestos (FA) analysis, will be collected as separate samples to the aforementioned 10L bulk samples.

The following will be considered when sampling soils for the purpose of assessing ambient background concentrations of metals in soils:

- whether the background sampling area consists of similar soil types as the site or area of environmental concern (AEC); and
- collection and comparison of samples with soils and/or sediments from the same soil horizon layer.

Samples will be submitted to a NATA accredited laboratory for analysis.

8.3.7.3 Decontamination

Non-disposable sampling equipment will be decontaminated using the procedures set out in **Section 13.7** of this report.

8.3.7.4 Headspace Screening

Collected relevant soil samples will be subjected to headspace screening for ionisable volatile organic compounds, using the procedures set out in Section 13.7 of this report.

8.3.7.5 Sample Identification, Handling, Storage and Transport

Soil samples will be identified, handled, stored and transported using the procedures set out in **Section 13.7** of this report.

8.3.7.6 Selection of Laboratory

The analytical laboratories used for this project will reputable industry recognised environmental laboratories, that are NATA accredited for the analytical methods used.

8.3.7.7 Scheduling of Laboratory Analysis

Collected samples will be scheduled for laboratory analysis based on:

- The COPC identified for the AEC the sample was collected from;

- Observations made of the sample when collected (including staining, odour, presence of anthropogenic materials, and presence of potential asbestos containing materials);
- The results of sample headspace screening (if applicable); and
- The need for specific qualitative or quantitative data to inform assessment of risk associated with other laboratory analytical data (e.g. pH, cation exchange capacity, clay content, organic carbon content).

The laboratory analytical schedule (including upper limiting sample quantities) adopted for this project, is set out in **Table 8.3.7.7**.

Table 8.3.7.7 Schedule of Laboratory Analysis

ID	AEC	Sampling Point ID	TRH/BTEX	PAH	OCP	PCB	Metals (8)	Asbestos (0.001%)	PFAS	VOC
AEC01	Site footprint (~7,618m^2 and ~0.5m thick)	TP01-TP22	3	3	3	3	3	22	-	
AEC02	Historical sheds (~3,322m^2 and ~0.5m thick)	TP01-TP11	Included within AEC01							
AEC08	Building 06 (~200m^2 and ~0.3m thick)	TP23-TP26	-	-	4	4	4	4	-	
AEC09	Building 07 (~200m^2 and ~0.3m thick)	TP17-TP27-TP29	-	-	4	4	4	4	-	
AEC10	Building 08 (~200m^2 and ~0.3m thick)	TP30-TP33	-	-	4	4	4	4	-	
AEC11	Building 09 (~120m^2 and ~0.3m thick)	TP34-TP35	-	-	4	4	4	4	-	
AEC12	Vehicle workshop located in the rear of 213 Fitzgerald Avenue (65m^2)	TP36-TP37	2	2	2	2	2	2	2	2
AEC13	Shed Structure (<10m^2)	TP38	-	-	1	1	1	1	-	
AEC14	Shed Structure (<10m^2)	TP39	-	-	1	1	1	1	-	
AEC15	Shed Structure (<10m^2)	TP40	-	-	1	1	1	1	-	
AEC16	Shed Structure (<10m^2)	TP41	-	-	1	1	1	1	-	
AEC17	Shed Structure (<10m^2)	TP42	-	-	1	1	1	1	-	
AEC18	Shed Structure (<10m^2)	TP43	-	-	1	1	1	1	-	
AEC19	Shed Structure (<10m^2)	TP44	-	-	1	1	1	1	-	
AEC20	Shed Structure (<10m^2)	TP45	-	-	1	1	1	1	-	

8.3.7.8 Analytical Methods, Limits of Reporting and Holding Times

The analytical methods, limits of reporting and sample holding times adopted for this project, are set out in **Table 0.**

8.4 SCA - Data Assessment and Reporting

The findings of the supplementary contamination assessment will be presented as an addendum to this RAP. The RAP addendum report will include:

- An executive summary;
- The scope of work undertaken;
- Site identification details;
- Information on supplementary contamination assessment works undertaken;
- Field and laboratory analytical data;
- Field and laboratory data QA/QC assessment;
- Supplementary site contamination assessment and characterisation;
- Information on revised inferred unacceptable contamination extents (if any);
- Information on revised inferred remediation extents (if any);
- Information on the revised remedial strategy (if any);
- Information on revised validation strategy (if any);
- Information on revised site monitoring requirements (if any); and
- Conclusions and recommendations.

9 Remediation Objectives and Criteria

CRC CARE (2019c) defines a remediation objective as a site specific objective that relates solely to the reduction or control of unacceptable risks associated with one or more pollutant linkage.

The remediation objective is to remediate identified land contamination exposure risks to levels that do not present an unacceptable human health or ecological exposure risk, based on the proposed land use scenario for the site, which comprises:

- For ground floor units with outdoor courtyards and communal space including the children's playground and herb gardens - Residential with accessible soil, including garden with home grown produce contributing less than 10% fruit and vegetable intake (excluding home grown poultry and/or eggs), and includes children's day care centres, preschools and primary schools,
- For high density residential building footprints without outdoor courtyards - Residential with minimal opportunities for soil access including dwellings with fully and permanently paved yard space such as high-rise buildings and flats.

Subject to final landscaping plans for the proposed redevelopment scheme, consideration may need to be given to the less conservative 'Public open space' land use scenario for communal areas (as set out in Section 3.2.3 of NEPC (2013f).

It is noted that the client's preferred outcome at the completion of remedial works, is to not have:

- a covenant registered on the land title;
- a notation on a planning certificate for the site; and
- an environmental management plan (EMP) for the site.

It is acknowledged that Section 2.1.2 of NEPC (2013a) advises that:

- investigation and screening levels are not clean up levels or response levels nor are they desirable soil or water quality criteria; and
- the use of investigation and screening levels as default remediation criteria may result in unnecessary remediation and increased development costs, unnecessary disturbance to the site and local environment, and potential waste of landfill space.

However, in practice, the investigation and screening levels in NEPC (2013a) are often used as clean-up / remediation targets, because the assumptions on which those levels are based, can have general applicability for protection of certain land uses and there may not be a reason for varying from them.

The remediation assessment criteria that have been adopted for this project, and the basis/source of those criteria, are set out in **Table 13.3** of this RAP.

10 Remediation Extent and Options

10.1 Inferred Extent

It is noted that in Alliance (2024a) has not identified any unacceptable human health or ecological risks for the site. However, this may be subject to change as a result of the supplementary contamination assessment works (as proposed in **Section 8.3** of this RAP).

It is also noted that the results of the supplementary assessment may also require a change to the preferred management / remediation strategy, or even potentially remove the need for management / remediation. Should the inferred extents, preferred strategy or need for management / remediation change, based on supplementary assessment works, these changes would be presented in an addendum to this RAP, and be approved by the Site Auditor prior to the strategy being implemented.

10.2 Options Assessment

10.2.1 Preamble

When assessing management of contamination, the preferred hierarchy[8] of options for site clean-up and/or management should be considered, which includes:

- on-site treatment of the contamination so that it is destroyed, or the associated risk is reduced to an acceptable level; and
- off-site treatment of excavated soil so that the contamination is destroyed, or the associated risk is reduced to an acceptable level, after which the soil is returned to the site; or

if the above are not practicable;

- consolidation and isolation of the soil by on-site containment with a properly designed barrier; and
- removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material; or
- where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

Section 4.10 of SEPP (2021) states that a consenting authority cannot refuse development for category 1 remediation work unless the authority is satisfied that there would be a more significant risk to human health or some other aspect of the environment from carrying out of the work, than there would be from use of the concerned land (in the absence of any work) for any purpose for which it may be lawfully used.

[8] NEPC 2013, 'National Environment Protection (Assessment of Site Contamination) Measure 1999, Site Contamination Policy Framework, Section 6' dated May 2013

10.2.2 Remedial Options Selection and Assessment

Whilst Alliance (2024a) did not identify any unacceptable land contamination risks that would support the need for management or remediation of the site based on the proposed land use scenario, there are data gaps around inaccessible areas to be assessed following demolition and removal of hardstand, and therefore the extent of any remediation at the site is unknown.

Remedial options are conceptual only until the SCA is completed and an assessment on whether remediation is necessary.

11 Conceptual Remedial Options

Based on the current understanding of the proposed land use scenarios for the site, the client's preferred remedial outcomes for the site, and the commentary presented in **Section 10.2**, the conceptual remedial options for the site are presented in **Table 11.1**.

It is noted that the preferred remedial options are based on a qualitative assessment of a limited set of data. One or more of the preferred options may be subject to change, as a result of:

- Latent subsurface conditions, including unexpected finds;
- Temporal or seasonal fluctuations; and
- Supplementary contamination assessment works (as proposed in **Section 8.3** of this RAP).

It is also noted that the results of the supplementary assessment may also require a change to the preferred remedial options. Should this scenario arise, that change would be presented in an addendum to this RAP and approved by the Site Auditor prior to the strategy being implemented.

If unacceptable soil contamination is found during the SCA, the conceptual remedial options (set out in **Table 11.1**) may be implemented.

Table 11.1 Conceptual remedial options

Contamination Risk	Conceptual Remedial Option
TRH, BTEX, PAH, OC pesticides, PCB, PFAS and metals in soils across the site footprint	Excavate soils until validation sampling meets assessment criteria, and dispose to suitably licensed waste receiving facility, with a waste classification. Validate residual excavations in accordance with **Section 13**.
Asbestos fines in surface and fill soils across the site footprint	Excavate soils until validation sampling meets assessment criteria, and dispose to suitably licensed waste receiving facility, with a waste classification. Validate residual excavations in accordance with **Section 13.**
Bonded ACM in surface soils <0.1m below surface outside of proposed basement footprint	Works will be undertaken in a manner that avoids further damage or burial of the ACM by the process. Systematic inspection of surface and hand picking visible of ACM fragments. Rake surface soils in one direction, to a depth of 0.1m below ground level, using an excavator fitted with a tooth bucket. Systematic inspection of raked surface and hand picking of visible ACM fragments. Rake surface soils in a direction 90^{o} perpendicular to the first raking direction, to a depth of 0.1m below ground level, using an excavator fitted with a tooth bucket. Systematic inspection of raked surface and hand picking of visible ACM fragments, until validation sampling meets assessment criteria. ACM fragments will be disposed to a suitably licensed waste receiving facility, with a waste classification. This method (as opposed to hand raking) is proposed, to accommodate the physical properties of surface soils and presence of anthropogenic materials in the surface soils. Validate raked area in accordance with **Section 13**.
Bonded ACM in fill soils >0.1m below surface outside of proposed basement footprint	Works will be undertaken in a manner that avoids further damage or burial of the ACM by the process. Establish a treatment pad area.

Contamination Risk	Conceptual Remedial Option
	Staged excavation of fill soils and spreading across treatment pad to a thickness no greater than 0.1m. Systematic inspection of surface of spread material and picking of visible ACM fragments. Rake spread soils in one direction, using an excavator fitted with a tooth bucket. Systematic inspection of raked surface and picking of visible ACM fragments. Rake spread soils in a direction 90^{o} perpendicular to the first raking direction, using an excavator fitted with a tooth bucket. Systematic inspection of raked surface and hand picking of visible ACM fragments, until validation sampling meets assessment criteria. Reinstatement of treated soils >0.1m below finished surface. ACM fragments will be disposed to a suitably licensed waste receiving facility, with a waste classification. This method (as opposed to hand raking) is proposed, to accommodate the physical properties of soils and presence of anthropogenic materials in the surface soils. Validate residual excavations in accordance with **Section 13.**
Bonded ACM in surface or fill soils within the proposed basement footprint	Excavate soils until validation sampling meets assessment criteria, and dispose to suitably licensed waste receiving facility, with a waste classification. Validate residual excavations in accordance with **Section 13.**

12 Remedial Strategy

If unacceptable contamination is found during the SCA, the following remedial strategy may be implemented.

12.1 Schedule of Remediation

The extent of remedial works is currently unknown and requires completion of the SCA as detailed in **Section 8,** to inform a remediation schedule (if warranted).

12.2 Notifications and Approvals

A notification of intent to undertake remedial works (if required) will be submitted to the relevant planning authority, 30 days prior to the date that remedial works (excluding any supplementary contamination assessment works where proposed) are intended to commence.

Alliance understands that remedial works classified as Category 2 under State Environmental Planning Policy (SEPP) Hazards and Resilience (2021), do not require development consent. However, in the event that the proposed remedial works trigger the Category 1 criteria in the SEPP, including but not limited to issues related to:

- designated development under the Environmental Planning and Assessment Regulation;
- critical habitat under the Threatened Species Conservation Act;
- the works having a significant effect on a critical habitat, or threatened species, populations or ecological communities;
- the works being located in areas of environmental significance;
- requiring consent under another SEPP or a regional environmental plan (REP); or
- remediation work being carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any local government area in which the land is situated (or if the land is within the unincorporated area, the Minister),

then development consent for the remedial works may be required.

It is anticipated that remediation works that may plausibly be required on the site would be classified as Category 2. Advice on this matter will be sought from a suitably experienced planner, with a decision made on the Category 2 classification by the relevant planning consent authority.

The following information will be provided to the relevant planning authority, with the notice of intent to undertake remedial works:

- a copy of previous contamination assessment reports;
- a copy of this RAP;
- the contact details of the party responsible for ensuring remedial works comply with relevant regulatory requirements; and
- the contact details of the remediation contractor.

Occupants of properties adjoining the site and located immediately across the road from the site, will be provided with a notification of intent to undertake remedial works on the site, in accordance with **Section 16.3** of this RAP.

Development consent or a construction certificate will be obtained (if required) from the relevant planning authority for demolition, excavation and/or shoring works.

Demolition works (if required) will be undertaken by a contractor holding an appropriate SafeWork NSW demolition licence. That licence will hold a chemical endorsement, in the event that demolition works include an underground and/or aboveground storage tank.

Approvals will be obtained (if required) from NSW Roads and Maritime Services (RMS) for works being undertaken adjacent to (or on) RMS identified assets.

While considered unlikely in the context of this project:

- A water access licence will be obtained (if required) from Water NSW, in the event remediation works requires water to be taken at specified times, rates and circumstances from specified areas or locations.
- A water supply work and use approval will be obtained (if required) from Water NSW, in the event remediation works requires construction and use of a specific water supply at a specified location. Water supply works may include pumps, bores, spear points and wells.

Asbestos removal works (if required) will be notified to SafeWork NSW by the remediation contractor. The asbestos removal works will be undertaken by a contractor that will hold a:

- Class A licence for removal of friable asbestos / asbestos fines; and
- Class B licence for removal of bonded asbestos.

Within 30 days of completion of all remediation and validation works, a notice of completion of the remedial works will be submitted to the relevant planning authority.

12.3 Structural Stability

The stability of structures (including, but not necessarily limited to footings, walls, buildings and roads), which may be impacted by the proposed remedial works) will be assessed by a suitably experienced structural consultant before commencing remedial works. Recommendations made by the structural consultant will be incorporated by the remediation contractor, into the execution of all relevant site works.

12.4 Demolition Works

A hazardous materials survey will be prepared prior to demolition of structures. The survey will identify the location, nature and extent of all hazardous materials (including asbestos, lead, PCB and synthetic mineral fibres) in those structures.

Identified hazardous materials will be treated (where appropriate), removed from site, and a clearance certificate obtained from a licensed asbestos assessor and/or competent person, prior to commencing demolition of the structures. The clearance certificate will be prepared with reference to guidance provided in Appendix D of SafeWork NSW (2022).

The remediation contractor will retain records of the transport and disposal of demolition wastes (including hazardous materials), removed from the site.

12.5 Remedial Works

The conceptual remedial options (and associated methodologies) to be adopted for each of the identified AEC or potential contamination risks, are presented in **Section 11** of this RAP, and any addenda prepared for this RAP.

Remedial works will be undertaken by the remediation contractor with guidance provided by the appointed environmental consultant. The environmental consultant will assist the remediation contractor in setting out the inferred extents of remediation required, based on refined remedial extents set out in the supplementary contamination assessment report referred to in **Section 10**, and any subsequent addenda prepared for this RAP. The environmental consultant will provide guidance to the remediation contractor on:

- where to extend remedial works beyond the inferred extent (if observations indicate a need for 'chasing out' additional contamination); and
- when to stop remedial works, to allow validation works to be undertaken.

The remediation contractor will be responsible for:

- Coordinating right of way access through third party properties (as required) with the site owner and owners/tenants of third party properties;
- Site establishment, including stabilising of site access entry/exit points;
- Provision of worker amenities on site;
- Establishment of sediment and erosion controls;
- Establishing soil / sediment treatment areas, which may require localised minor earthworks to create cleared and 'flat' treatment pads;
- Mixing treated material back into onsite soils;
- Disposal of wastes to appropriately licensed facilities; and
- Retaining records of the transport and disposal of all wastes generated during remedial works.

12.6 Unexpected Finds, Unsuccessful Remedial Strategies and Contingency Plans

There is a degree of uncertainty inherent in site assessment and remediation works. Based on the site history information made available to Alliance prior to preparing this RAP, it is considered the unexpected scenarios identified in **Table 12.6** could occur during remedial works.

Contingency plans and protocols to be implemented, should those scenarios arise, are also presented in **Table 12.6**.

Table 12.6 Unexpected Finds, Unsuccessful Remedial Strategies and Contingency Plans

Unexpected Find Scenario / Unsuccessful Remedial Strategy	Contingency Plan
Change to proposed development design	Cease remedial works. Assess the change to proposed development design and note any deviations from the original plan.

Table 12.6 Unexpected Finds, Unsuccessful Remedial Strategies and Contingency Plans

Unexpected Find Scenario / Unsuccessful Remedial Strategy	Contingency Plan
	Assess the potential that these deviations may impact the remedial works/outcome, and if they are likely to adversely impact the remedial works/outcome, undertake the following: o Prepare revisions to the remedial design documents (if required); and o Prepare an addendum to the remediation and/or validation strategy in the RAP (if required). Obtain addendum endorsement from the Site Auditor before proceeding. If the deviations are not likely to impact the remedial works/outcome, continue with remedial works as per this RAP.
Potential asbestos containing materials encountered.	Cease remedial works. Consider undertaking intrusive soil investigations into and around the potential asbestos identified beyond the inferred remedial extent and assess whether the asbestos is bonded and/or friable. Assess whether the asbestos encountered still presents an unacceptable human health exposure risk. Submit notification to SafeWork NSW for asbestos removal works (if not already addressed in an existing notification). Prepare an addendum to the remediation and/or validation strategy in the RAP. Obtain addendum endorsement from the Site Auditor before proceeding. Remediate the unexpected contamination. Undertake validation of the remedial works.
Unexpected, buried contamination or underground structures encountered during remedial works (e.g. buried waste, underground storage tank, underground sump/pit).	Cease remedial works. Consider undertaking intrusive soil investigations into and around the unexpected find, to assess the potential nature and extent of the contamination / structure. Consider undertaking groundwater assessment works, if the potential nature and extent of the contamination / structures suggest a risk to groundwater. Assess whether the contamination encountered presents an unacceptable exposure risk to identified receptors. Prepare an addendum to the remediation and/or validation strategy in the RAP (if required), pending the outcomes of the soil and/or groundwater assessment works. Obtain addendum endorsement from the Site Auditor before proceeding. Remediate the unexpected contamination. Undertake validation of the remedial works.

12.7 Material Importation and Backfilling of Remedial Excavations

Should backfilling of remedial excavations be required, then backfill material being imported onto site will be lawful and will be limited to:

- Virgin excavated natural material (VENM);
- Excavated natural material (ENM); and
- Other materials that:
    - have been certified as compliant with an NSW EPA issued resource recovery exemption and the placement on the site is within the constraints of the resource recovery exemption; and
    - do not present an unacceptable human health or ecological exposure risk, in the context of the proposed land use scenario.

Material proposed for importing will be compatible with existing soil characteristics for site drainage purposes. Nominating engineering properties (compaction, density, moisture content) is not within the scope of this RAP and will be specified by others.

Certification of VENM, ENM, granular construction material (e.g. aggregates and backfill sands) or other approved resource recovery material, will be reviewed by the environmental consultant before the remediation contractor commences importing the material. Evidence of review of documentation by the consultant will be included in the validation report.

The remediation contractor will be responsible for:

- Inspecting every load of imported material for consistency with the material described in the relevant certification, including that the material is free of anthropogenic materials, odours or staining.
- Maintaining a record of inspection of each load; and
- Maintaining detailed records of all material imported to site, including details of the supplier/s, source of the material, quantity of the material, importing vehicle registration numbers, and dates/times the material is received on site, and placement location of imported material.

Evidence from the remediation contractor demonstrating that the above has been undertaken, will be included in the validation report.

If materials ae found to not conform with site requirements, those will be rejected for return to the source site or disposed off-site with a waste classification to a suitably licensed facility.

13 Site Validation Data Quality Objectives (DQO)

Appendix B in NEPC (2013b) provides guidance on the data quality objective (DQO) process, which is a seven step iterative planning approach that can be used to define the type, quantity and quality of data needed to inform decisions relating to land contamination risks at the site.

13.1 Step 1: State the problem

The reason the project is being undertaken, is set out in **Section 1.1** of this report.

The objective of this project is set out in **Section 1.2** of this report.

The project team and technical support experts identified for the project include the Alliance project director, Alliance project manager, Alliance field staff and Alliance's subcontractors.

The design and undertaking of this project will be constrained by the client's financial and time budgets.

The regulatory authorities associated with this project include NSW EPA, the local planning authority, the Department of Planning and Environment and SafeWork NSW.

13.2 Step 2: Identify the decision / goal of the study

The decisions that need to be made during this project, to address the project objectives, include:

- Is the data collected for the project, suitable for assessing land contamination exposure risks?
- Do the detected concentrations of contaminants of potential concern identified in the CSM, present an unacceptable exposure risk to the receptors identified in the CSM, based on the proposed land use scenario?
- Has the remediation objective been achieved?
- Is the site suitable, in the context of land contamination, for the proposed land use scenario?

13.3 Step 3: Identify the information inputs

The information inputs required to make the decisions for the project set out in **Section 13.2**, include:

- Data obtained during the site history review, site walkover and remediation works observations;
- Records produced by the remediation contractor and other relevant 3rd parties, during the undertaking of remediation works;
- Identification of sample media that needs to be collected, as set out in **Section 13.7**;
- Parameters that will be measured in each relevant sample, as set out in **Section 13.7**;
- The analytical methods required for each identified COPC, so that assessment can be made relative to adopted site criteria. These are set out in **Section 13.7** of this report; and

- The site criteria for the media of concern. These criteria are set out in **Table 13.3** and will be adopted based on the proposed land use scenario[9], identified receptors, and site specific soil and groundwater conditions (where relevant).

Table 13.3 Adopted Remediation Assessment Screening Criteria

Exposure Pathway	Land Use Scenario[10]	Criteria Reference
Human health dermal contact / ingestion / dust inhalation	HIL A - Residential with accessible soil HIL B - Residential with minimal opportunities for soil access	Table 1A (1) in NEPC (2013a) Table 1A (3) in NEPC (2013a) Table B4 in Friebel, E & Nadebaum P (2011) US EPA Regional Screening Levels (RSLs) – Generic Tables for resident soil and composite worker soil[11] Table 2 in HEPA (2020)
Human health (asbestos)	Residential A Residential B	Table 7 in NEPC (2013a)[12]
Human health (aesthetics)	All	Characteristics and processes in Section 3.6.2 and 3.6.3 in NEPC (2013a)
Ecological	Urban residential / public open space	Table 1B (1) in NEPC (2013a) Table 1B (2) in NEPC (2013a) Table 1B (3) in NEPC (2013a) Table 1B (4) in NEPC (2013a) Table 1B (5) in NEPC (2013a) Table 1B (6) in NEPC (2013a)
Management Limits (petroleum hydrocarbons)	Residential, parkland and public open space	Table 1B (7) in NEPC (2013a)

[9] The land use scenarios in Section 2.2 of NEPC (2013a) will be considered when adopting human health assessment criteria. The land use scenarios in Section 2.5 of NEPC (2013a) will be considered when adopting ecological assessment criteria.
[10] Consideration will be given to soil type, soil texture, soil depth.
[11] The US EPA RSLs will be used for chlorinated hydrocarbon health screening levels as an initial screening criteria. The generic tables for residents use a target hazard quotient of 1 and a target risk of 10^{-6}. Alliance note that NEPM health screening criteria was derived using a target risk of 10^{-5} and a target hazard quotient of 1 and as such, the RSL calculator will be used to derive project specific health screening levels for relevant chlorinated hydrocarbons using a target risk of 10^{-5} and a target hazard quotient of 1 for the resident and composite worker. Exposure days per year and number of years will be adjusted to meet with the relevant NEPM land use.
[12] A depth of up to 10cm below ground level is adopted to define 'surface soil'.

13.4 Step 4: Define the boundaries of the study

The spatial extent of the project will be limited to:

- The boundaries of the site as set out in **Section 2**; and
- Physical constraints or infrastructure on site or on land adjacent to the site, that prevents safe and reasonable access for project team members and/or typical and readily available equipment used for projects of this nature.

The scale of the decisions required (as set out in **Section 13.2**) will be based on the boundaries of the site set out in **Section 2**.

The vertical and lateral extents of validation works will be limited to the extents of remediation works undertaken on relevant AECs identified in the CSM (refer **Section 6.6**), which are currently unknown, and are to be informed by the outcome of the SCA proposed in **Section 8**, but are likely to be:

- The inferred vertical extent of the relevant, nominated AECs likely to be:
    - To the base of fill material in the relevant AECs;
    - To ~0.3m depth, below ground level (below building and structural footprints); and
- The inferred lateral boundaries of each identified AEC.

The time and budget constraints of this project will be as per those set out in the contract (and any subsequent variations to that contract) between the client and Alliance.

The temporal boundaries of the project will include:

- Availability of project team members (including subcontractors and subconsultants) to collect and assess relevant project data;
- The availability of site access to undertake fieldwork; and
- Meteorological conditions including heat, cold, wind and rain, which may constrain undertaking of fieldwork, or may affect the quality of the data being collected.

13.5 Step 5: Develop the analytical approach

13.5.1 Field Duplicates and Triplicates

A minimum of one set of field duplicates and triplicates will be collected for each set of 20 samples collected (an equivalent of 5%), excluding asbestos samples.

Where PFAS is a contaminant of concern, a minimum of one set of field duplicates and triplicates will be collected for each set of 10 samples collected (an equivalent of 10%).

Field duplicate and triplicate samples will be collected by splitting one bulk sample across three separate sample containers. Soil samples will not be homogenised, particularly where volatile or semi volatile COPC are being considered.

Analysis of the duplicate samples and triplicate samples will be scheduled based on at least one of the analytes that the relevant parent sample is being analysed for.

The relative percent difference (RPD) of the detected concentrations in the parent and duplicate, and the parent and triplicate, will be calculated, and the result compared to the relevant data quality indicator (DQI), as set out in **Section 13.5.5**.

13.5.2 Trip Spikes and Trip Blanks

One trip spike and one trip blank will be used for each day of sampling[13].

A minimum of one trip spike and one trip blank will be scheduled for BTEX analysis, during the project, provided the sample preservation, handling, transport and storage procedures used are the same for each day of sampling undertaken.

13.5.3 Equipment Rinsate Blanks

One rinsate blank will be used for each day of sampling[14].

One rinsate blank will be collected for every 10 primary samples collected, when PFAS is a contaminant of potential concern.

A minimum of one rinsate blank will be scheduled for analysis for at least one of the COPC, during the project, provided sample collection and equipment decontamination procedures are the same for each day of sampling.

Analysis of the rinsate blank will be based on at least one of the analytes that the parent sample is being analysed for (excluding asbestos).

13.5.4 Analytical Laboratory Quality Assurance and Quality Control

The primary analytical laboratory will:

- be NATA accredited for the methods used; and
- use a quality assurance and quality control (QA/QC) program that will typically include analysis of method blanks, matrix spikes, surrogate spikes, laboratory control samples and laboratory duplicates.

The primary analytical laboratory will report on whether the analytical results of the QA/QC program are within the criteria set out in the laboratory's adopted data quality objectives.

[13] When samples are being collected on that day, that will be analysed for BTEX and/or TRH C_6-C_{10}.
[14] Only where non-disposable sampling equipment is being used on that day.

13.5.5 Data Quality Indicators

A set of data quality indicators (DQI) will be adopted for assessing the completeness, comparability, representativeness, precision and bias (accuracy) of data collected during fieldwork, the analytical data produced by the laboratory. Each of these DQI, and associated target criteria are set out in **Table 13.5.5**.

Table 13.5.5. Data Quality Indicators and Target Criteria

Completeness			
Field Considerations	***Target Criteria***	***Laboratory Considerations***	***Target Criteria***
Experienced sampling team used	Yes	Complete sample receipt advice and chain of custody attached	Yes
Sampling devices and equipment set out in sampling plan were used (refer **Section 13.7**).	Yes	Critical samples identified in sampling plan, analysed	Yes
Critical locations in sampling plan, sampled (refer **Section 13.7**).	Yes	Analysis undertaken addresses COPC in sampling plan (refer **Section 13.7**)	Yes
Critical samples in sampling plan, collected (refer **Section 13.7**).	Yes	Analytical methods reported in laboratory documentation and appropriate limit of reporting used	Yes
Completed field and calibration logs attached	Yes	Sample holding times met (refer **Section 13.7**)	Yes
Completed chain of custody attached	Yes		

Comparability			
Field Considerations	***Target Criteria***	***Laboratory Considerations***	***Target Criteria***
Same sampling team used for all work.	Yes	Same laboratory used for all analysis (refer **Section 13.7**).	Yes
Weather conditions suitable for sampling.	Yes	Comparable methods if different laboratories used (refer **Section 13.7**).	Yes
Same sample types collected and preserved in same way (refer **Section 13.7**).	Yes	Comparable limits of reporting if different laboratories used.	Yes
Relevant samples stored in insulated containers and chilled (refer **Section 13.7**).	Yes	Comparable units of measure if different laboratories have been used (refer **Section 13.7**).	Yes

Representativeness			
Field Considerations	***Target Criteria***	***Laboratory Considerations***	***Target Criteria***
Media identified in sampling plan, sampled (refer **Section 13.7**).	Yes	Samples identified in sampling plan, analysed.	Yes
Samples required by sampling plan, collected (refer **Section 13.7**).	Yes		

Precision

Table 13.5.5. Data Quality Indicators and Target Criteria

Field Considerations	***Target Criteria***	***Laboratory Considerations***	***Target Criteria***
Minimum 5% duplicates and triplicates collected and analysed (refer **Section 13.5**).	Yes	All laboratory duplicate RPDs within laboratory acceptance criteria (refer **Section 13.5**).	Yes
Minimum 10% duplicates and triplicates collected and analysed where PFAS is a contaminant of concern (refer **Section 13.5)**.	Yes		
RPD unlimited where detected concentrations are <10 times the limit of reporting.	Yes		
RPD within 50% where detected concentrations are 10-20 times the limit of reporting.	Yes		
RPD within 30% where detected concentrations are >20 times the limit of reporting.	Yes		

Bias (Accuracy)			
Field Considerations	***Target Criteria***	***Laboratory Considerations***	***Target Criteria***
Trip blank analyte results less than limit of reporting (refer **Section 13.5**).	Yes	Laboratory method blank results within laboratory acceptance limits (refer Section 13.5).	Yes
Trip spike analyte results less between 60% and 140% (refer **Section 13.5**).	Yes	Laboratory control sample results within laboratory acceptance limits (refer Section 13.5).	Yes
Rinsate blank analyte results less than limit of reporting (refer **Section 13.5**).	Yes	Laboratory spike sample results within laboratory acceptance limits.	Yes
Field (PFAS) blank analyte results less than limit of reporting (refer **Section 13.5**).	Yes		

13.5.6 If / Then Statements

If the field and laboratory analytical dataset meets the DQI target assessment criteria, then the data may be considered adequately complete, comparable, representative, precise and unbiased, for the purpose of addressing the decisions / goals of this project as set out in **Section 13.2**.

If the field and laboratory analytical dataset does not meet the DQI target assessment criteria, then additional data may need to be collected to address gaps identified in the data.

If the field and laboratory analytical results are within the adopted land contamination assessment criteria (refer **Section 13.3**), then it may be assessed that the remediation objective has been achieved, and that the site does not present an unacceptable human health and/or ecological exposure risk, based on the adopted land use scenario.

If the field and laboratory analytical results are outside adopted land contamination assessment criteria (refer **Section 13.3**), then it may be assessed that the remediation objective has not been achieved and that identified land contamination at the site presents an unacceptable human health and/or ecological exposure risk, and that further contamination management / remediation work is required.

13.6 Step 6: Performance and Acceptance Criteria

13.6.1 If / The Decisions

There are two types of decision error:

- Sampling errors – these occur when the sampling program does not adequately detect variability of a contaminant from point to point across a site. That is, the samples collected are not representative of site conditions (e.g. an appropriate number of representative samples have not been collected from each stratum to account for estimated variability in that contaminant); and
- Measurement errors - these occur during sample collection, preparation, analysis and reduction of data.

During land contamination assessment, these errors can result in either:

- a Type I error, where land contamination human health and/or ecological exposure risks are considered to be acceptable, when they are not acceptable; or
- a Type II error, where land contamination human health and/or ecological exposure risks are considered to be unacceptable, when they are acceptable.

For decision rules to be sound, they should be designed to mitigate risk of decision errors occurring. The risk of decision error on this project will be mitigated by:

- Ensuring fieldwork is undertaken by suitably experienced field staff and sub-contractors, with reference to the DQO adopted for this project;
- Ensuring laboratory analysis is undertaken by NATA accredited laboratories; and
- Ensuring assessment of field and laboratory analytical data is undertaken by suitably experienced environmental consultants and/or outsourcing assessment to technical experts (if warranted).

13.7 Step 7: Develop the plan for obtaining data

13.7.1 Sampling Point Densities and Locations

Section 5.5 in NSW EPA (2022) provides guidance regarding validation sampling.

Section 7.5 of NEPC (2013b) and Table 3, Table 4 and Table 5 in NSW EPA (2022) provides guidance on sampling point densities, sampling methods and sample quantities for stockpiles.

Section 4.1 and Table 1 of WA DOH (2009) provides guidance on asbestos in soil sampling densities (in-situ and stockpiles), relative to the likelihood of asbestos being present on the site, based on assessment of site history.

The scope of this project has included collection of data that provides an understanding of:

- site history;
- the locations of potentially contaminated areas;
- the identified COPC;
- laydown mechanisms for COPC in each AEC;
- the likely lateral and vertical extent of potential contamination in each AEC; and
- constraints on site which may restrict the use of certain sampling techniques.

On that basis, it is considered reasonable to adopt a mixture of

- systematic grid based sampling pattern; and
- a judgemental sampling pattern

using the preferred sampling point densities set out in **Table 13.7.1**.

In the event unacceptable contamination risks are identified in those AECs being subjected to supplementary contamination assessment works and they are remediated, then conceptual validation strategies to address the COPCs being potentially being remediated in those AECs, are presented in **Table 13.7.1.**1

Table 13.7.1.1 Validation Strategies (if required)

ID	Contamination Risk	Preferred Validation Strategy
-	Friable Asbestos (FA/AF)	A visual assessment of the residual remediation area and photographic record. Visual validation of excavation base and walls, and collection of: • one sample per 5 m x 5 m (25 m^2) of excavation base, minimum of two; and • one sample per five lineal metres of excavation wall, if greater than 0.1 m for each relevant stratum, or per vertical metre of excavation depth, whichever is greater. Laboratory analysis of all samples for Asbestos 500 ml (WA 0.001% w/w). Clearance certificate from an LAA.
-	Surface soils (top 10cm) with asbestos containing materials	Works will be undertaken in a manner that avoids further damage or burial of the ACM in the process. A visual assessment from each phase of raking works. A visual assessment of the residual footprint following removal and photographic record. Clearance certificate from a licenced asbestos assessor (LAA) or competent person. If visual evidence of construction or demolition waste is observed in surface soils that have been remediated for visible asbestos, validation will include collection of one 10L sample per 5m x 5m (25 m^2) of area remediated for bonded ACM field screening.
-	Bonded Asbestos (ACM) deeper than surface soils (below 10cm)	A visual assessment of the residual remediation excavation footprint and photographic record. A visual inspection of each batch of treated material. Collect one representative 10L sample per spread or per 70m^3 of treated material for bonded ACM field screening Visual validation of excavation base and walls if exposed natural material, otherwise collect: • one 10L sample per 5m x 5m of excavation base; and • one 10L sample per ten lineal metres of excavation wall, for each relevant stratum, or per vertical metre of excavation depth, whichever is greater, minimum four. for bonded ACM field screening. Clearance certificate from a licensed asbestos assessor (LAA) or competent person.
-	Chemical Contaminants	A visual assessment of the residual remediation area and photographic record. Visual validation of excavation base and walls, and collection of • one sample per 5 m x 5 m (25 m^2) of excavation base, minimum of two; and • one sample per five lineal metres of excavation wall, if greater than 0.1 m for each relevant stratum, or per vertical metre of excavation depth, whichever is greater. Laboratory analysis of all samples for COPC

Table 13.7.1.1 Validation Strategies (if required)

ID	Contamination Risk	Preferred Validation Strategy
Imported VENM for backfilling	Site specific	VENM to be validated using the procedures set out in https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/virgin-excavated-natural-material Visual assessment (by a suitably experienced person) of materials upon delivery to site to assess consistency with the material in the supply documentation, confirm free of anthropogenic indicators of contamination (based on professional judgement using criteria set out in **Table 13.3** for aesthetics risk) and are consistent with material description provided in the reviewed certification report. Refer to **Section 0** for non-conforming materials.
Imported ENM for backfilling	Refer The excavated natural material 2014 Order and Exemption and asbestos	Quantity dependent – refer to The excavated natural material (ENM) resource recovery exemption. Gravimetric assessment of samples for bonded asbestos. Laboratory analysis of all samples as per Order and Exemption, and asbestos (0.001% w/w). Visual assessment (by a suitably experienced person) of materials upon delivery to site to assess consistency with the material in the supply documentation, confirm free of anthropogenic indicators of contamination (based on professional judgement using criteria set out in **Table 13.3** for aesthetics risk) and are consistent with material description provided in the reviewed certification report. Refer to **Section 0** for non-conforming materials.
Imported Other for backfilling	Refer relevant Order and Exemption and asbestos	Quantity dependent – refer to the relevant resource recovery exemption. Gravimetric assessment of samples for bonded asbestos. Laboratory analysis of all samples as per Order and Exemption, and asbestos (0.001% w/w). Visual assessment (by a suitably experienced person) of materials upon delivery to site to assess consistency with the material in the supply documentation, confirm free of anthropogenic indicators of contamination (based on professional judgement using criteria set out in **Table 13.3** for aesthetic risk) and are consistent with material description provided in the reviewed certification report. Refer to **Section 0** for non-conforming materials.

Table 13.7.1.1 Validation Strategies (if required)

ID	Contamination Risk	Preferred Validation Strategy
Imported landscaping / topsoil material including recycled materials	TRH, PAH, asbestos, OCP and metals (8)	Product supply documentation to be provided to the environmental consultant prior to import, including supplier certification required to assess imported landscaping materials are consistent with the relevant requirements of AS4419 (2003) and NSW EPA 2024 'Contaminated Mulch Management Plan' dated March 2024, ref: EPA2024P4500. Sampling to be undertaken with reference to Table 2, Table 3 and Table 4 of NSW EPA (2022). Gravimetric assessment of samples for bonded asbestos. Laboratory analysis of all samples, including asbestos (0.001% w/w). Visual assessment (by a suitably experienced person) of materials upon delivery to site to assess consistency with the material in the supply documentation and confirm free of anthropogenic indicators of contamination (based on professional judgement using criteria set out in **Table 13.3** for aesthetic risk). Refer to **Section 0** for non-conforming materials.

13.7.2 Sampling Methods

13.7.2.1 Soils

Soil samples will be collected from each relevant sampling point, at the surface at 0.0-0.1m or 0.0-0.15m, unless there is evidence of a thin surficial layer of contamination. Samples will then be collected at regular intervals thereafter (typically at depth intervals of no more than 0.5m), or where there is a change in lithology, or where there is visual/olfactory evidence of potential contamination. Samples will also typically be collected beneath the point where fill meets the underlying natural soil.

Samples collected from excavation bases and footprints, will typically be collected across a depth of 0.0-0.1m below the surface.

Samples collected from excavation walls will typically be collected across a profile 0.1 to 0.2m in thickness and will target suspect material based on visual and/or olfactory observations.

Samples requiring asbestos gravimetric screening will be 10L in volume, with sampling targeting suspect asbestos material or construction debris, and screened with reference to Table 5 in WA DOH (2009).

Samples requiring calculation of asbestos fines (AF) and fibrous asbestos (FA), with sampling targeting suspect asbestos material or construction debris, and collected as separate samples to the 10L bulk samples.

If olfactory or visual observations of remedial works, or headspace analysis of screening samples, indicate a potential for contamination to be present, then consideration will be given to collection of additional validation samples / data.

The location of collected validation sampling data will be recorded on a site plan.

Samples will be submitted to a NATA accredited laboratory for analysis.

13.7.3 Decontamination

Non-disposable sampling equipment will be decontaminated between sampling points to mitigate potential for cross contamination of samples. Decontamination will include the following procedure:

- Washing off the non-disposable sampling equipment with a solution of potable water and phosphate free detergent (e.g. Decon 90), noting that Decon 90 will not be used on equipment used for collection of samples that will be analysed for PFAS compounds;
- Rinsing the washed equipment with distilled or de-ionised water; and
- Air drying of the rinsed equipment.

13.7.4 Headspace Screening

When COPC identified for the site include volatiles (e.g. BTEX, TRH or VOC), collected soil samples will be subjected to headspace screening for ionisable volatile organic compounds, using a calibrated photo-ionisation detector (PID) fitted with a 10.6 eV lamp. A sub sample from each collected sample will be placed in a zip lock bag, sealed, and shaken. Each zip lock bag will then be pierced with the tip of a PID, and the results recorded on the relevant sampling point borehole or test pit log.

13.7.5 Sample Identification, Handling, Storage and Transport

Soil samples will be identified using the relevant Alliance project number, the sampling point identification number and the sampling depth interval (e.g. BH01/0.0-0.2 or TP05/0.5-0.7), and date the sample was collected.

Samples will be placed in laboratory prepared containers (containing preservatives as appropriate), bulk sample bags and zip lock bags. Soil and water samples will be stored in insulated containers with ice.

Samples will be transported to the relevant analytical laboratory by Alliance or a third party courier, using chain of custody (COC) documentation.

13.7.6 Selection of Laboratory

The analytical laboratories used for this project will reputable industry recognised environmental laboratories, that are NATA accredited for the analytical methods used.

13.7.7 Scheduling of Laboratory Analysis

Collected samples will be scheduled for laboratory analysis based on:

- The COPC identified for the AEC the sample was collected from;
- Observations made of the sample when collected (including staining, odour, presence of anthropogenic materials, and presence of potential asbestos containing materials);
- The results of sample headspace screening (if applicable); and
- The need for specific qualitative or quantitative data to inform assessment of risk associated with other laboratory analytical data (e.g. pH, cation exchange capacity, clay content, organic carbon content).

The laboratory analytical schedule adopted for this project for the conceptual remedial works, is set out in **Table 13.7.7.1**.

Table 13.7.7.1 Schedule of Laboratory Analysis for Conceptual Remediation

ID	AEC	Analytes (TRH/BTEX, PAH, OCP, PCB, Metals (8), Asbestos)
-	Excavations impacted with friable asbestos / asbestos fines	All samples for asbestos (0.001%w/w)
-	Excavations impacted with chemical contaminant/s	All samples for asbestos (0.001%w/w), TRH/BTEX. PAH, OCP, PCB, metals (8) VOCs and PFAS (AEC12 only)
-	Virgin excavated natural material	All samples for relevant contaminants of concern, based on guidance presented in https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/virgin-excavated-natural-material
-	Excavated natural material	All samples for the chemicals and attributes in Table 4 of The excavated natural material Order 2014 and asbestos (0.001%w/w).
-	Other imported material	All samples for the relevant chemicals and attributes in the relevant resource recovery order and asbestos (ACM 10L field screening and 0.001% w/w laboratory analysis).
-	Mulch	All samples for the requirements of the Mulch Order 2016, and asbestos (ACM 10L field screening and 0.001% w/w laboratory analysis).
-	Imported landscaping material	Relevant samples by supplier as per AS4419 (2003). Validation samples by environmental consultant for OCP, metals (8) and asbestos (ACM 10L field screening, and AF 0.001% w/w laboratory analysis)

13.7.8 Analytical Methods, Limits of Reporting and Holding Times

The analytical methods, limits of reporting and sample holding times adopted for this project, are set out in **Table 0.**

Table 0 Analytical Methods, Limits of Reporting and Holding Times

Analyte	Method	Limit of Reporting (mg/kg)	Limit of Reporting (µg/L)	Limit of Reporting (ug/m^3)	Holding Time
BTEX and TRH C_6-C_{10}	USEPA 5030, 8260B and 8020	0.2-0.5	1-2 and 50	-	14 days
TRH C_{10}-C_{40}	USEPA 8015B & C	20-100	50-500	-	14 days
VOC	USEPA 8260 / US EPA TO15	0.1-0.5	-	1.5-50	14 days
PAH	USEPA 8270	0.1-0.2	0.5-10	-	14 days
PCB	USEPA 8270	0.2	-	-	14 days
OCP	USEPA 8081	0.2	-	-	14 days
Metals	USEPA 6010, 6020	0.4-5	0.0002-0.001	-	6 months
Metals (Hg and Cr^{vi})	USEPA 8015B & C	0.05-2	0.1-5	-	6 months (28 days)
PFAS Extended Suite	In house based on USEPA 537 V1.1	5 µg/kg	0.01-0.05		14 days (soils) 28 days (waters)
Asbestos ID	AS4926	Absence / presence	-	-	No limit
Asbestos (WA DOH)	Inhouse	0.001% w/w	-	-	No limit

14 Site Remediation and Validation Report

At the completion of remedial works, a site remediation and validation report will be prepared with reference to the relevant sections of NSW EPA (2020b) The site remediation and validation report will include:

- An executive summary;
- The scope of reporting work undertaken;
- Site identification details;
- A summary of geology and hydrogeology;
- A summary of site condition and the surrounding environment;
- Information on supplementary contamination assessment works undertaken (if any);
- A pre-remediation conceptual site model;
- Summary of the remedial action plan;
- Remediation and validation activities undertaken;
- Information on waste management;
- Information on the remedial works undertaken;
- Information on imported material;
- An assessment of field and laboratory quality assurance / quality control data;
- Validation results and discussion;
- A post remediation conceptual site model; and
- Conclusions and recommendations.

15 Environmental Management Plan (Post Remediation)

Alliance noes that the SEARs for the project require a long term environmental management plan be provided. On the basis that preferred conceptual remedial options do not involve managing residual contamination on site, an environmental management plan is considered not required. However, should the SCA works involve a change in remedial strategy that warrants the need for an EMP, then the validation of the site as suitable for the proposed land will be contingent upon the implementation of the EMP by future site users. Should an EMP be required, then it will be prepared with reference to the relevant sections of NSW EPA (2020b), and include the following:

- The purpose of the EMP, including the reason for it and time period of the EMP;
- How the plan will be made legally enforceable (subject to opinion of the local consent authority);
- Whether the environmental management plan is active or passive;
- Parties responsible for implementation and review/maintenance of the plan and their tasks;
- Where the plan will be recorded;
- Background site identification (including street number, street name and suburb, lot and Deposited Plan number, co-ordinates, locality map, site survey plan), site owner, local government area, consent authority and site zoning (current and future);
- Site history as it relates to the existing site contamination which requires management;
- Current / future site use and layout (relevant to the environmental management plan);
- A description of existing / residual contamination;
- Management activities associated with the EMP, including procedures, responsibilities, monitoring requirements, reporting requirements, communication protocol and contingency plans;
- Inspection, maintenance, environmental sampling, analysis and reporting requirements (if applicable);
- Monitoring and review procedures for the EMP; and
- Communication and stakeholder notification arrangements and procedures.

A draft of the EMP will be submitted to the appointed NSW EPA Site Auditor for review and endorsement.

16 Site Management Plan

16.1 Register of Contacts

A register of contact details of stakeholders considered relevant to the project, is presented in **Table 16.1**.

Table 16.1 Register of Contacts

Role	Person	Stakeholder	Contact
Emergency Services	-	Police / Fire Ambulance	000
Site Owner	-	New South Wales Land and Housing Corporation	-
Project Owner	Naoise Gogan	New South Wales Land and Housing Corporation	0411 965 683
Planning Authority	-	City of Randwick Council	1300 722 542
WHS Regulatory Authority	-	SafeWork NSW	131 050
Environmental Regulatory Authority	-	NSW EPA	131 500
Remediation Contractor	To be confirmed (if warranted)	To be confirmed (if warranted)	To be confirmed (if warranted)
Environmental Consultant	Samuel Willis	Alliance Geotechnical	0472 784 385
Licensed Asbestos Assessor	Sam Jones	Alliance Geotechnical	0430 214 402
NSW EPA Accredited Site Auditor	Louise Walkden	Ramboll Group	0433 982 855

16.2 Emergency Preparedness and Response

An emergency assembly point will be established at an appropriate location, and this location communicated to workers and visitors during the site induction process. In the event an emergency situation arises, workers and visitors will assemble at this location (if safe to do so) and await further instructions from the site supervisor, project manager or emergency services.

Spill control kits and fire extinguishers will be located at appropriate locations at the site.

Contact details to be used in the event of an emergency, are presented in **Table 16.1**.

16.3 Community Relations

Occupants of properties adjoining the site and located immediately across the road from the site, will be provided with a notification of intent to undertake remedial works on the site, a minimum of two business days before commencing those remedial works.

A register will be maintained on site, for the recording of remedial works related communications from the community.

Communication received from community about the remedial works, will be directed to the project manager in the first instance. The project manager will arrange for the communication to responded to, in accordance with arrangements agreed to between the remediation contractor and the principal.

16.4 Signage, Security and Hours of Operations

The hours of operation at the site will be limited to:

- Monday to Friday between 7:00am and 5:00pm, and Saturday between 8:00am and 1:00pm; or
- days and times set out in the relevant development consent conditions (if available), which will take precedent over the aforementioned days and times.

The 24-hour contact details of the remediation contractor will be put on a sign, and posted on the site boundary, adjacent to the site access point. The sign will be maintained by the remediation contractor until completion of remedial works.

Security of the site will be maintained for the duration of the remedial works, with appropriate boundary fencing/barricades and access point locks.

16.5 Workplace Health and Safety

16.5.1 Safe Work Method Statements

All parties intending to undertake tasks in the remediation area/s will prepare a safe work method statement (SWMS) that documents:

- The task/s to be undertaken;
- Hazards associated with undertaking those task/s;
- A risk assessment of each hazard, considering consequence and likelihood;
- Control measures to be implemented to mitigate identified risks; and
- A re-assessment of each hazard, assuming control measure implementation, and showing a demonstrable decrease to the risk.

16.5.2 Personal Protective Equipment (PPE)

The following personal protective equipment (PPE) will be worn (as a minimum) by all persons working on, or visiting, the remediation work area/s:

- Eye protection (e.g. safety glasses or goggles);
- Long sleeves and long pants;
- A high visibility vest (or clothing);
- Protective footwear (e.g. safety boots);
- Hard hat; and
- Cut resistant gloves.

Additional PPE or respiratory protective equipment (RPE) may also be required, subject to the control measures set out in the SWMS for the task.

16.5.3 Occupational Hygiene

Atmospheric monitoring will be undertaken (subject to the findings of the risk assessment in the relevant SWMS), or as may be recommended by a suitably experienced occupational hygienist. Monitoring may include airborne fibre monitoring during asbestos remedial works, vapour monitoring during hydrocarbon remediation, or gas/explosion risk monitoring during landfill remediation.

Plant and equipment will be appropriately decontaminated before leaving a remedial works zone.

16.5.4 Decontamination

The following decontamination procedure will apply to all persons exiting the remediation work area/s:

- Cleaning of protective footwear, including removal of potentially contaminated material from the soles of the footwear; and
- Washing of hands (including prior to eating, drinking or smoking).

16.6 Asbestos Removal Control Plan (ARCP)

An asbestos removal control plan (ARCP) is a document that identifies the specific control measures that will be used to ensure workers and other people are not at unacceptable risk when asbestos removal work is being conducted. It is focused on the specific control measures necessary to minimise risk from exposure to asbestos.

An ARCP plan helps ensure the asbestos removal is well planned and carried out in a safe manner. An asbestos removal control plan is only required to be prepared for licensed asbestos removal work. However, one can be prepared to assist when planning asbestos removal work that does not require a licence.

Asbestos registers relevant to the asbestos to be removed and the area to be worked on, will be taken into account when preparing an ARCP.

The structure of the ARCP will address the specific requirements for each job and will be prepared with reference to Appendix B in SafeWork NSW (2022).

For works involving the management and/or removal of asbestos, an asbestos removal control plan (ARCP) will be prepared before licensed asbestos removal work commences The ARCP will include details of:

- how the asbestos removal will be undertaken, including the method, tools, equipment and PPE to be used; and
- the asbestos to be removed, including the location, type and condition of the asbestos.

Specifications and drawings relevant to the asbestos removal work, will be attached to the ARCP, to provide additional information about the asbestos.

Preparation of the ARCP will include, as far as is practicable, consultation with the client, the person with management or control of the site, workers, and workers' health and safety representatives.

For residential asbestos removal work, the person conducting a business or undertaking (PCBU), and the owner/occupier will also be consulted.

Once prepared, copies of the ARCP will be:

- given to the person who commissioned the licensed asbestos removal work
- kept at the workplace until the completion of the asbestos removal work; and
- readily accessible on site for the duration of the licensed asbestos removal work, to:
- PCBUs at the workplace;
- workers or their health and safety representatives; and
- the occupants of the premises (if the work is carried out in residential premises).

The ARCP will also be made available for inspection under the Work Health and Safety Act.

If a notifiable incident occurs in connection with the asbestos removal work to which the ARCP relates, the licensed asbestos removalist will keep the plan for at least two years after the incident occurs.

16.7 Traffic Management

The remediation contractor will:

- ensure vehicles exit the site in a forward direction;
- arrange for receipt and dispatch of materials during approved remedial working hours (refer **Section 16.4**);
- securely cover all loads to prevent dust or odour emissions during transportation; and
- utilise suitable experienced and qualified traffic controllers (as required).

Traffic and haulage routes will be selected based on:

- compliance with traffic road rules;
- opportunities to mitigate noise, vibration, dust and odour impacts to properties/occupants adjacent to the site; and
- preference for state controlled roads (as opposed to local roads);

16.8 Soil and Stormwater Management

16.8.1 Site Access and Egress

A sediment and erosion control plan will be prepared by the remediation contractor, to suit the nature and staging of the remedial works. Control measures will be operated and maintained by the remediation contractor, until completion of the remedial works.

Vehicle and plant site access/egress will be managed to prevent soils being tracked onto roads and pathways external to the site (e.g. gravels, gabions, cattle grids). Soil will be broomed or washed off tyres/tracks prior to the vehicle or plant leaving the remediation work area. Broomed/washed soil will be managed onsite, depending on its likely contamination status.

Surface stormwater generated from (or travelling through) the remediation works area, will be managed using relevant measures set out in Landcom (2004).

In the event soils are tracked onto roads or pathways external to the site, these soils will be removed by sweeping and/or shovelling.

16.8.2 Stockpiles

Stockpiles of material generated during remedial works will be:

- generally constructed as low elongated mounds on level surfaces;
- placed away from stormwater pits, drainage lines and gutters;
- not located on footpaths or nature strips, unless approved by the local planning authority;
- stored in secure areas and covered if remaining on site for more than 24 hours; and
- kept damp if containing (or suspected of containing) asbestos.

16.8.3 Groundwater and Excavation Pump Out

Should excavations require water to be pumped out, the water will be sampled and analysed by a suitably experienced environmental consultant, for total suspended solids (TSS), pH, metals (8) and petroleum hydrocarbons.

If the laboratory analytical results are less than the relevant[15] aquatic ecosystem groundwater investigation levels (GILs) set out in ANZECC (2000), then the excavation water may be discharged to the local stormwater system.

If the laboratory analytical results are greater than the relevant[16] aquatic ecosystem groundwater investigation levels (GILs) set out in ANZECC (2000), then other options for the excavation water will be considered, including:

- assessment of proposed receiving waters, in the context of the contaminant concentrations found in the excavation water;
- removal and offsite disposal by a liquid waste contractor; or
- discharge to sewer under an approval obtained from the relevant sewerage infrastructure operator.

In the event the site requires dewatering, development consent from the relevant planning authority and/or approvals from the state water authority, will be obtained (if required).

[15] Freshwater or marine, and adopted based on protection levels that consider aquatic ecosystem disturbance.
[16] Freshwater or marine, and adopted based on protection levels that consider aquatic ecosystem disturbance.

16.8.4 Site Rehabilitation

Areas of the site that become exposed as a result of remedial works, will be stabilised progressively, as remedial works are completed. Stabilisation methods will be maintained until such time as they are no longer required (e.g. vegetation becomes established and self-sustaining, or site development work commences).

16.9 Waste Management

Wastes generated during remedial works will be removed from site for recycling / disposal, with reference to NSW EPA (2014) and the relevant provisions of the Protection of the Environment Operations Act 1997 and SafeWork NSW (2022).

The remediation contractor will maintain detailed records of each load of waste generated during remedial works, including:

- The location the waste was generated from;
- The classification of the waste;
- The date and time the waste was removed from the site;
- The vehicle registration number of the waste transport vehicle;
- Evidence of Integrated Waste Tracking Solution (IWTS) information (where applicable)
- The volume of each waste type removed from site;
- Weighbridge receipt docket from the waste receiving facility; and
- The number of the environment protection licence (EPL) authorising the receiving facility to accept that classification or waste.

16.10 Dust Control

The following control measures will be implemented to mitigate risk of dust emissions migrating beyond the boundary of the remediation work area/s:

- erection of dust screens around the perimeter of the site (e.g. fencing with shade cloth attached);
- securely covering all loads entering or exiting the site;
- use of water sprays across the site to suppress dust;
- covering stockpiles of contaminated soil remaining on site for more than 24 hours;
- keeping excavation surfaces moist;
- wetting down of placed fill material during spreading;
- sweeping of hardstand surfaces;
- minimising soil disturbance works during windy days; and
- retaining stabilised site access/egress points for vehicles.

16.11 Odour Control

Should odours be detected at the site boundary during remediation works, monitoring of those odours may be undertaken, using methods[17] suited to the odour type, based on recommendations from a suitably experienced odour consultant (if required). This may include:

- use of appropriate covering techniques such as plastic sheeting to cover excavation faces or stockpiles;
- use of fine mist sprays (which may incorporate deodorizing agents);
- use of hydrocarbon mitigating agents on impacted areas/materials; and
- adequate maintenance of equipment and machinery to minimise exhaust emissions.

16.12 Airborne Asbestos Monitoring

Airborne asbestos monitoring will be undertaken on site by a Licensed Asbestos Assessor (LAA) during friable asbestos removal or handling. Monitoring during bonded asbestos removal, will be undertaken, subject to advice provided by the occupational hygienist/competent person appointed to the project.

Monitoring will be used to validate controls put in place to mitigate potential asbestos exposure.

Portable battery operated air monitors will be placed in static positions approximately 1.5m above the ground surrounding the asbestos handling / removal area.

Analysis of monitors will be undertaken by a NATA-accredited laboratory. The results of analysis will be compared to the criteria presented in **Table 16.12** and the appropriate action applied.

[17] Methods could include instrumental, chemical analysis, electronic, sensory tests or olfactometry.

Table 16.12 Atmospheric Monitoring Action Criteria and Measures

Detected Concentration (fibres per millilitre)	Action
<0.01	Continue with established control measures
0.01 to 0.02	Review established control measures Investigate probably cause Establish additional control to mitigate further fibre release
>0.02	Stop works Notify the relevant regulatory authority that work has ceased Investigate probably cause Extent the works exclusion zone Establish additional control to mitigate further fibre release Do not re-commence work until detected concentrations are at or below 0.01 fibres per millilitre

16.13 Noise and Vibration Control

Plant and equipment being utilised for remedial works, will be fitted with noise attenuation devices (e.g. exhaust mufflers). Where possible, selection and use of reversing alarms will avoid standard tonal pulse alarms.

Vehicle access roads will be designed to mitigate the need for vehicles and mobile plant to reverse during travel (e.g. creation of turning circles in the immediate vicinity of remediation work area/s).

'Offensive noise', as defined under the Protection of the Environment Operations Act 1997, will not be emitted beyond the site boundary, during remedial works.

Vibrations generated during remedial works will be managed to mitigate risk of damage to structural assets and risk of amenity loss to adjacent land occupiers. Advice from geotechnical, structural or vibration consultants will be sought, if required.

16.14 Site Incident Contingency Plan

There are inherent risks of incidents to occur onsite that may affect the surrounding environment and community. Based on the site history information made available to Alliance for preparation of this RAP, it is considered plausible that incidents involving the surrounding environment and community, outlined in **Table 16.14**, could occur during site works. Contingency plans and protocols to be implemented, should those incidents occur, are presented in **Table 16.14**.

Table 16.14 Site Incident Contingency Plan

Site Incident	Contingency Plan
High levels of dust detected outside the boundary of the site as a result of site works	Stop works, notify relevant stakeholders. Assess the application and effectiveness of measures outlined in **Section 16.10**. If measures are assessed to be inappropriate, consider additional measures, such as (but not limited to) postponing of works to account for poor weather conditions, or similar, and update the site management plan.
High levels of noise and/or vibration detected outside the boundary of the site as a result of site works	Stop works, notify all necessary stakeholders, and assess the applications and effectiveness of measures outlined in **Section 16.13**. If measures are assessed to be inappropriate, consider additional measures, such as engaging a suitably experienced geotechnical, structural or vibration consultant, or similar, to assess and provide advice on noise / vibration management.
Asbestos detected above 0.02 fibres per millilitre in asbestos air monitors at site boundaries	Stop works, notify relevant stakeholders, and as per **Table 16.12**: o Notify the relevant regulatory authority that work has ceased. o Investigate probably cause. o Extend the works exclusion zone. o Establish additional control to mitigate further fibre release. o Do not re-commence work until detected concentrations are at or below 0.01 fibres per millilitre.

17 Conclusions

Based on the assessment undertaken by Alliance of site history information, fieldwork observations and data, and laboratory analytical data, in the context of the proposed land use scenario and objectives of this project, Alliance considers that the remediation objective can be achieved, and the site made suitable for the proposed land use scenario, subject to the:

- Implementation of the strategies, methodologies, plans and procedures set out in this remediation action plan, if required, following the completion of the SCA proposed in **Section 8**; and
- Preparation of a site remediation and validation report (if required).

In the event that the proposed development scheme changes from that which was considered during preparation of this RAP, then the SCA and remedial strategies including the relevance of adopted land use scenarios must be reviewed, which may result in addendums to the RAP being required. The addendums will be reviewed by the appointed NSW EPA site auditor for the purpose of obtaining endorsement, before implementation of the addendum.

Specific assumptions that apply to the adopted land use scenario, are presented in **Section 6** of this report.

This report must be read in conjunction with the ***Important Information About This Report*** statements at the front of this report.

18 References

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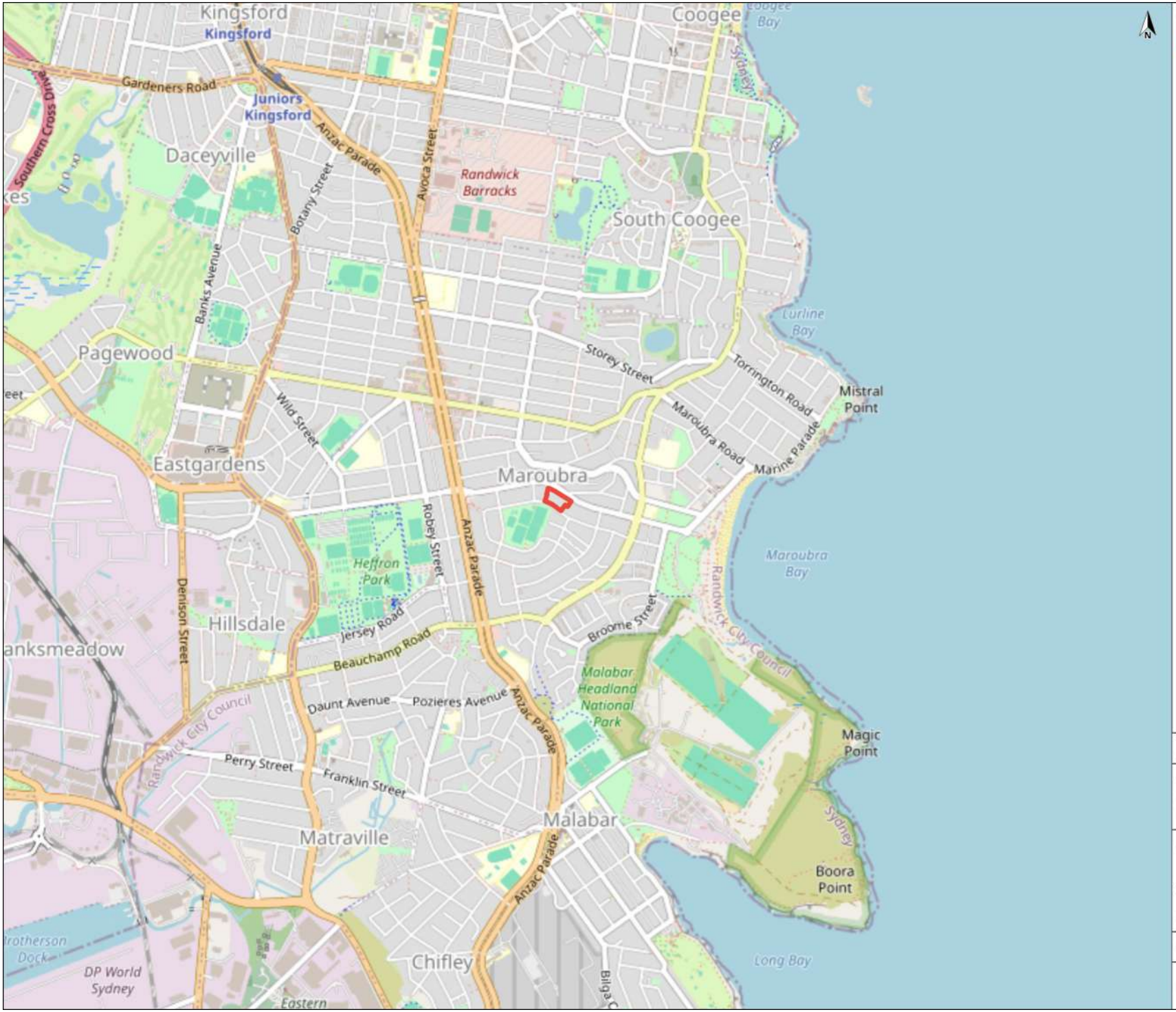
FIGURES



Legend

Approximate Site Boundary

0 500 m 1000 m

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Produced by **Datanest.earth**

Title: Site Locality Plan		
Client: New South Wales Land and Housing Corporation		Size: A4
Project: 195-213 Fitzgerald Avenue & 40-64 Yorktown Parade, Maroubra NSW	Drawn: GS	Figure No.: 1
Date: 15-07-2024	Checked: SW	
Proj No: 17716.2	Scale: 1:29647	Version: ER-1-2

Legend

Approximate Site Boundary

0 10 m 20 m

© Nearmap

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Produced by **Datanest.earth**

Title: Site Layout Plan		
Client: New South Wales Land and Housing Corporation		Size: A4
Project: 195-213 Fitzgerald Avenue & 40-64 Yorktown Parade, Maroubra NSW	Drawn: GS	Figure No.: 2
Date: 15-07-2024	Checked: SW	
Proj No: 17716.2	Scale: 1:870	Version: ER-1-2

Legend

- Approximate Hand Auger Locations
- Approximate Site Boundary

0 10 m 20 m

© Nearmap

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Produced by **Datanest.earth**

Title: Previous Sampling Points		
Client: New South Wales Land and Housing Corporation		Size: A4
Project: 195-213 Fitzgerald Avenue & 40-64 Yorktown Parade, Maroubra NSW	Drawn: GS	Figure No.: 3
Date: 15-07-2024	Checked: SW	
Proj No: 17716.2	Scale: 1:793	Version: ER-1-2

Legend

- AEC01 - Site Footprint
- AEC02 - Historical Sheds
- Site Boundary

0 5 m 10 m

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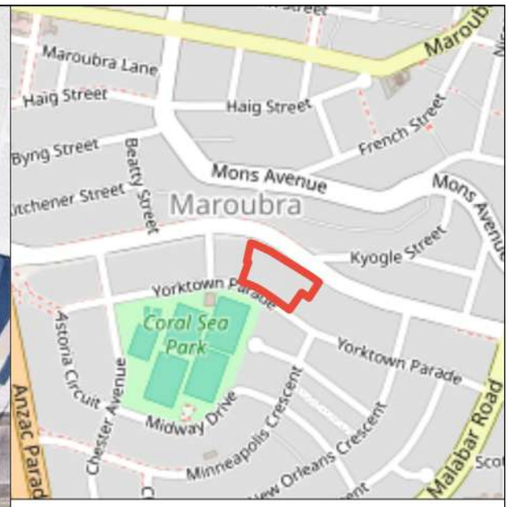
Produced by **Datanest.earth**

Title: Areas of Environmental Concern Post DSI		
Client: New South Wales Land and Housing Corporation		Size: A3
Project: 195-213 Fitzgerald Avenue & 40-64 Yorktown Parade, Maroubra NSW	Drawn: MC	Figure No.: 4
Date: 09-09-2024	Checked: SW	
Proj No: 17716.2	Scale: 1:507	Version: ER-1-2



Legend

- Approximate extent of proposed basement
- Approximate Site Boundary

0 10 m 20 m

alliance

Produced by **Datanest.earth**

Title: Basement Plan		
Client: New South Wales Land and Housing Corporation		Size: A3
Project: 195-213 Fitzgerald Avenue & 40-64 Yorktown Parade, Maroubra NSW	Drawn: MC	Figure No.: 5
Date: 02-09-2024	Checked: SW	
Proj No: 17716.2	Scale: 1:580	Version: ER-1-2

Legend

- Approximate extent of proposed basement
- AEC01 - Site Footprint
- AEC02 - Historical Sheds
- Site Boundary

0 5 m 10 m

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Produced by **Datanest.earth**

Title: Revised Areas of Environmental Concern with Proposed Basement		
Client: New South Wales Land and Housing Corporation		Size: A3
Project: 195-213 Fitzgerald Avenue & 40-64 Yorktown Parade, Maroubra NSW	Drawn: MC	Figure No.: 6
Date: 04-10-2024	Checked: SW	
Proj No: 17716.2	Scale: 1:482	Version: ER-1-2

Legend

- SCA Sampling Points
- Approximate extent of proposed basement
- AEC01 - Site Footprint
- AEC02 - Historical Sheds
- Site Boundary

0 5 m 10 m

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Produced by **Datanest.earth**

Title: Supplementary Contamination Assessment - Soil Sampling Point Layout Plan		
Client: New South Wales Land and Housing Corporation		Size: A3
Project: 195-213 Fitzgerald Avenue & 40-64 Yorktown Parade, Maroubra NSW	Drawn: MC	Figure No.: 7
Date: 09-09-2024	Checked: SW	
Proj No: 17716.2	Scale: 1:538	Version: ER-1-2

APPENDIX A – Previous Contamination Assessment Logs and Field Records

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BH No: HA02
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW
Started: 21/06/2024
Finished: 21/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine to coarse grained, brown to dark brown, trace silt, trace rootlets, brick, concrete	0.0-0.1 J/A PID=2.3	D - M	-	TOPSOIL/FILL No PACM, staining, or odour.
			0.5		SP	SAND, fine to medium grained, grey, occasional pale brown grey lenses.	0.3-0.4 J/A PID=2.5	-	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA02 terminated at 0.6m				

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BH No: HA03
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Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW
Started: 21/06/2024
Finished: 21/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine to medium grained, brown grey to brown, trace silt, trace gravel of timber, trace rootlets.	0.0-0.1 J/A PID=1.7	D - M	-	TOPSOIL/FILL No PACM, staining, or odour.
			0.5		SP	SAND, fine to medium grained, dark grey.	0.35-0.45 J/A PID=1.9	D - M	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA03 terminated at 0.7m				

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BH No: HA04
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW
Hole Location:
Started: 21/06/2024
Finished: 21/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine grained, dark brown grey to grey, trace rootlets.	0.0-0.1 J/A PID=1.9	D	-	TOPSOIL/FILL No PACM, staining, or odour.
					SP	SAND, fine to medium grained, pale grey to grey, trace rootlets.	0.2-0.3 J/A PID=2.0	D	-	ALLUVIAL No PACM, staining, or odour.
			0.5			Target depth reached. Borehole HA04 terminated at 0.5m				
			1.0							

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BH No: HA05
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW

Started: 21/06/2024
Finished: 21/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine grained, brown grey, trace tree debris.	0.0-0.1 J/A PID=3.2	D	-	TOPSOIL/FILL No PACM, staining, or odour.
			0.5		SP	SAND, fine to medium grained, grey, trace silt, trace rootlets.	0.15-0.25 J/A PID=11.6	D - M	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA05 terminated at 0.5m				

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BH No: HA06
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Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW

Started: 21/06/2024
Finished: 21/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine grained, dark grey brown, trace fine to medium subangular gravel of timber and plastic, trace rootlets.	0.0-0.1 J/A PID=2.5	M - D	-	TOPSOIL/FILL No PACM, staining, or odour.
			0.5		SP	SAND, fine to medium grained, dark grey and grey, trace silt.	0.2-0.3 J/A PID=3.6	M	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA06 terminated at 0.6m				

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BH No: HA07
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW

Started: 21/06/2024
Finished: 21/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, brown to grey brown, trace silt.	0.0-0.1 J/A DUPE02/TRIP02 PID=1.6	M - D	-	TOPSOIL/FILL No PACM, staining, or odour.
			0.5		SP	SAND, fine to medium grained, pale grey occasional dark grey.	0.4-0.5 J/A PID=2.0	M	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA07 terminated at 0.7m				

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BH No: HA08
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Doonside, NSW

Started: 21/06/2024
Finished: 21/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOI/FILLL: SAND, fine to medium grained, dark brown, trace silt.	0.0-0.1 J/A PID=2.4	M	-	TOPSOIL/FILL No PACM, staining, or odour.
			0.5		-	FILL: SAND, dark grey, trace silt.	0.2-0.3 J/A PID=2.4	D - M	-	FILL No PACM, staining, or odour.
					SP	SAND, fine to coarse grained, pale brown grey.	0.6-0.7 J/A PID=1.7	D	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA08 terminated at 0.9m				

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BH No: HA09
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW

Started: 20/06/2024
Finished: 20/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine grained, brown grey, trace rootlets.	0.0-0.1 J/A PID=2.9	D	-	TOPSOIL/FILL No PACM, staining, or odour.
			0.5		SP	SAND, fine to medium grained, dark grey, trace silt, trace rootlets.	0.2-0.3 J/A PID=2.8	M - D	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA09 terminated at 0.5m				

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BH No: HA10
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW

Started: 20/06/2024
Finished: 20/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine to medium grained, dark brown, trace silt, trace rootlets.	0.0-0.1 J/A PID=2.1	D - M	-	TOPSOIL/FILL No PACM, staining, or odour.
			0.5		SP	SAND, fine to medium grained, pale grey to grey.	0.45-0.55 J/A PID=1.6	D	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA10 terminated at 0.7m				

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BH No: HA11
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW

Started: 21/06/2024
Finished: 21/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine to medium grained, dark grey to dark brown grey, trace silt.	0.0-0.1 J/A PID=2.0	M - D	-	TOPSOIL/FILL No PACM, staining, or odour.
			0.5		SP	SAND, fine to medium grained, grey to dark grey, trace silt and rootlets.	0.35-0.45 J/A PID=1.7	M	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA11 terminated at 0.65m				

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BH No: HA12
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW

Started: 20/06/2024
Finished: 20/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine grained, grey brown, trace gravel, charcoal and glass, trace rootlets.	0.0-0.1 J/A PID=2.4	-	-	TOPSOIL/FILL No PACM, staining, or odour.
			0.5		SM	Silty SAND, fine to medium grained, grey, trace rootlets.	0.25-0.35 J/A PID=3.4	M	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA12 terminated at 0.6m				

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BH No: HA13
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Doonside, NSW

Started: 20/06/2024
Finished: 20/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine grained, brown to grey brown, trace rootlets.	0.0-0.1 J/A PID=2.3	D	-	TOPSOIL/FILL No PACM, staining, or odour.
			0.5		SP	SAND, fine to medium grained, grey to dark grey, trace silt.	0.15-0.25 J/A PID=2.3	D - M	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA13 terminated at 0.6m				

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BH No: HA14
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW

Started: 20/06/2024
Finished: 20/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine to medium grained, brown to grey brown, trace subangular to subrounded gravel.	0.0-0.1 J/A PID=2.0	M	-	TOPSOIL/FILL No PACM, staining, or odour.
					-	FILL: SAND, fine to medium grained, grey brown.	0.2-0.3 J/A PID=3.2	D - M	-	FILL No PACM, staining, or odour.
			0.5		SP	SAND, grey to pale grey, trace silt.	0.5-0.6 J/A PID=2.0	D - M	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA14 terminated at 0.8m				

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BH No: HA16
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW

Started: 20/06/2024
Finished: 20/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine to medium grained, trace subangular to subrounded gravel, trace silt.	0.0-0.1 J/A PID=1.1	M	-	TOPSOIL/FILL No PACM, staining, or odour.
					SP	SAND, fine to medium grained, trace silt, trace rootlets.	0.2-0.3 J/A PID=1.2	D - M	-	ALLUVIAL No PACM, staining, or odour.
			0.5			Target depth reached. Borehole HA16 terminated at 0.5m				
			1.0							

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BH No: HA18
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW

Started: 20/06/2024
Finished: 20/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: Silty SAND, fine to medium grained, brown, trace gravel.	0.0-0.1 J/A PID=1.5	D	-	TOPSOIL/FILL No PACM, staining, or odour.
			0.5		SP	SAND, fine to medium grained, grey to pale brown grey, trace silt.	0.2-0.3 J/A PID=1.7	D	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA18 terminated at 0.5m				

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BH No: HA19
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW
Started: 20/06/2024
Finished: 20/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine to medium grained, dark brown, trace silt, trace rootlets.	0.0-0.1 J/A PID=1.8	D	-	TOPSOIL/FILL No PACM, staining, or odour.
			0.5		SP	SAND, fine to medium grained, brown grey to dark grey.	0.15-0.25 J/A PID=1.3	D	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA19 terminated at 0.6m				

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BH No: HA20
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW

Started: 20/06/2024
Finished: 20/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: Silty SAND, fine to medium grained, dark brown to brown grey, trace rootlets.	0.0-0.1 J/A PID=2.1	M	-	TOPSOIL No PACM, staining, or odour.
			0.5		SP	SAND, fine to medium grained, grey, trace silt.	0.4-0.5 J/A PID=1.3	D - M	-	ALLUVIAL No PACM, staining, or odour.
			1.0			Target depth reached. Borehole HA20 terminated at 0.7m				

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BH No: HA21
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Mount Druitt, NSW

Started: 20/06/2024
Finished: 20/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine to medium grained, dark brown to brown, trace silt, trace rootlets.	0.0-0.1 J/A DUPE01/TRIP01 PID=1.7	D	-	TOPSOIL No PACM, staining, or odour.
					SP	SAND, fine to medium grained, pale brown grey. From 0.4m: becoming grey.	0.2-0.3 J/A PID=1.4	D	-	ALLUVIAL No PACM, staining, or odour.
			0.5			Target depth reached. Borehole HA21 terminated at 0.5m				
			1.0							

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BH No: HA22
Sheet: 1 of 1
Job No: 17716.2

Borehole Log

Client: New South Wales Land and Housing Corporation
Project: Detailed Site Investigation (DSI)
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Doonside, NSW

Started: 20/06/2024
Finished: 20/06/2024
Borehole Size: 70 mm

Rig Type: Hand Auger
Hole Coordinates E, N
Driller: MC
Logged: MC
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: SI

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
HA	Not Encountered				-	TOPSOIL/FILL: SAND, fine to medium grained, pale brown grey, trace rootlets.	0.0-0.1 J/A PID=1.7	D	-	TOPSOIL No PACM, staining, or odour.
					SP	SAND, fine to medium grained, pale grey to grey, trace rootlets.	0.1-0.2 J/A PID=1.6	D	-	ALLUVIAL No PACM, staining, or odour.
			0.5			Target depth reached. Borehole HA22 terminated at 0.5m				
			1.0							

APPENDIX B – Groundwater Records

State Overview
State Overview

Rivers and Streams
favourites search
download sites
find a site
⊞ Real Time Data - Riv...

Daily River Reports
⊞ Daily River Reports

Dams
favourites search
download sites
find a site
⊞ Real Time Data - Ma...

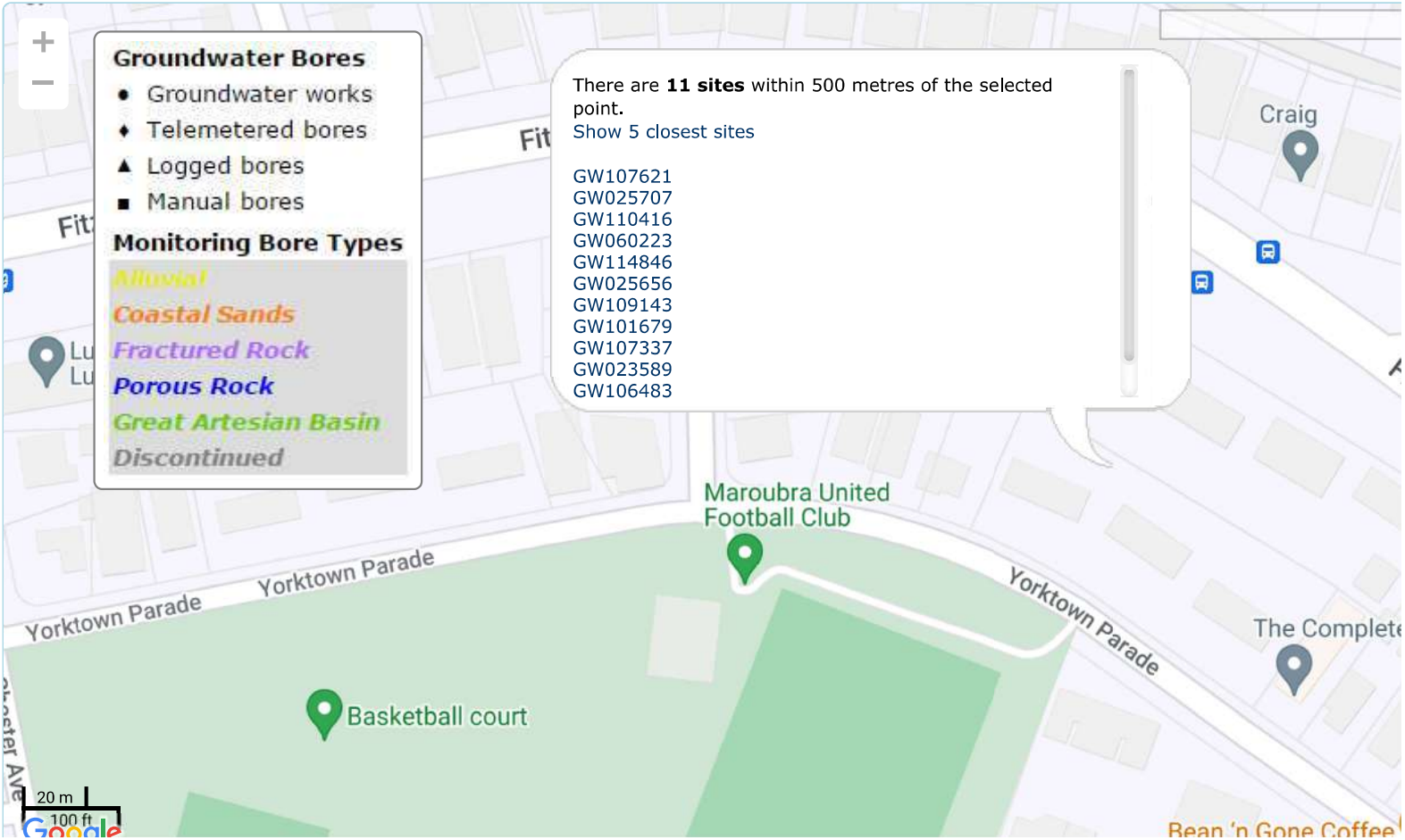
Groundwater (Telemetered data)
favourites search

ALL GROUNDWATER MAP

bookmark this page

All data times are Eastern Standard Time

Map Info



WaterNSW
Work Summary
GW114846

Licence: 10WA118957
Licence Status: CURRENT

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): DOMESTIC

Work Type: Spear
Work Status: Supply Obtained
Construct.Method: Auger - Solid
Owner Type: Private

Commenced Date:
Completion Date: 20/04/2014
Final Depth: 7.00 m
Drilled Depth: 7.00 m

Contractor Name: (None)
Driller: Achilles Chris Mylonas
Assistant Driller:

Property: Stephenson 95 Yorktown Parade MAROUBRA 2035 NSW
GWMA: -
GW Zone: -
Standing Water Level (m): 3.000
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	BOTANY	646//32151
Licensed:	CUMBERLAND	BOTANY	Whole Lot 646//32151

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6242181.000
Easting: 338216.000
Latitude: 33°56'54.4"S
Longitude: 151°14'57.3"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	7.00	100			Auger - Solid Flight
1	1	Casing	Pvc Class 9	0.00	6.00	100	90		Driven into Hole, Glued
1	1	Opening	Screen - Gauze/Mesh	5.40	6.00	50		0	PVC Class 9, Screwed, A: 0.19mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
3.00	7.00	4.00	Unknown	3.00	5.00			01:00:00	

Remarks

20/04/2014: Form A Remarks:
Coordinates provided by LAS.
No Drillers log on file.
L.Franchi
15/06/2015: Nat Carling, 15-June-2015; Updated work type & removed owners name from work name.

***** End of GW114846 *****

WaterNSW
Work Summary
GW110416

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): DOMESTIC

Work Type: Spear
Work Status:
Construct.Method: Auger
Owner Type: Private

Commenced Date:
Completion Date: 06/09/2009
Final Depth: 7.00 m
Drilled Depth:

Contractor Name: COMBINED DRILLING SERVICES
Driller: Achilles Chris Mylonas
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	BOTANY	1 38119
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6242103.000
Easting: 337895.000
Latitude: 33°56'56.7"S
Longitude: 151°14'44.8"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	7.00	100			Auger
1	1	Casing	P.V.C.	0.00	7.00	100			Driven into Hole, Glued
1	1	Opening	Screen	6.00	7.00	50		0	PVC, Screwed, A: 0.19mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
2.50	7.00	4.50	Unknown						

***** End of GW110416 *****

WaterNSW
Work Summary
GW109143

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): DOMESTIC

Work Type: Spear
Work Status:
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 04/08/2008
Final Depth: 5.00 m
Drilled Depth:

Contractor Name: B & B DRILLING INC
Driller: Michael Gerard Barrett
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m): 3.000
Salinity Description: Good
Yield (L/s): 0.500

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	BOTANY	534//36819
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6242084.000
Easting: 338152.000
Latitude: 33°56'57.5"S
Longitude: 151°14'54.8"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

***** End of GW109143 *****

WaterNSW
Work Summary
GW107621

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): DOMESTIC

Work Type: Spear
Work Status:
Construct.Method: Auger
Owner Type: Private

Commenced Date:
Completion Date: 15/11/2005
Final Depth: 10.00 m
Drilled Depth: 10.00 m

Contractor Name:
Driller: Rosario Fedele
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	BOTANY	374B//36576
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9130-3S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6242354.000
Easting: 338066.000
Latitude: 33°56'48.7"S
Longitude: 151°14'51.6"E

GS Map: -
MGA Zone: 56
Coordinate Source: GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	10.00	100			Auger

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	10.00	10.00	sand	Sand	

Remarks

09/04/2010: updated from original form A

***** End of GW107621 *****

WaterNSW
Work Summary
GW107337

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): DOMESTIC

Work Type: Spear
Work Status: Supply Obtained
Construct.Method: Jetted - Water
Owner Type: Private

Commenced Date:
Completion Date: 09/08/2005
Final Depth: 6.00 m
Drilled Depth: 6.00 m

Contractor Name: B & B DRILLING INC
Driller: Michael Gerard Barrett
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m): 3.000
Salinity Description: Good
Yield (L/s): 0.500

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	BOTANY	654//32151
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9130-3S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6242110.000
Easting: 338211.000
Latitude: 33°56'56.7"S
Longitude: 151°14'57.1"E

GS Map: -
MGA Zone: 56
Coordinate Source: GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	6.00	90			Jetted - Water
1	1	Casing	P.V.C.	0.00	5.40	32	26		Seated on Bottom, Glued
1	1	Opening	Screen - Wire Wound	5.40	6.00	50		0	Stainless Steel, Screwed, A: 0.15mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
3.00	6.00	3.00	Unknown	3.00		0.50		00:05:00	

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.30	0.30	topsoil	Topsoil	
0.30	2.50	2.20	sand, yellow	Sand	
2.50	3.00	0.50	rock, coffee	Rock	
3.00	6.00	3.00	sand, brown	Sand	

Remarks

29/03/2010: updated from original form A

***** End of GW107337 *****

WaterNSW
Work Summary
GW106483

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): DOMESTIC

Work Type: Spear
Work Status: Abandoned
Construct.Method: Auger - Solid
Owner Type: Private

Commenced Date:
Completion Date: 12/10/2004
Final Depth: 5.00 m
Drilled Depth: 5.00 m

Contractor Name: WATER WORKS
Driller: Andrew Malcolm Chalmers
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	BOTANY	2148//752015
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9130-3S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6242450.000
Easting: 337524.000
Latitude: 33°56'45.2"S
Longitude: 151°14'30.6"E

GS Map: -
MGA Zone: 56
Coordinate Source: GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	5.00	125			Auger - Solid Flight
1		Backfill	Sand	0.00	5.00				

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	5.00	5.00	sand, rock	Sand	

Remarks

12/10/2004: Form A Remarks:
Drilling terminated hole backfilled - Abandoned Bore
14/01/2010: updated from original form A

***** End of GW106483 *****

WaterNSW
Work Summary
GW101679

Licence: 10WA113262
Licence Status: CURRENT

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): DOMESTIC

Work Type: Bore
Work Status:
Construct.Method: Hand Drilled
Owner Type:

Commenced Date:
Completion Date: 29/09/1998
Final Depth: 7.00 m
Drilled Depth: 7.00 m

Contractor Name: (None)
Driller: Rosario Fedele
Assistant Driller:

Property: Marjoe Pty Limited 251 Fitzgerald Ave MAROUBRA 2035 NSW
GWMA: -
GW Zone: -
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	BOTANY	19//36217
Licensed:	CUMBERLAND	BOTANY	Whole Lot 19//36217

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6242254.000
Easting: 338298.000
Latitude: 33°56'52.0"S
Longitude: 151°15'00.6"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	7.00	90			Hand Drilled

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	7.00	7.00	Sand	Sand	

Remarks

29/09/1998: Form A Remarks:
FORM A COMMENTS.
HAND DRILL DEPTH 7.0M DIAMETER 90mm

***** End of GW101679 *****

WaterNSW
Work Summary
GW060223

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): RECREATION (GROU

Work Type: Battery Spears
Work Status: Supply Obtained
Construct.Method:
Owner Type: Local Govt

Commenced Date:
Completion Date: 01/01/1983
Final Depth: 9.00 m
Drilled Depth: 9.00 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m): 2.300
Salinity Description: 0-500 ppm
Yield (L/s): 3.000

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	BOTANY	Z//36839
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9130-3S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6242115.000
Easting: 337821.000
Latitude: 33°56'56.3"S
Longitude: 151°14'41.9"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	9.00	350			Percussion
1	1	Casing	Steel	0.00	6.00	200			Seated on Bottom, Welded
1	1	Opening	Screen	6.00	9.00	200		0	Stainless Steel, Welded, A: 0.50mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
2.30	9.00	6.70	Unknown	2.30	4.87	3.00	9.00	08:00:00	160.00

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	3.50	3.50	BROWN SAND	Sand	
3.50	7.00	3.50	BROWN SILTY SAND/SMALL PEAT LAYERS	Sand	
7.00	9.00	2.00	YELLOW SILTY SAND	Sand	

Remarks

09/03/1987: CORAL SEA PARK MAROUBRA.
09/03/1987: BATTERY OF 6 SPEARS.
02/04/2009: Previous Lic No's : 10BL602524 and 10BL132182.
23/11/2012: Nat Carling, 23-Nov-2012; Added status & rock type codes to driller's log.

***** End of GW060223 *****

WaterNSW
Work Summary
GW025707

Licence: 10WA112817
Licence Status: CURRENT

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): GENERAL USE

Work Type: Spear
Work Status:
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 01/12/1964
Final Depth: 5.10 m
Drilled Depth: 5.20 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property: N/A NSW
GWMA: 018
GW Zone:
Standing Water Level (m):
Salinity Description: invalid code
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	BOTANY	UNKNOWN FROM HYDSYS
Licensed:	CUMBERLA	BOTANY	Whole Lot

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9130-3S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6242277.000
Easting: 338184.000
Latitude: 33°56'51.2"S
Longitude: 151°14'56.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,PR. MAP

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
2.70	2.70	0.00	Unconsolidated	2.70		0.25			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	5.18	5.18	Sand Water Supply	Sand	

Remarks

19/02/1975: SITED 81 YORKTOWN PDE. MAROUBRA

***** End of GW025707 *****

WaterNSW
Work Summary
GW025656

Licence: 10BL017533
Licence Status: CONVERTED

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): GENERAL USE

Work Type: Spear
Work Status: Supply Obtained
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date:
Final Depth: 4.80 m
Drilled Depth: 4.90 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property: N/A NSW
GWMA: 018
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	BOTANY	UNKNOWN FROM HYDSYS
Licensed:	CUMBERLA	BOTANY	Whole Lot

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9130-3S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6242225.000
Easting: 338259.000
Latitude: 33°56'53.0"S
Longitude: 151°14'59.1"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,PR. MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Corrugated Galvan	0.00	4.80	25			

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
3.90	4.80	0.90	(Unknown)						

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	3.96	3.96	Sand	Sand	
3.96	4.87	0.91	Aquifer Water Supply	Invalid Code	

Remarks

19/02/1975: SITED 53 NEW ORLEANS CRESC. 2035

***** End of GW025656 *****

WaterNSW
Work Summary
GW023589

Licence: 10BL017644
Licence Status: CONVERTED

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): GENERAL USE

Work Type: Spear
Work Status:
Construct.Method: Pre-drilled
Owner Type: Private

Commenced Date:
Completion Date: 01/02/1966
Final Depth: 3.60 m
Drilled Depth: 3.70 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property: N/A NSW
GWMA: 018
GW Zone:
Standing Water Level (m):
Salinity Description: Fair
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	BOTANY	99999
Licensed:	CUMBERLA	BOTANY	Whole Lot

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9130-3S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6242264.000
Easting: 337568.000
Latitude: 33°56'51.3"S
Longitude: 151°14'32.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,PR. MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Corrugated Galvan	0.00	3.10	31			Driven into Hole
1	1	Opening	Perforations,Screen - Gauze/Me	3.10	3.60	31		1	Mechanically Slotted, A: 15.87mm
1	1	Opening	Perforations,Screen - Gauze/Me	3.10	3.60	31		2	Copper Alloy, A: 0.17mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
1.50	1.50	0.00	Unconsolidated	1.50		0.35			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	3.65	3.65	Sand Grey Water Supply	Sand	

Remarks

07/08/1974: SITED 5 ASTORIA CIRCUIT MAROUBRA

***** End of GW023589 *****

APPENDIX C – Alliance (2024a) Contamination Assessment Laboratory Summary Tables

Client: New South Wales Land and Housing Corportation
Project: 195-213 Fitgerald Avenue 40-64 Yorktown Parade, Maroubra, NSW
Project No.: 17716.2

Analytical Summary Table - LR1 - Soils

alliance
geotechnical & environmental solutions

		Metals																Inorganics		
		Arsenic		Cadmium		Chromium (III+VI)		Copper		Lead		Mercury		Nickel		Zinc	Zinc	Conductivity (1:5 aqueous extract)	Cation Exchange Capacity	Moisture Content (dried @ 103°C)
		mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	µS/cm	meq/100g	%
EQL		2	0.001	0.4	0.0002	5	0.001	5	0.001	5	0.001	0.1	0.0001	5	0.001	5	0.005	10	0.5	1
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																				
Site Specific EILs						260		100		1100				35		235				
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space		100																		
NEPM 2013 Table 1A(1) HILs Res A Soil		100		20				6,000		300		40		400		7,400				
NEPM 2013 Table 1A(1) HILs Res B Soil		500		150				30,000		1,200		120		1,200		60,000				
Field ID	**Date**																			
DUPE-01	**21 Jun 2024**	<2	-	<0.4	-	<5	-	6.0	-	21	-	<0.1	-	<5	-	48	-	-	-	10
HA02 0.0-0.1	**21 Jun 2024**	<2	-	<0.4	-	7.3	-	19	-	71	-	<0.1	-	<5	-	60	-	-	-	6.8
HA03 0.0-0.1	**21 Jun 2024**	<2	-	<0.4	-	<5	-	12	-	26	-	<0.1	-	<5	-	43	-	-	-	6.9
HA04 0.0-0.1	**21 Jun 2024**	3.6	-	<0.4	-	<5	-	15	-	25	-	0.2	-	<5	-	30	-	-	-	11
HA05 0.15-0.25	**21 Jun 2024**	<2	-	<0.4	-	<5	-	<5	-	5.2	-	<0.1	-	<5	-	14	-	-	-	4.9
HA06 0.0-0.1	**21 Jun 2024**	<2	-	<0.4	-	<5	-	23	-	51	-	<0.1	-	<5	-	67	-	-	-	8.8
HA07 0.0-0.1	**21 Jun 2024**	<2	-	<0.4	-	<5	-	24	-	30	-	<0.1	-	<5	-	110	-	-	-	8.1
HA08 0.2-0.3	**21 Jun 2024**	<2	-	<0.4	-	<5	-	10.0	-	14	-	<0.1	-	<5	-	19	-	-	-	5.0
HA8 0.6-0.7	**21 Jun 2024**	<2	-	<0.4	-	<5	-	<5	-	<5	-	<0.1	-	<5	-	<5	-	<10	1.0	3.7
HA09 0.0-0.1	**21 Jun 2024**	<2	-	<0.4	-	<5	-	15	-	28	-	<0.1	-	<5	-	45	-	-	-	4.2
HA10 0.0-0.1	**21 Jun 2024**	<2	-	<0.4	-	<5	-	14	-	37	-	<0.1	-	<5	-	82	-	-	-	11
HA11 0.0-0.1	**21 Jun 2024**	<2	-	<0.4	-	<5	-	21	-	41	-	<0.1	-	<5	-	200	-	-	-	9.0
HA12 0.0-0.1	**21 Jun 2024**	<2	-	<0.4	-	<5	-	23	-	50	-	<0.1	-	<5	-	82	-	-	-	9.1
HA13 0.0-0.1	**21 Jun 2024**	<2	-	<0.4	-	<5	-	<5	-	14	-	<0.1	-	<5	-	29	-	-	-	3.1
HA14 0.2-0.3	**21 Jun 2024**	<2	-	<0.4	-	<5	-	10	-	28	-	<0.1	-	<5	-	290	-	-	-	2.5
HA16 0.0-0.1	**21 Jun 2024**	<2	-	<0.4	-	<5	-	6.2	-	26	-	<0.1	-	<5	-	44	-	-	-	4.9
HA18 0.0-0.1	**21 Jun 2024**	<2	-	<0.4	-	<5	-	21	-	37	-	<0.1	-	<5	-	79	-	-	-	6.0
HA19 0.15-0.25	**21 Jun 2024**	<2	-	<0.4	-	<5	-	<5	-	8.7	-	<0.1	-	<5	-	19	-	<10	<0.5	4.4
HA20 0.0-.1	**21 Jun 2024**	<2	-	1.0	-	13	-	42	-	110	-	<0.1	-	<5	-	190	-	-	-	9.2
HA21 0.0-0.1	**21 Jun 2024**	<2	-	<0.4	-	<5	-	11	-	39	-	<0.1	-	<5	-	77	-	-	-	13
HA22 0.0-0.1	**21 Jun 2024**	<2	-	<0.4	-	5.3	-	6.7	-	33	-	<0.1	-	<5	-	49	-	-	-	5.0
RINS-1	**21 Jun 2024**	-	<0.001	-	<0.0002	-	<0.001	-	<0.001	-	<0.001	-	<0.0001	-	<0.001	-	<0.005	-	-	-
TRIP-BLANK-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRIP-SPIKE-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Statistics																				
Minimum Detect		**3.6**	**ND**	**1**	**ND**	**5.3**	**ND**	**6**	**ND**	**5.2**	**ND**	**0.2**	**ND**	**ND**	**ND**	**14**	**ND**	**ND**	**1**	**2.5**
Maximum Detect		**3.6**	**ND**	**1**	**ND**	**13**	**ND**	**42**	**ND**	**110**	**ND**	**0.2**	**ND**	**ND**	**ND**	**290**	**ND**	**ND**	**1**	**13**
Average Concentration *		**1.1**		**0.24**		**3.4**		**14**		**33**		**0.057**		**2.5**		**75**		**5**	**0.62**	**7**
Standard Deviation *		**0.57**		**0.17**		**2.5**		**9.8**		**24**		**0.033**		**0**		**71**		**0**	**0.53**	**2.9**
95% UCL (Student's-t) *		**1.337**		**0.304**		**4.305**		**17.45**		**42.23**		**0.0695**		**2.5**		**101.9**		**5**	**2.993**	**8.09**

* A Non Detect Multiplier of 0.5 has been applied.
**Chromium VI
***D / ND = Detect / Non-Detect

Environmental Standards
NEPM, NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil
2013, NEPM 2013 Table 1A(1) HILs Res A Soil
2013, NEPM 2013 Table 1A(1) HILs Res B Soil
2013, NEPM 2013 Table 1A(1) HILs Rec C Soil

Client: New South Wales Land and Housing Corportation
Project: 195-213 Fitgerald Avenue 40-64 Yorktown Parade, Maroubra, NSW
Project No.: 17716.2

Analytical Summary Table - LR1 - Soils

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		Asbestos	BTEX																	
	pH (1:5 aqueous extract)	Asbestos Reported Result	Naphthalene (VOC)		Benzene		Toluene		Ethylbenzene		Xylene (m & p)		Xylene (o)		Xylene Total		Xylene Total		C6-C10 Fraction (F1)	
	-	Comment	mg/kg	%	mg/kg	%	mg/kg	%	mg/kg	%	mg/kg	%	mg/kg	%	mg/kg	%	mg/kg	%	mg/kg	%
EQL	0.1		0.5	1	0.1	1	0.1	1	0.1	1	0.2	1	0.1	1	0.3	1	20	1		
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																	700			
Site Specific EILs																				
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space			170																	
NEPM 2013 Table 1A(1) HILs Res A Soil																				
NEPM 2013 Table 1A(1) HILs Res B Soil																				

Field ID	Date																			
DUPE-01	**21 Jun 2024**	-	-	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA02 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA03 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA04 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA05 0.15-0.25	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA06 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA07 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA08 0.2-0.3	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA8 0.6-0.7	**21 Jun 2024**	8.1	ND***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA09 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA10 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA11 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA12 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA13 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA14 0.2-0.3	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA16 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA18 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA19 0.15-0.25	**21 Jun 2024**	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA20 0.0-.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA21 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
HA22 0.0-0.1	**21 Jun 2024**	-	ND***	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
RINS-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
TRIP-BLANK-1	**21 Jun 2024**	-	-	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-	<0.1	-	<0.3	-	<20	-	
TRIP-SPIKE-1	**21 Jun 2024**	-	-	-	110	-	97	-	95	-	96	-	99	-	110	-	100	-	95	

Statistics

Minimum Detect	**7.4**	**1**	**ND**	**110**	**ND**	**97**	**ND**	**95**	**ND**	**96**	**ND**	**99**	**ND**	**110**	**ND**	**100**	**ND**	**95**		
Maximum Detect	**8.1**	**1**	**ND**	**110**	**ND**	**97**	**ND**	**95**	**ND**	**96**	**ND**	**99**	**ND**	**110**	**ND**	**100**	**ND**	**95**		
Average Concentration *	**7.8**	**1**	**0.25**		**0.05**		**0.05**		**0.05**		**0.1**		**0.05**		**0.15**		**10**			
Standard Deviation *	**0.49**	**0**	**0**		**0**		**0**		**0**		**0**		**0**		**0**		**0**			
95% UCL (Student's-t) *	**9.96**	**1**	**0.25**		**0.05**		**0.05**		**0.05**		**0.1**		**0.05**		**0.15**		**10**			

* A Non Detect Multiplier of 0.5 has been applied.
**Chromium VI
***D / ND = Detect / Non-Detect

Environmental Standards
NEPM, NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil
2013, NEPM 2013 Table 1A(1) HILs Res A Soil
2013, NEPM 2013 Table 1A(1) HILs Res B Soil
2013, NEPM 2013 Table 1A(1) HILs Rec C Soil

Analytical Summary Table - LR1 - Soils

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		TRH						TPH													
		C6-C10 (F1 minus BTEX)	>C10-C16 Fraction (F2)	>C10-C16 Fraction (F2 minus Naphthalene)	>C16-C34 Fraction (F3)	>C34-C40 Fraction (F4)	>C10-C40 Fraction (Sum)	C6-C9 Fraction		C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Chrysene
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL		20	50	50	100	100	100	20	1	20	50	50	50	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil			1,000		2,500	10,000														
Site Specific EILs																				
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space																				
NEPM 2013 Table 1A(1) HILs Res A Soil																				
NEPM 2013 Table 1A(1) HILs Res B Soil																				
Field ID	**Date**																			
DUPE-01	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA02 0.0-0.1	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA03 0.0-0.1	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA04 0.0-0.1	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	55	55	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA05 0.15-0.25	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA06 0.0-0.1	**21 Jun 2024**	<20	<50	<50	150	<100	150	<20	-	75	81	95	251	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA07 0.0-0.1	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA08 0.2-0.3	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA8 0.6-0.7	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA09 0.0-0.1	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA10 0.0-0.1	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA11 0.0-0.1	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	56	56	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA12 0.0-0.1	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	61	61	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA13 0.0-0.1	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA14 0.2-0.3	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA16 0.0-0.1	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA18 0.0-0.1	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA19 0.15-0.25	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA20 0.0-.1	**21 Jun 2024**	<20	<50	<50	<100	120	120	<20	-	<20	<50	120	120	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA21 0.0-0.1	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA22 0.0-0.1	**21 Jun 2024**	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
RINS-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRIP-BLANK-1	**21 Jun 2024**	<20	-	-	-	-	-	<20	-	-	-	-	-	-	-	-	-	-	-	-
TRIP-SPIKE-1	**21 Jun 2024**	-	-	-	-	-	-	-	94	-	-	-	-	-	-	-	-	-	-	-
Statistics																				
Minimum Detect		**ND**	**ND**	**ND**	**150**	**120**	**120**	**ND**	**94**	**75**	**81**	**55**	**55**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Maximum Detect		**ND**	**ND**	**ND**	**150**	**120**	**150**	**ND**	**94**	**75**	**81**	**120**	**251**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Average Concentration *		**10**	**25**	**25**	**55**	**54**	**59**	**10**		**13**	**28**	**39**	**47**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Standard Deviation *		**0**	**0**	**0**	**23**	**16**	**27**	**0**		**15**	**13**	**27**	**55**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
95% UCL (Student's-t) *		**10**	**25**	**25**	**64.39**	**60.07**	**69.79**	**10**		**19.35**	**33.06**	**49.67**	**68.8**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**

* A Non Detect Multiplier of 0.5 has been applied.
**Chromium VI
***D / ND = Detect / Non-Detect

Environmental Standards
NEPM, NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil
2013, NEPM 2013 Table 1A(1) HILs Res A Soil
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Client: New South Wales Land and Housing Corportation
Project: 195-213 Fitgerald Avenue 40-64 Yorktown Parade, Maroubra, NSW
Project No.: 17716.2

Analytical Summary Table - LR1 - Soils

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	PAH											Particle Size	PCBs						
	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)pyrene TEQ calc (Half)	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ calc (Zero)	PAHs (Sum of total)	% Clay*	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																			
Site Specific EILs																			
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space					170														
NEPM 2013 Table 1A(1) HILs Res A Soil								3	3	3	300								
NEPM 2013 Table 1A(1) HILs Res B Soil								4	4	4	400								
Field ID	**Date**																		
DUPE-01	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<1	<1	<1	<1	<1	<1	<1
HA02 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA03 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA04 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA05 0.15-0.25	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA06 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<1	<1	<1	<1	<1	<1	<1
HA07 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA08 0.2-0.3	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA8 0.6-0.7	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	<2.5	-	-	-	-	-	-	-
HA09 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA10 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA11 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA12 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<1	<1	<1	<1	<1	<1	<1
HA13 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA14 0.2-0.3	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA16 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA18 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA19 0.15-0.25	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	<2.5	-	-	-	-	-	-	-
HA20 0.0-.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<1	<1	<1	<1	<1	<1	<1
HA21 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<1	<1	<1	<1	<1	<1	<1
HA22 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
RINS-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRIP-BLANK-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRIP-SPIKE-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Statistics																			
Minimum Detect		**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**0.6**	**1.2**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**0.1**	**ND**
Maximum Detect		**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**0.6**	**1.2**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**0.1**	**ND**
Average Concentration *		**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.6**	**1.2**	**0.25**	**0.25**	**1.2**	**0.17**	**0.17**	**0.17**	**0.17**	**0.17**	**0.17**	**0.17**
Standard Deviation *		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
95% UCL (Student's-t) *		**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.6**	**1.2**	**0.25**	**0.25**	**1.25**	**0.249**	**0.249**	**0.249**	**0.249**	**0.249**	**0.252**	**0.249**

* A Non Detect Multiplier of 0.5 has been applied.
**Chromium VI
***D / ND = Detect / Non-Detect

Environmental Standards
NEPM, NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil
2013, NEPM 2013 Table 1A(1) HILs Res A Soil
2013, NEPM 2013 Table 1A(1) HILs Res B Soil
2013, NEPM 2013 Table 1A(1) HILs Rec C Soil

Client: New South Wales Land and Housing Corportation
Project: 195-213 Fitgerald Avenue 40-64 Yorktown Parade, Maroubra, NSW
Project No.: 17716.2

Analytical Summary Table - LR1 - Soils

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		Organochlorine Pesticides																	
	PCBs (Sum of total)	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4-DDE	a-BHC	Aldrin	b-BHC	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	g-BHC (Lindane)	Heptachlor
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	0.1	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																			
Site Specific EILs																			
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space										180									
NEPM 2013 Table 1A(1) HILs Res A Soil	1										240					10			6
NEPM 2013 Table 1A(1) HILs Res B Soil	1										600					20			10
Field ID	**Date**																		
DUPE-01	**21 Jun 2024**	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA02 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA03 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA04 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA05 0.15-0.25	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA06 0.0-0.1	**21 Jun 2024**	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA07 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA08 0.2-0.3	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA8 0.6-0.7	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA09 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA10 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA11 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA12 0.0-0.1	**21 Jun 2024**	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA13 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA14 0.2-0.3	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA16 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA18 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA19 0.15-0.25	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA20 0.0-.1	**21 Jun 2024**	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA21 0.0-0.1	**21 Jun 2024**	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA22 0.0-0.1	**21 Jun 2024**	0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
RINS-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRIP-BLANK-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRIP-SPIKE-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Statistics

Minimum Detect	**0.1**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Maximum Detect	**0.1**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Average Concentration *	**0.17**	**0.17**	**0.17**	**0.084**	**0.084**	**0.084**	**0.084**	**0.084**	**0.084**	**0.084**	**0.084**	**0.084**	**0.084**	**0.084**	**0.084**	**0.084**	**0.084**	**0.084**	**0.084**
Standard Deviation *	**0.2**	**0.2**	**0.2**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
95% UCL (Student's-t) *	**0.252**	**0.249**	**0.249**	**0.125**	**0.125**	**0.125**	**0.125**	**0.125**	**0.125**	**0.125**	**0.125**	**0.125**	**0.125**	**0.125**	**0.125**	**0.125**	**0.125**	**0.125**	**0.125**

* A Non Detect Multiplier of 0.5 has been applied.
**Chromium VI
***D / ND = Detect / Non-Detect

Environmental Standards

NEPM, NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil
2013, NEPM 2013 Table 1A(1) HILs Res A Soil
2013, NEPM 2013 Table 1A(1) HILs Res B Soil
2013, NEPM 2013 Table 1A(1) HILs Rec C Soil

	Heptachlor epoxide	Methoxychlor
	mg/kg	mg/kg
EQL	0.05	0.05
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil		
Site Specific EILs		
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space		
NEPM 2013 Table 1A(1) HILs Res A Soil		300
NEPM 2013 Table 1A(1) HILs Res B Soil		500
Field ID	**Date**	
DUPE-01	**21 Jun 2024**	<0.5	<0.5
HA02 0.0-0.1	**21 Jun 2024**	<0.05	<0.05
HA03 0.0-0.1	**21 Jun 2024**	<0.05	<0.05
HA04 0.0-0.1	**21 Jun 2024**	<0.05	<0.05
HA05 0.15-0.25	**21 Jun 2024**	<0.05	<0.05
HA06 0.0-0.1	**21 Jun 2024**	<0.5	<0.5
HA07 0.0-0.1	**21 Jun 2024**	<0.05	<0.05
HA08 0.2-0.3	**21 Jun 2024**	<0.05	<0.05
HA8 0.6-0.7	**21 Jun 2024**	-	-
HA09 0.0-0.1	**21 Jun 2024**	<0.05	<0.05
HA10 0.0-0.1	**21 Jun 2024**	<0.05	<0.05
HA11 0.0-0.1	**21 Jun 2024**	<0.05	<0.05
HA12 0.0-0.1	**21 Jun 2024**	<0.5	<0.5
HA13 0.0-0.1	**21 Jun 2024**	<0.05	<0.05
HA14 0.2-0.3	**21 Jun 2024**	<0.05	<0.05
HA16 0.0-0.1	**21 Jun 2024**	<0.05	<0.05
HA18 0.0-0.1	**21 Jun 2024**	<0.05	<0.05
HA19 0.15-0.25	**21 Jun 2024**	-	-
HA20 0.0-.1	**21 Jun 2024**	<0.5	<0.5
HA21 0.0-0.1	**21 Jun 2024**	<0.5	<0.5
HA22 0.0-0.1	**21 Jun 2024**	<0.05	<0.05
RINS-1	**21 Jun 2024**	-	-
TRIP-BLANK-1	**21 Jun 2024**	-	-
TRIP-SPIKE-1	**21 Jun 2024**	-	-

Statistics

Minimum Detect	**ND**	**ND**
Maximum Detect	**ND**	**ND**
Average Concentration *	**0.084**	**0.084**
Standard Deviation *	**0.1**	**0.1**
95% UCL (Student's-t) *	**0.125**	**0.125**

* A Non Detect Multiplier of 0.5 has been applied.
**Chromium VI
***D / ND = Detect / Non-Detect

Environmental Standards
NEPM, NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil
2013, NEPM 2013 Table 1A(1) HILs Res A Soil
2013, NEPM 2013 Table 1A(1) HILs Res B Soil
2013, NEPM 2013 Table 1A(1) HILs Rec C Soil

Analytical Summary Table - LR3 - QA/QC

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				Metals								Inorganics		Asbestos	BTEX					
				Arsenic	Cadmium	Chromium (III+VI)*****	Copper	Lead	Mercury	Nickel	Zinc	Moisture Content	Moisture Content (dried @ 103°C)	Asbestos Reported Result	Naphthalene (VOC)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	Comment	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				2	0.4	2	5	5	0.1	2	5	1	1		0.5	0.1	0.1	0.1	0.2	0.1
Lab Report Number	**Field ID**	**Date**	**Matrix Type**																	
1110644	**HA21 0.0-0.1**	**21 Jun 2024**	**Soil**	<2	<0.4	<5	11	39	<0.1	<5	77	-	13	ND****	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1
1110644	**DUPE-01**	**21 Jun 2024**	**Soil**	<2	<0.4	<5	6.0	21	<0.1	<5	48	-	10	-	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1
RPD				0	0	0	59	60	0	0	46	-	26	-	0	0	0	0	0	0
1110644	**HA21 0.0-0.1**	**21 Jun 2024**	**Soil**	<2	<0.4	<5	11	39	<0.1	<5	77	-	13	ND****	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1
ES2418753	**Trip01**	**05 Jun 2024**	**Soil**	<5	<1	12	18	69	<0.1	4	138	25.0	-	-	-	-	-	-	-	-
RPD				0	0	82	48	56	0	0	57	-	-	-	-	-	-	-	-	-

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**
****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 99999999 (0 - 10 x EQL); 50 (10 - 20 x EQL); 30 (> 20 x EQL))**
*****Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory**
******D / ND = Detect / Non-Detect**
******** Chromium VI**

					TRH							TPH								
				Xylene Total	C6-C10 Fraction (F1)	C6-C10 (F1 minus BTEX)	>C10-C16 Fraction (F2)	>C10-C16 Fraction (F2 minus Naphthalene)	>C16-C34 Fraction (F3)	>C34-C40 Fraction (F4)	>C10-C40 Fraction (Sum)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.3	20	20	50	50	100	100	100	20	20	50	50	50	0.5	0.5	0.5	0.5
1110644	HA21 0.0-0.1	21 Jun 2024	Soil	<0.3	<20	<20	<50	<50	<100	<100	<100	<20	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5
1110644	DUPE-01	21 Jun 2024	Soil	<0.3	<20	<20	<50	<50	<100	<100	<100	<20	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5
RPD				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1110644	HA21 0.0-0.1	21 Jun 2024	Soil	<0.3	<20	<20	<50	<50	<100	<100	<100	<20	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5
ES2418753	Trip01	05 Jun 2024	Soil	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**
****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range**
*****Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any me**
******D / ND = Detect / Non-Detect**
******** Chromium VI**

				PAH																	
				Benzo(a) pyrene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)pyrene TEQ calc (Half)	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ calc (Zero)	PAHs (Sum of total)	Arochlor 1016	Arochlor 1221	Arochlor 1232
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.1	0.1	0.1
Lab Report Number	**Field ID**	**Date**	**Matrix Type**																	
1110644	**HA21 0.0-0.1**	**21 Jun 2024**	**Soil**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<1	<1	<1
1110644	**DUPE-01**	**21 Jun 2024**	**Soil**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<1	<1	<1
RPD				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1110644	**HA21 0.0-0.1**	**21 Jun 2024**	**Soil**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<1	<1	<1
ES2418753	**Trip01**	**05 Jun 2024**	**Soil**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**
****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range**
*****Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any me**
******D / ND = Detect / Non-Detect**
******** Chromium VI**

				PCBs					Organochlorine Pesticides											
				Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4-DDE	a-BHC	Aldrin	b-BHC	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Lab Report Number	**Field ID**	**Date**	**Matrix Type**																	
1110644	**HA21 0.0-0.1**	**21 Jun 2024**	**Soil**	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1110644	**DUPE-01**	**21 Jun 2024**	**Soil**	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
RPD				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1110644	**HA21 0.0-0.1**	**21 Jun 2024**	**Soil**	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES2418753	**Trip01**	**05 Jun 2024**	**Soil**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**
****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range**
*****Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any me**
******D / ND = Detect / Non-Detect**
******** Chromium VI**

				Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Lab Report Number	**Field ID**	**Date**	**Matrix Type**								
1110644	**HA21 0.0-0.1**	**21 Jun 2024**	**Soil**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1110644	**DUPE-01**	**21 Jun 2024**	**Soil**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
RPD				0	0	0	0	0	0	0	0
1110644	**HA21 0.0-0.1**	**21 Jun 2024**	**Soil**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES2418753	**Trip01**	**05 Jun 2024**	**Soil**	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**
****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range**
*****Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any me**
******D / ND = Detect / Non-Detect**
******** Chromium VI**

APPENDIX D – Alliance (2024b) Contamination Assessment Laboratory Summary Tables

		Metals									Asbestos	BTEX									
		Arsenic	Cadmium	Chromium (III+VI)**	Copper	Lead		Mercury	Nickel	Zinc	Asbestos Reported Result	Naphthalene (VOC)		Benzene		Toluene		Ethylbenzene		Xylene (m & p)	
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	Comment	mg/kg	%	mg/kg	%	mg/kg	%	mg/kg	%	mg/kg	%
EQL		2	0.4	5	5	5	0.01	0.1	5	5	D/ND	0.5	1	0.1	1	0.1	1	0.1	1	0.2	1
NSW 2014 General Solid Waste CT1 (No Leaching)		100	20	100		100		4	40					10		288		600			
NSW 2014 General Solid Waste SCC1 (with leached)		500	100			1,500		50	1,050					18		518		1,080			
NSW 2014 General Solid Waste TCLP1 (leached)							5														
NSW 2014 Restricted Solid Waste CT2 (No Leaching)		400	80	400		400		16	160					40		1,152		2,400			
NSW 2014 Restricted Solid Waste SCC2 (with leached)		2,000	400			6,000		200	4,200					72		2,073		4,320			
NSW 2014 Restricted Solid Waste TCLP2 (leached)							20														
Field ID	**Date**																				
HA02 0.0-0.1	**21 Jun 2024**	<2	<0.4	7.3	19	71	-	<0.1	<5	60	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA03 0.0-0.1	**21 Jun 2024**	<2	<0.4	<5	12	26	-	<0.1	<5	43	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA04 0.0-0.1	**21 Jun 2024**	3.6	<0.4	<5	15	25	-	0.2	<5	30	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA05 0.15-0.25	**21 Jun 2024**	<2	<0.4	<5	<5	5.2	-	<0.1	<5	14	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA06 0.0-0.1	**21 Jun 2024**	<2	<0.4	<5	23	51	-	<0.1	<5	67	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA07 0.0-0.1	**21 Jun 2024**	<2	<0.4	<5	24	30	-	<0.1	<5	110	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA08 0.2-0.3	**21 Jun 2024**	<2	<0.4	<5	10.0	14	-	<0.1	<5	19	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA8 0.6-0.7	**21 Jun 2024**	<2	<0.4	<5	<5	<5	-	<0.1	<5	<5	-	-	-	-	-	-	-	-	-	-	-
HA09 0.0-0.1	**21 Jun 2024**	<2	<0.4	<5	15	28	-	<0.1	<5	45	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA10 0.0-0.1	**21 Jun 2024**	<2	<0.4	<5	14	37	-	<0.1	<5	82	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA11 0.0-0.1	**21 Jun 2024**	<2	<0.4	<5	21	41	-	<0.1	<5	200	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA12 0.0-0.1	**21 Jun 2024**	<2	<0.4	<5	23	50	-	<0.1	<5	82	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA13 0.0-0.1	**21 Jun 2024**	<2	<0.4	<5	<5	14	-	<0.1	<5	29	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA14 0.2-0.3	**21 Jun 2024**	<2	<0.4	<5	10	28	-	<0.1	<5	290	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA16 0.0-0.1	**21 Jun 2024**	<2	<0.4	<5	6.2	26	-	<0.1	<5	44	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA18 0.0-0.1	**21 Jun 2024**	<2	<0.4	<5	21	37	-	<0.1	<5	79	D	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA19 0.15-0.25	**21 Jun 2024**	<2	<0.4	<5	<5	8.7	-	<0.1	<5	19	-	-	-	-	-	-	-	-	-	-	-
HA20 0.0-0.1	**21 Jun 2024**	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA20 0.0-.1	**21 Jun 2024**	<2	1.0	13	42	110	-	<0.1	<5	190	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA21 0.0-0.1	**21 Jun 2024**	<2	<0.4	<5	11	39	-	<0.1	<5	77	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
HA22 0.0-0.1	**21 Jun 2024**	<2	<0.4	5.3	6.7	33	-	<0.1	<5	49	ND	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
TRIP-BLANK-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	<0.5	-	<0.1	-	<0.1	-	<0.1	-	<0.2	-
TRIP-SPIKE-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	110	-	97	-	95	-	96	-	99
Statistics																					
Minimum Detect		**3.6**	**1**	**5.3**	**6.2**	**5.2**	**0.04**	**0.2**	**ND**	**14**	**1**	**ND**	**110**	**ND**	**97**	**ND**	**95**	**ND**	**96**	**ND**	**99**
Maximum Detect		**3.6**	**1**	**13**	**42**	**110**	**0.04**	**0.2**	**ND**	**290**	**1**	**ND**	**110**	**ND**	**97**	**ND**	**95**	**ND**	**96**	**ND**	**99**
Average Concentration *		**1.1**	**0.24**	**3.4**	**14**	**34**		**0.058**	**2.5**	**77**	**1**	**0.25**		**0.05**		**0.05**		**0.05**		**0.1**	
Standard Deviation *		**0.58**	**0.18**	**2.6**	**9.9**	**24**		**0.034**	**0**	**72**	**0**	**0**		**0**		**0**		**0**		**0**	
95% UCL (Student's-t) *		**1.355**	**0.309**	**4.396**	**17.97**	**43.27**		**0.0705**	**2.5**	**104.6**	**1**	**0.25**		**0.05**		**0.05**		**0.05**		**0.1**	

* A Non Detect Multiplier of 0.5 has been applied.

**Chromium VI

D-Detect / ND-Non-Detect

Environmental Standards

NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)
NSW EPA, November 2014, NSW 2014 General Solid Waste SCC1 (with leached)
NSW EPA, November 2014, NSW 2014 General Solid Waste TCLP1 (leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste CT2 (No Leaching)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste TCLP2 (leached)

		Xylene (o)		Xylene Total	
		mg/kg	%	mg/kg	%
EQL		0.1	1	0.3	1
NSW 2014 General Solid Waste CT1 (No Leaching)				1,000	
NSW 2014 General Solid Waste SCC1 (with leached)				1,800	
NSW 2014 General Solid Waste TCLP1 (leached)					
NSW 2014 Restricted Solid Waste CT2 (No Leaching)				4,000	
NSW 2014 Restricted Solid Waste SCC2 (with leached)				7,200	
NSW 2014 Restricted Solid Waste TCLP2 (leached)					
Field ID	**Date**				
HA02 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA03 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA04 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA05 0.15-0.25	**21 Jun 2024**	<0.1	-	<0.3	-
HA06 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA07 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA08 0.2-0.3	**21 Jun 2024**	<0.1	-	<0.3	-
HA8 0.6-0.7	**21 Jun 2024**	-	-	-	-
HA09 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA10 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA11 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA12 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA13 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA14 0.2-0.3	**21 Jun 2024**	<0.1	-	<0.3	-
HA16 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA18 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA19 0.15-0.25	**21 Jun 2024**	-	-	-	-
HA20 0.0-0.1	**21 Jun 2024**	-	-	-	-
HA20 0.0-.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA21 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
HA22 0.0-0.1	**21 Jun 2024**	<0.1	-	<0.3	-
TRIP-BLANK-1	**21 Jun 2024**	<0.1	-	<0.3	-
TRIP-SPIKE-1	**21 Jun 2024**	-	110	-	100
Statistics					
Minimum Detect		**ND**	**110**	**ND**	**100**
Maximum Detect		**ND**	**110**	**ND**	**100**
Average Concentration *		**0.05**		**0.15**	
Standard Deviation *		**0**		**0**	
95% UCL (Student's-t) *		**0.05**		**0.15**	

* A Non Detect Multiplier of 0.5 has been applied.
**Chromium VI
D-Detect / ND-Non-Detect
Environmental Standards
NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)
NSW EPA, November 2014, NSW 2014 General Solid Waste SCC1 (with leached)
NSW EPA, November 2014, NSW 2014 General Solid Waste TCLP1 (leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste CT2 (No Leaching)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste TCLP2 (leached)

		TRH								TPH					
		C6-C10 Fraction (F1)		C6-C10 (F1 minus BTEX)	>C10-C16 Fraction (F2)	>C10-C16 Fraction (F2 minus Naphthalene)	>C16-C34 Fraction (F3)	>C34-C40 Fraction (F4)	>C10-C40 Fraction (Sum)	C6-C9 Fraction		C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)
		mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg
EQL		20	1	20	50	50	100	100	100	20	1	20	50	50	50
NSW 2014 General Solid Waste CT1 (No Leaching)										650					10,000
NSW 2014 General Solid Waste SCC1 (with leached)										650					10,000
NSW 2014 General Solid Waste TCLP1 (leached)															
NSW 2014 Restricted Solid Waste CT2 (No Leaching)										2,600					40,000
NSW 2014 Restricted Solid Waste SCC2 (with leached)										2,600					40,000
NSW 2014 Restricted Solid Waste TCLP2 (leached)															
Field ID	**Date**														
HA02 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50
HA03 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50
HA04 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	55	55
HA05 0.15-0.25	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50
HA06 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	150	<100	150	<20	-	75	81	95	251
HA07 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50
HA08 0.2-0.3	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50
HA8 0.6-0.7	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA09 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50
HA10 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50
HA11 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	56	56
HA12 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	61	61
HA13 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50
HA14 0.2-0.3	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50
HA16 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50
HA18 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50
HA19 0.15-0.25	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA20 0.0-0.1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA20 0.0-.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	120	120	<20	-	<20	<50	120	120
HA21 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50
HA22 0.0-0.1	**21 Jun 2024**	<20	-	<20	<50	<50	<100	<100	<100	<20	-	<20	<50	<50	<50
TRIP-BLANK-1	**21 Jun 2024**	<20	-	<20	-	-	-	-	-	<20	-	-	-	-	-
TRIP-SPIKE-1	**21 Jun 2024**	-	95	-	-	-	-	-	-	-	94	-	-	-	-
Statistics															
Minimum Detect		**ND**	**95**	**ND**	**ND**	**ND**	**150**	**120**	**120**	**ND**	**94**	**75**	**81**	**55**	**55**
Maximum Detect		**ND**	**95**	**ND**	**ND**	**ND**	**150**	**120**	**150**	**ND**	**94**	**75**	**81**	**120**	**251**
Average Concentration *		**10**		**10**	**25**	**25**	**56**	**54**	**59**	**10**		**14**	**28**	**40**	**48**
Standard Deviation *		**0**		**0**	**0**	**0**	**24**	**16**	**28**	**0**		**15**	**13**	**28**	**56**
95% UCL (Student's-t) *		**10**		**10**	**25**	**25**	**65.22**	**60.65**	**70.91**	**10**		**19.89**	**33.52**	**51.01**	**71.24**

* A Non Detect Multiplier of 0.5 has been applied.
**Chromium VI
D-Detect / ND-Non-Detect

Environmental Standards

NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)
NSW EPA, November 2014, NSW 2014 General Solid Waste SCC1 (with leached)
NSW EPA, November 2014, NSW 2014 General Solid Waste TCLP1 (leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste CT2 (No Leaching)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste TCLP2 (leached)

		PAH																			
		Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)pyrene TEQ calc (Half)	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ calc (Zero)	PAHs (Sum of total)
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NSW 2014 General Solid Waste CT1 (No Leaching)						0.8															200
NSW 2014 General Solid Waste SCC1 (with leached)						10															200
NSW 2014 General Solid Waste TCLP1 (leached)																					
NSW 2014 Restricted Solid Waste CT2 (No Leaching)						3.2															800
NSW 2014 Restricted Solid Waste SCC2 (with leached)						23															800
NSW 2014 Restricted Solid Waste TCLP2 (leached)																					
Field ID	**Date**																				
HA02 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA03 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA04 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA05 0.15-0.25	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA06 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA07 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA08 0.2-0.3	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA8 0.6-0.7	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA09 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA10 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA11 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA12 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA13 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA14 0.2-0.3	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA16 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA18 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA19 0.15-0.25	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA20 0.0-0.1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA20 0.0-.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA21 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
HA22 0.0-0.1	**21 Jun 2024**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
TRIP-BLANK-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRIP-SPIKE-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Statistics																					
Minimum Detect		**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**0.6**	**1.2**	**ND**	**ND**
Maximum Detect		**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**0.6**	**1.2**	**ND**	**ND**
Average Concentration *		**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.6**	**1.2**	**0.25**	**0.25**
Standard Deviation *		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
95% UCL (Student's-t) *		**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.6**	**1.2**	**0.25**	**0.25**

* A Non Detect Multiplier of 0.5 has been applied.
**Chromium VI
D-Detect / ND-Non-Detect

Environmental Standards

NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)
NSW EPA, November 2014, NSW 2014 General Solid Waste SCC1 (with leached)
NSW EPA, November 2014, NSW 2014 General Solid Waste TCLP1 (leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste CT2 (No Leaching)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste TCLP2 (leached)

		PCBs								Halogenated Benzenes
		Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	Hexachlorobenzene
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05
NSW 2014 General Solid Waste CT1 (No Leaching)									50	
NSW 2014 General Solid Waste SCC1 (with leached)									50	
NSW 2014 General Solid Waste TCLP1 (leached)										
NSW 2014 Restricted Solid Waste CT2 (No Leaching)									50	
NSW 2014 Restricted Solid Waste SCC2 (with leached)									50	
NSW 2014 Restricted Solid Waste TCLP2 (leached)										
Field ID	**Date**									
HA02 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
HA03 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
HA04 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
HA05 0.15-0.25	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
HA06 0.0-0.1	**21 Jun 2024**	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
HA07 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
HA08 0.2-0.3	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
HA8 0.6-0.7	**21 Jun 2024**	-	-	-	-	-	-	-	-	-
HA09 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
HA10 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
HA11 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
HA12 0.0-0.1	**21 Jun 2024**	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
HA13 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
HA14 0.2-0.3	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
HA16 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
HA18 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
HA19 0.15-0.25	**21 Jun 2024**	-	-	-	-	-	-	-	-	-
HA20 0.0-0.1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-
HA20 0.0-.1	**21 Jun 2024**	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
HA21 0.0-0.1	**21 Jun 2024**	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
HA22 0.0-0.1	**21 Jun 2024**	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.05
TRIP-BLANK-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-
TRIP-SPIKE-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-
Statistics										
Minimum Detect		**ND**	**ND**	**ND**	**ND**	**ND**	**0.1**	**ND**	**0.1**	**ND**
Maximum Detect		**ND**	**ND**	**ND**	**ND**	**ND**	**0.1**	**ND**	**0.1**	**ND**
Average Concentration *		**0.15**	**0.15**	**0.15**	**0.15**	**0.15**	**0.15**	**0.15**	**0.15**	**0.075**
Standard Deviation *		**0.19**	**0.19**	**0.19**	**0.19**	**0.19**	**0.19**	**0.19**	**0.19**	**0.096**
95% UCL (Student's-t) *		**0.229**	**0.229**	**0.229**	**0.229**	**0.229**	**0.231**	**0.229**	**0.231**	**0.114**

* A Non Detect Multiplier of 0.5 has been applied.
**Chromium VI
D-Detect / ND-Non-Detect
Environmental Standards
NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)
NSW EPA, November 2014, NSW 2014 General Solid Waste SCC1 (with leached)
NSW EPA, November 2014, NSW 2014 General Solid Waste TCLP1 (leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste CT2 (No Leaching)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste TCLP2 (leached)

		Organochlorine Pesticides																				
		Other organochlorine pesticides EPAVic	4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL		0.1	0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
NSW 2014 General Solid Waste CT1 (No Leaching)																						
NSW 2014 General Solid Waste SCC1 (with leached)																						
NSW 2014 General Solid Waste TCLP1 (leached)																						
NSW 2014 Restricted Solid Waste CT2 (No Leaching)																						
NSW 2014 Restricted Solid Waste SCC2 (with leached)																						
NSW 2014 Restricted Solid Waste TCLP2 (leached)																						
Field ID	**Date**																					
HA02 0.0-0.1	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA03 0.0-0.1	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA04 0.0-0.1	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA05 0.15-0.25	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA06 0.0-0.1	**21 Jun 2024**	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA07 0.0-0.1	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA08 0.2-0.3	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA8 0.6-0.7	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA09 0.0-0.1	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA10 0.0-0.1	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA11 0.0-0.1	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA12 0.0-0.1	**21 Jun 2024**	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA13 0.0-0.1	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA14 0.2-0.3	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA16 0.0-0.1	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA18 0.0-0.1	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HA19 0.15-0.25	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA20 0.0-0.1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA20 0.0-.1	**21 Jun 2024**	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA21 0.0-0.1	**21 Jun 2024**	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HA22 0.0-0.1	**21 Jun 2024**	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
TRIP-BLANK-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRIP-SPIKE-1	**21 Jun 2024**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Statistics																						
Minimum Detect		**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Maximum Detect		**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Average Concentration *		**0.15**	**0.075**	**0.075**	**0.075**	**0.075**	**0.075**	**0.15**	**0.075**	**0.075**	**0.075**	**0.075**	**0.075**	**0.075**	**0.075**	**0.075**	**0.075**	**0.075**	**0.075**	**0.075**	**0.075**	**0.075**
Standard Deviation *		**0.19**	**0.096**	**0.096**	**0.096**	**0.096**	**0.096**	**0.19**	**0.096**	**0.096**	**0.096**	**0.096**	**0.096**	**0.096**	**0.096**	**0.096**	**0.096**	**0.096**	**0.096**	**0.096**	**0.096**	**0.096**
95% UCL (Student's-t) *		**0.229**	**0.114**	**0.114**	**0.114**	**0.114**	**0.114**	**0.229**	**0.114**	**0.114**	**0.114**	**0.114**	**0.114**	**0.114**	**0.114**	**0.114**	**0.114**	**0.114**	**0.114**	**0.114**	**0.114**	**0.114**

* A Non Detect Multiplier of 0.5 has been applied.
**Chromium VI
D-Detect / ND-Non-Detect
Environmental Standards
NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)
NSW EPA, November 2014, NSW 2014 General Solid Waste SCC1 (with leached)
NSW EPA, November 2014, NSW 2014 General Solid Waste TCLP1 (leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste CT2 (No Leaching)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste TCLP2 (leached)

		Methoxychlor	Toxaphene
		mg/kg	mg/kg
EQL		0.05	0.5
NSW 2014 General Solid Waste CT1 (No Leaching)			
NSW 2014 General Solid Waste SCC1 (with leached)			
NSW 2014 General Solid Waste TCLP1 (leached)			
NSW 2014 Restricted Solid Waste CT2 (No Leaching)			
NSW 2014 Restricted Solid Waste SCC2 (with leached)			
NSW 2014 Restricted Solid Waste TCLP2 (leached)			
Field ID	**Date**		
HA02 0.0-0.1	**21 Jun 2024**	<0.05	<0.5
HA03 0.0-0.1	**21 Jun 2024**	<0.05	<0.5
HA04 0.0-0.1	**21 Jun 2024**	<0.05	<0.5
HA05 0.15-0.25	**21 Jun 2024**	<0.05	<0.5
HA06 0.0-0.1	**21 Jun 2024**	<0.5	<10
HA07 0.0-0.1	**21 Jun 2024**	<0.05	<0.5
HA08 0.2-0.3	**21 Jun 2024**	<0.05	<0.5
HA8 0.6-0.7	**21 Jun 2024**	-	-
HA09 0.0-0.1	**21 Jun 2024**	<0.05	<0.5
HA10 0.0-0.1	**21 Jun 2024**	<0.05	<0.5
HA11 0.0-0.1	**21 Jun 2024**	<0.05	<0.5
HA12 0.0-0.1	**21 Jun 2024**	<0.5	<10
HA13 0.0-0.1	**21 Jun 2024**	<0.05	<0.5
HA14 0.2-0.3	**21 Jun 2024**	<0.05	<0.5
HA16 0.0-0.1	**21 Jun 2024**	<0.05	<0.5
HA18 0.0-0.1	**21 Jun 2024**	<0.05	<0.5
HA19 0.15-0.25	**21 Jun 2024**	-	-
HA20 0.0-0.1	**21 Jun 2024**	-	-
HA20 0.0-.1	**21 Jun 2024**	<0.5	<10
HA21 0.0-0.1	**21 Jun 2024**	<0.5	<10
HA22 0.0-0.1	**21 Jun 2024**	<0.05	<0.5
TRIP-BLANK-1	**21 Jun 2024**	-	-
TRIP-SPIKE-1	**21 Jun 2024**	-	-

Statistics

Minimum Detect	**ND**	**ND**
Maximum Detect	**ND**	**ND**
Average Concentration *	**0.075**	**1.3**
Standard Deviation *	**0.096**	**2**
95% UCL (Student's-t) *	**0.114**	**2.139**

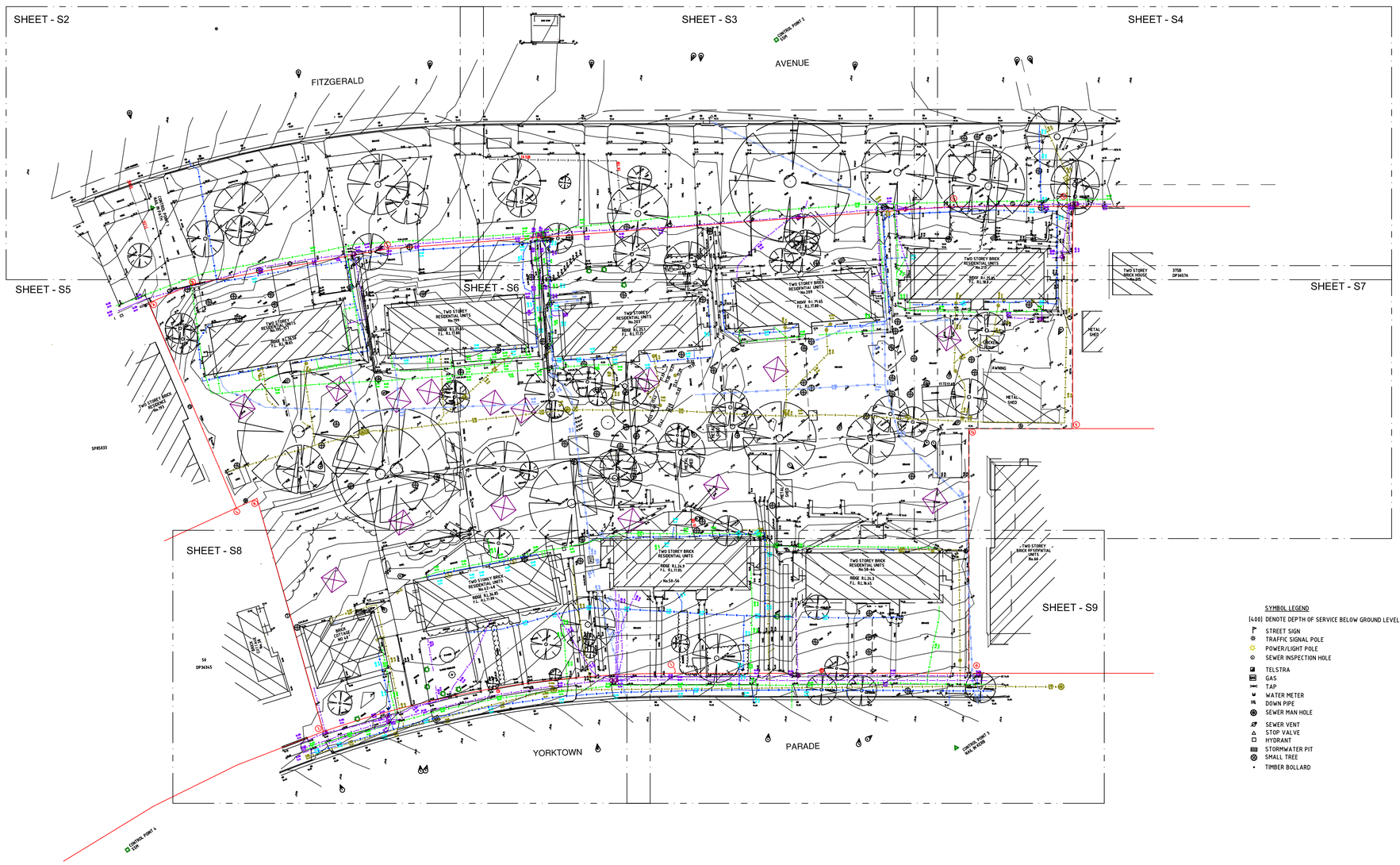
* A Non Detect Multiplier of 0.5 has been applied.
**Chromium VI
D-Detect / ND-Non-Detect

Environmental Standards

NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)
NSW EPA, November 2014, NSW 2014 General Solid Waste SCC1 (with leached)
NSW EPA, November 2014, NSW 2014 General Solid Waste TCLP1 (leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste CT2 (No Leaching)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste TCLP2 (leached)

APPENDIX E – Site Survey Plan

L.G.A. BAYSIDE COUNCIL



BOUNDARY DIMENSIONS

Number	Bearing	Distance
1	120°11'25"	93.180
2	124°29'35"	19.831
3	214°29'35"	36.558
4	304°28'45"	17.127
5	214°28'45"	40.235
6	304°28'45"	48.400
7	18°36'00"	39.864
8	279°53'40"	3.723
9	11°13'45"	36.670
10	101°13'55"	7.940
11	114°14'55"	32.635

ARC BOUNDARY DIMENSIONS

Number	Radius	ARC	CHORD	BEARING
1	178.920	58.913	58.647	115°04'15"

BOUNDARY CO-ORDINATES

BDY CNR	EASTING	NORTHING
A	337 909.900	6 242 443.000
B	337 917.700	6 242 442.000
C	337 947.500	6 242 428.000
D	338 028.000	6 242 381.000
E	338 044.300	6 242 370.000
F	338 023.600	6 242 340.000
G	338 009.500	6 242 350.000
H	337 986.700	6 242 317.000
I	337 946.800	6 242 344.000
J	337 893.700	6 242 369.000
K	337 906.400	6 242 407.000
J	337 902.600	6 242 407.000

LEGEND :

(A) - DENOTES BOUNDARY CORNER

(1) - DENOTES BOUNDARY DIMENSION TAG

CONTROL POINT 1	337 919.290	6 242 455.890	20.583	NAIL IN PATH
CONTROL POINT 2	338 019.650	6 242 420.510	17.680	SSM
CONTROL POINT 3	337 978.090	6 242 430.730	14.271	NAIL IN KARB
CONTROL POINT 4	337 856.140	6 242 371.120	17.244	SSM

SYMBOL LEGEND

[400] DENOTE DEPTH OF SERVICE BELOW GROUND LEVEL
STREET SIGN
TRAFFIC SIGNAL POLE
POWER/LIGHT POLE
SEWER INSPECTION HOLE
TELSTRA
GAS
TAP
WATER METER
DOWN PIPE
SEWER MAN HOLE
SEWER VENT
STOP VALVE
HYDRANT
STORMWATER PIT
SMALL TREE
TIMBER BOLLARD

NOTES:

1) TITLE BEARINGS AND DIMENSIONS ARE SHOWN. BOUNDARIES DETERMINED FROM PLANS AVAILABLE ON PUBLIC RECORD.
2) THIS SURVEY HAS BEEN MADE PURSUANT TO SECTION 9 OF THE SURVEYING & SPATIAL INFORMATION REGULATION 2017.
2) ORIGIN OF LEVELS: SSM 163664 R.L 17.68 (A.H.D.) SCIMS
3) SITE COMPRISES LOTS 248 & 249 DP36345 AND LOT 1 DP668769
4) SITE AREA 9596.6 m² BY TITLE DIMENSIONS.
5) UNDERGROUND SERVICES HAVE NOT BEEN INVESTIGATED.
6) TREE SIZES ARE INDICATIVE 300Ø@10Hß DENOTES TREE SIZE 0.3 TRUNK DIAMETER, 10 SPREAD, 8 HIGH. (G) - DENOTES TOP OF GUTTER. - DENOTES EASEMENT TO DRAIN WATER (DEALING No.Q313685)
7) TREE NAMES SHOWN CONSTITUTE OUR OPINION ONLY IF TREE SPECIES IDENTIFICATION IS IMPORTANT THEY SHOULD BE DETERMINED BY A QUALIFIED ARBORIST.
8) SERVICE PIT LOCATIONS HAVE DETERMINED BY SURVEY. LOCATION OF UNDERGROUND SERVICES HAVE BEEN DETERMINED ONSITE BY DIGSAFE PTY LTD, USING HAND WAND UNDERGROUND DETECTION AND GROUND PENETRATING RADAR (GPR). DUE TO SITE SOIL DENSITIES AND CONDITIONS SOME SERVICES WERE UNTRACEABLE AT POINTS. NON-SIGNAL PRODUCING SERVICES MAY EXIST AND ARE NOT SHOWN. PRIOR TO ANY CONSTRUCTION OR DEMOLITION, THOROUGH SEARCH OF ALL AUTHORITIES SHOULD BE MADE TO DETERMINE THE EXTENT AND NATURE OF SERVICES POT HOLING AND HAND AUGERS SHOULD BE USED WHEN EXAMINING SERVICES.
9) [500]A DENOTES SERVICE 500M BELOW SURFACE, DEPTH QUALITY CLASSIFICATION 'A'.
10) FOR DEPTH QUALITY CLASSIFICATION REFERS TO DIGSAFE REPORT.

No.	DATE	NOTATION/AMENDMENT	No.	DATE	NOTATION/AMENDMENT

FILE	FILE SIZE (MB)	CHECKED BY

CONTOUR INTERVAL:
DATUM: A.H.D.
ORIGIN OF DATUM: SSM 163664 RL17.68 SCIMS
100 YEAR FLOOD RL: N/A
RECOMMENDED MINIMUM FLOOR RL: N/A
SOURCE OF FLOOD INFO: N/A

LEGEND OF COMMONLY USED SYMBOLS

WATER W
SEWER S
ELECTRICITY O/H P
ELECTRICITY U/G E
TELECOM O/H T / U/G T
GAS G
STORMWATER SW
BENCH MARK
SURVEY CONTROL MARK PM SSM

REDUCTION RATIO 1 : 400 (A1)

0 5 10 15 20

LAND TITLE INFORMATION

LOTS: 248-249 1
PLAN NOs : D.P 36345 DP668769
OTHER:
AREA: 9596.6m²

DATE OF SURVEY: 24.06.24
SURVEY CONSULTANT:

Norton Survey Partners
SURVEYORS & LAND TITLE CONSULTANTS
PH +61 2 9555 2744
office@nspartners.com.au
SUITE 1 /505 BALMAIN ROAD
LILYFIELD N.S.W. 2040

REGISTERED SURVEYOR JACK HUGHES
REF: 31470-1.DWG

NSW GOVERNMENT Family & Community Services Land & Housing Corporation

DRAWING TITLE
DETAIL & LEVEL SURVEY

LOCATION
MAROUBRA

STREET ADDRESS
195-213 FITZGERALD AVENUE
40-64 YORKTOWN PARADE

TYPE
S

JOB NUMBER
31470

SHT. 1
OF 10

L.G.A. BAYSIDE COUNCIL

No.	DATE	NOTATION/AMENDMENT	No.	DATE	NOTATION/AMENDMENT

FILE	FILE SIZE (MB)	CHECKED BY

CONTOUR INTERVAL:
DATUM: A.H.D.
ORIGIN OF DATUM: SSM 163664 RL17.68 SCIMS
100 YEAR FLOOD RL: N/A
RECOMMENDED MINIMUM FLOOR RL: N/A
SOURCE OF FLOOD INFO: N/A

LEGEND OF COMMONLY USED SYMBOLS

WATER	W W W W
SEWER	S S S S
ELECTRICITY O/H	P P P P
ELECTRICITY U/G	E E E E
TELECOM O/H U/G	T T T T
GAS	G G G G
STORMWATER	SW SW SW SW

BENCH MARK — SURVEY CONTROL MARK — PM SSM

REDUCTION RATIO 1 : 100 (A1)

0 5 10 15 20

LAND TITLE INFORMATION
LOTS: 248-249
PLAN NOs : D.P 36345
OTHER:
AREA: 9596.6m²

DATE OF SURVEY: 24.06.24
SURVEY CONSULTANT:

Norton Survey Partners
SURVEYORS & LAND TITLE CONSULTANTS
PH +61 2 9555 2744
office@nspartners.com.au
SUITE 1 /505 BALMAIN ROAD
LILYFIELD N.S.W. 2040

REGISTERED SURVEYOR JACK HUGHES
REF: 31470-1.DWG

NSW GOVERNMENT
Family & Community Services
Land & Housing Corporation

DRAWING TITLE
DETAIL & LEVEL SURVEY

LOCATION
MAROUBRA

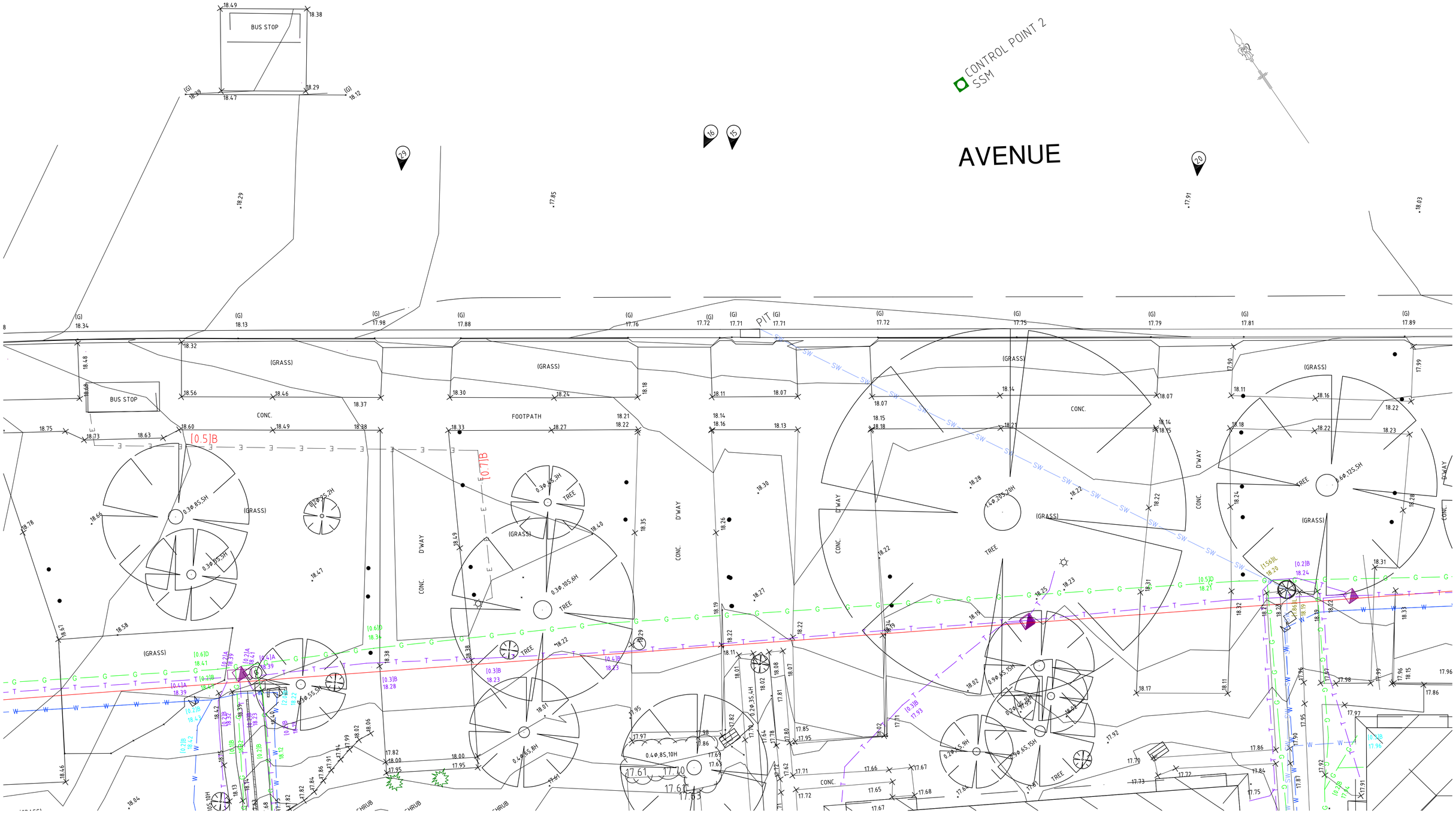
STREET ADDRESS
195-213 FITZGERALD AVENUE
40-64 YORKTOWN PARADE

TYPE S

JOB NUMBER 31470

SHT. 2 OF 10

L.G.A. BAYSIDE COUNCIL



No.	DATE	NOTATION/AMENDMENT

No.	DATE	NOTATION/AMENDMENT

FILE	FILE SIZE (MB)	CHECKED BY

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DATUM: A.H.D.

ORIGIN OF DATUM: SSM 163664 RL17.68 SCIMS

100 YEAR FLOOD RL: N/A

RECOMMENDED MINIMUM FLOOR RL: N/A

SOURCE OF FLOOD INFO: N/A

LEGEND OF COMMONLY USED SYMBOLS

WATER W
SEWER S
ELECTRICITY O/H P
ELECTRICITY U/G E
TELECOM O/H T / U/G T
GAS G
STORMWATER SW

BENCH MARK

SURVEY CONTROL MARK

PM SSM

REDUCTION RATIO 1 : 100 (A1)

0 5 10 15 20

LAND TITLE INFORMATION

LOTS: 248-249

PLAN NOs : D.P 36345

OTHER:

AREA: 9596.6m²

DATE OF SURVEY: 24.06.24

SURVEY CONSULTANT:

Norton Survey Partners
SURVEYORS & LAND TITLE CONSULTANTS
PH +61 2 9555 2744
office@nspartners.com.au
SUITE 1 /505 BALMAIN ROAD
LILYFIELD N.S.W. 2040

REGISTERED SURVEYOR JACK HUGHES

REF: 31470-1.DWG

NSW GOVERNMENT Family & Community Services Land & Housing Corporation

LOCATION

MAROUBRA

STREET ADDRESS

195-213 FITZGERALD AVENUE
40-64 YORKTOWN PARADE

TYPE S

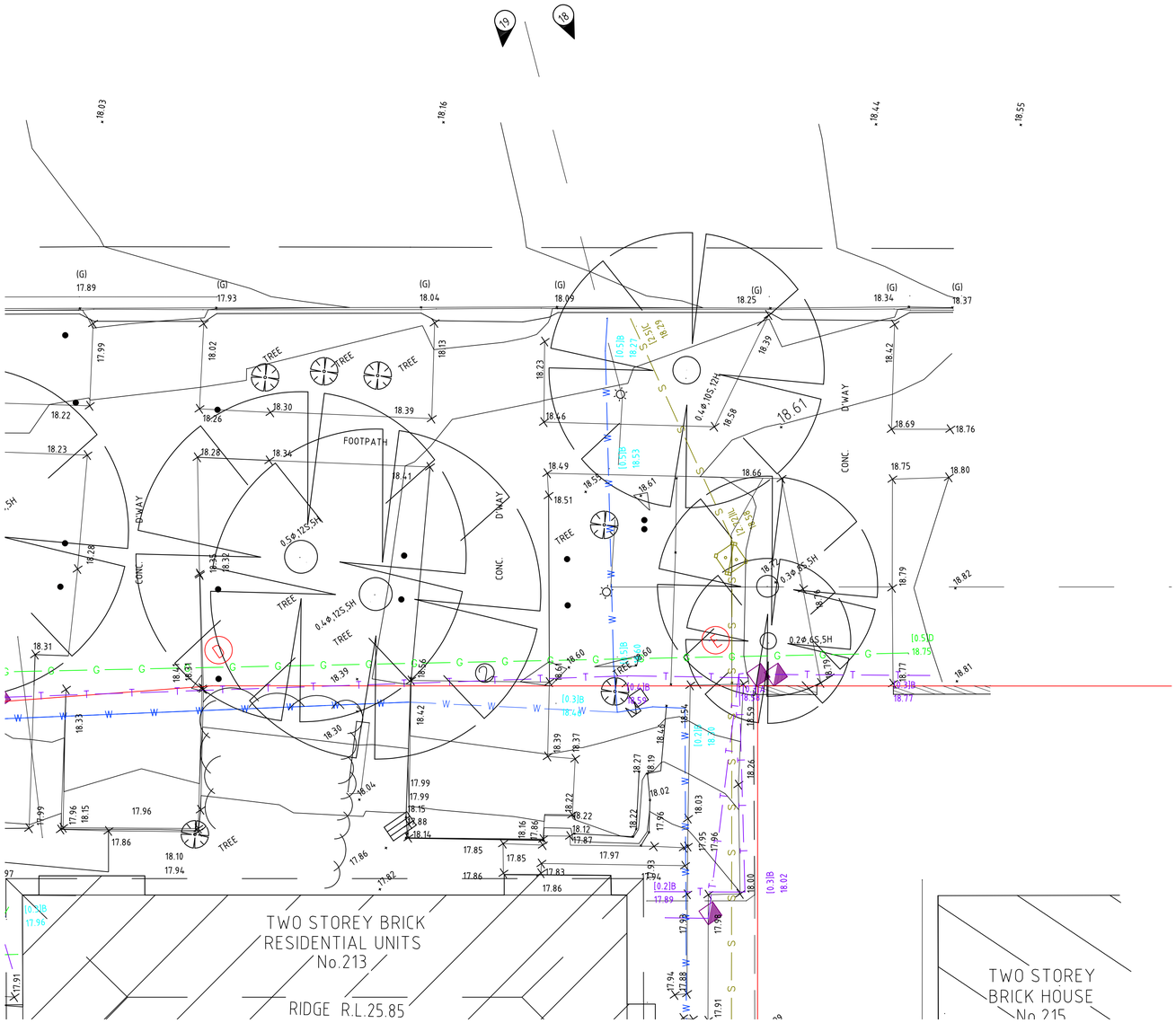
DRAWING TITLE

DETAIL & LEVEL SURVEY

JOB NUMBER 31470

SHT. 3 OF 10

L.G.A. BAYSIDE COUNCIL



No.	DATE	NOTATION/AMENDMENT	No.	DATE	NOTATION/AMENDMENT

FILE	FILE SIZE (MB)	CHECKED BY

CONTOUR INTERVAL:

DATUM: A.H.D.

ORIGIN OF DATUM: SSM 163664 RL17.68 SCIMS

100 YEAR FLOOD RL: N/A

RECOMMENDED MINIMUM FLOOR RL: N/A

SOURCE OF FLOOD INFO: N/A

LEGEND OF COMMONLY USED SYMBOLS

WATER W
SEWER S
ELECTRICITY O/H P
ELECTRICITY U/G E
TELECOM O/H T / U/G T
GAS G
STORMWATER SW
BENCH MARK
SURVEY CONTROL MARK PM SSM

REDUCTION RATIO 1 : 100 (A1)

0 5 10 15 20

LAND TITLE INFORMATION

LOTS: 248-249

PLAN NOs : D.P. 36345

OTHER:

AREA: 8596.6m²

DATE OF SURVEY: 24.06.24

SURVEY CONSULTANT:

Norton Survey Partners
SURVEYORS & LAND TITLE CONSULTANTS
PH +61 2 9555 2744
office@nspartners.com.au
SUITE 1 /505 BALMAIN ROAD
LILYFIELD N.S.W. 2040

REGISTERED SURVEYOR JACK HUGHES

REF: 31470-1.DWG

NSW GOVERNMENT Family & Community Services Land & Housing Corporation

DRAWING TITLE

DETAIL & LEVEL SURVEY

LOCATION

MAROUBRA

STREET ADDRESS

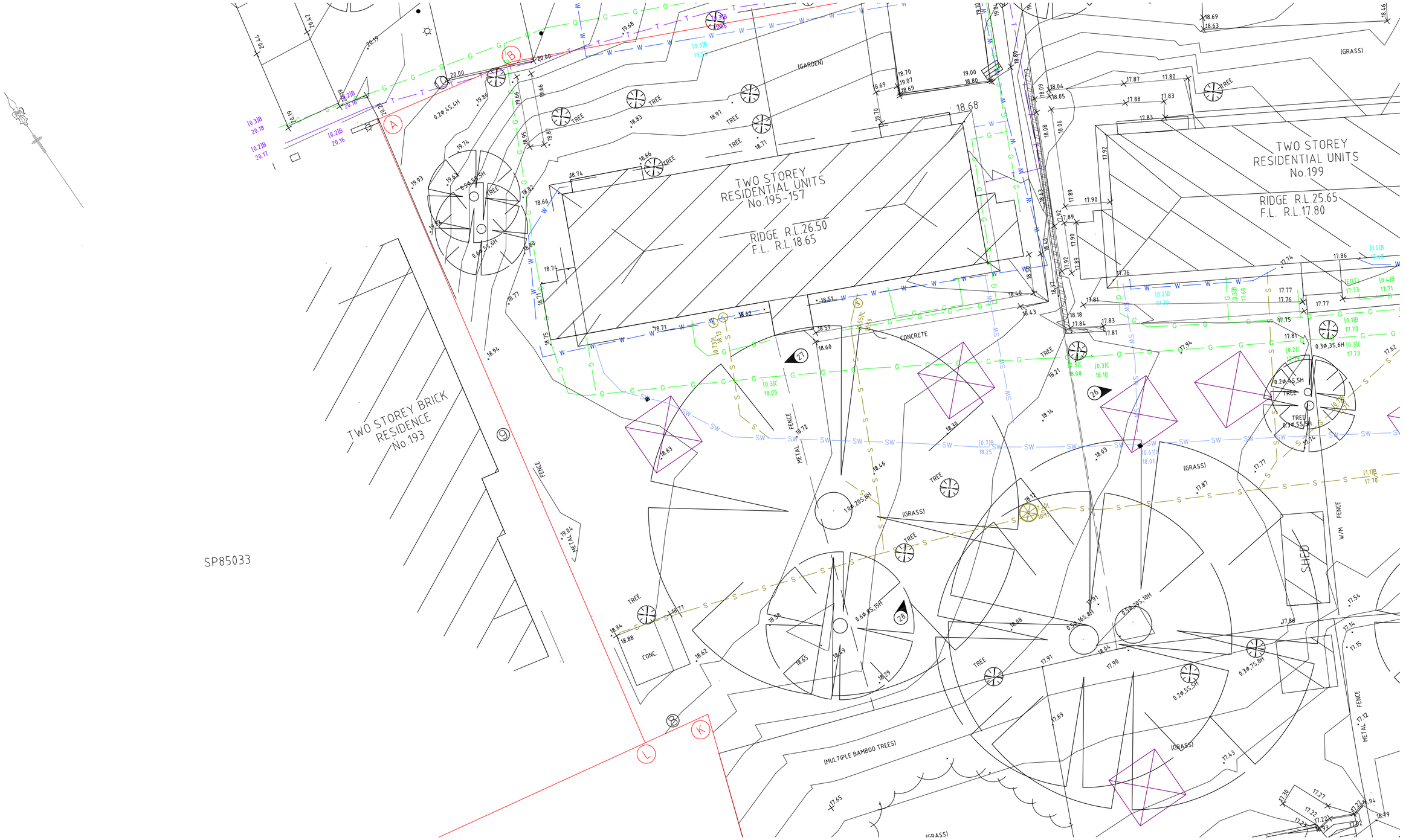
195-213 FITZGERALD AVENUE
40-64 YORKTOWN PARADE

TYPE S

JOB NUMBER 31470

SHT. 4 OF 10

L.G.A. BAYSIDE COUNCIL



No.	DATE	NOTATION/AMENDMENT	No.	DATE	NOTATION/AMENDMENT

FILE	FILE SIZE (MB)	CHECKED BY

CONTOUR INTERVAL:

DATUM: A.H.D.

ORIGIN OF DATUM: SSM 163664 RL17.68 SCIMS

100 YEAR FLOOD RL: N/A

RECOMMENDED MINIMUM FLOOR RL: N/A

SOURCE OF FLOOD INFO: N/A

LEGEND OF COMMONLY USED SYMBOLS

WATER / SEWER — ELECTRICITY O/H — ELECTRICITY U/G — TELECOM — GAS — STORMWATER

BENCH MARK △ SURVEY CONTROL MARK ◘ PM SSM

REDUCTION RATIO 1 : 100 (A1)

0 5 10 15 20

LAND TITLE INFORMATION

LOTS: 248-249

PLAN NOs : D.P 36345

OTHER:

AREA: 9596.6m²

DATE OF SURVEY: 24.06.24

SURVEY CONSULTANT:

Norton Survey Partners
SURVEYORS & LAND TITLE CONSULTANTS
PH +61 2 9555 2744
office@nspartners.com.au
SUITE 1 /505 BALMAIN ROAD
LILYFIELD N.S.W. 2040

REGISTERED SURVEYOR: JACK HUGHES

REF: 31470-1.DWG

NSW GOVERNMENT Family & Community Services Land & Housing Corporation

LOCATION: **MAROUBRA**

STREET ADDRESS: 195-213 FITZGERALD AVENUE
40-64 YORKTOWN PARADE

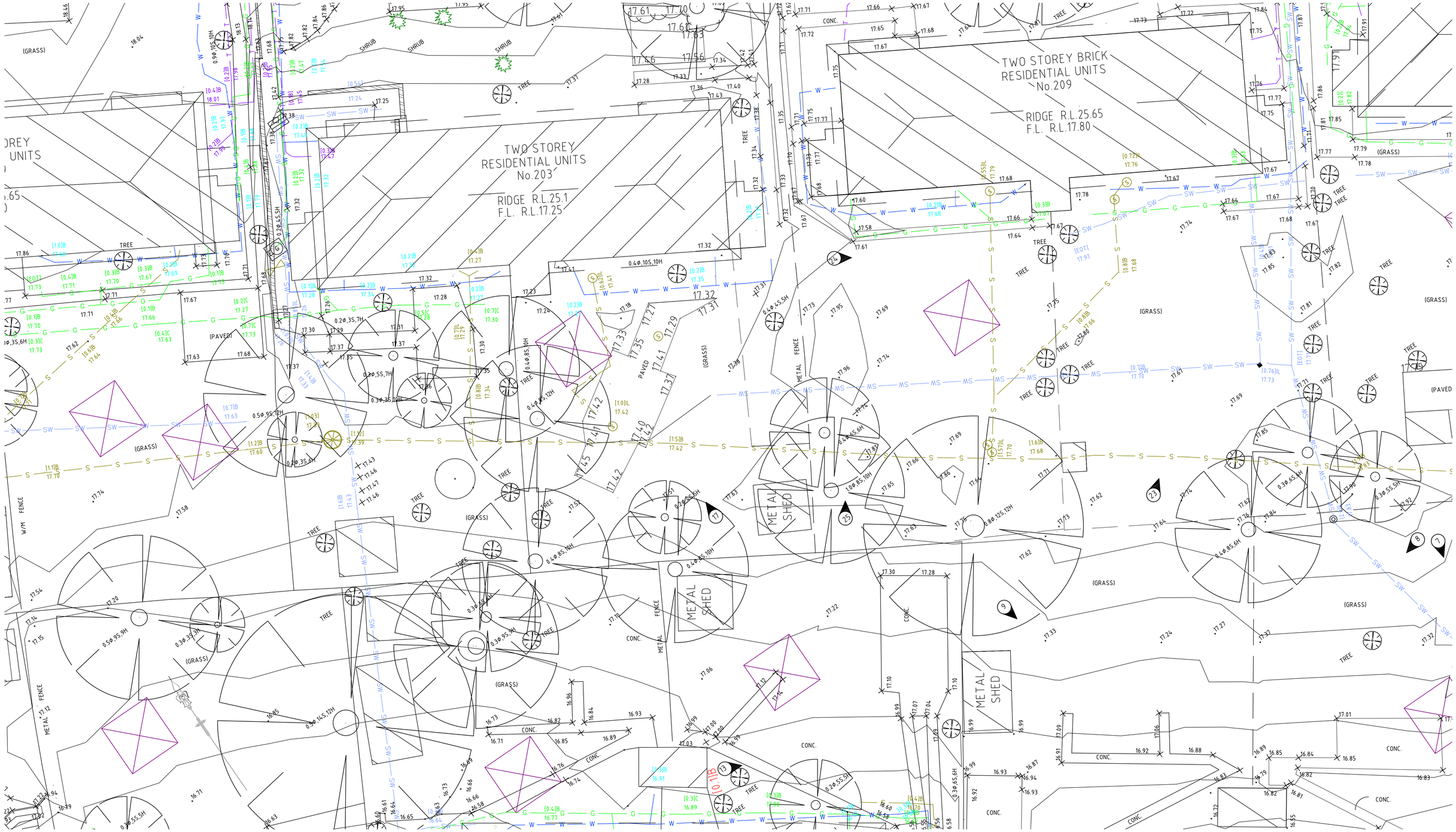
TYPE: S

DRAWING TITLE: DETAIL & LEVEL SURVEY

JOB NUMBER: 31470

SHT. 5 OF 10

L.G.A. BAYSIDE COUNCIL



No.	DATE	NOTATION/AMENDMENT	No.	DATE	NOTATION/AMENDMENT

FILE	FILE SIZE (MB)	CHECKED BY

CONTOUR INTERVAL:

DATUM: A.H.D.

ORIGIN OF DATUM: SSM 163664 RL17.68 SCIMS

100 YEAR FLOOD RL: N/A

RECOMMENDED MINIMUM FLOOR RL: N/A

SOURCE OF FLOOD INFO: N/A

LEGEND OF COMMONLY USED SYMBOLS

WATER W
SEWER S
ELECTRICITY O/H P
ELECTRICITY U/G E
TELECOM O/H T / U/G T
GAS G
STORMWATER SW
BENCH MARK
SURVEY CONTROL MARK PM SSM

REDUCTION RATIO 1 : 100 (A1)

0 5 10 15 20

LAND TITLE INFORMATION

LOTS: 248-249

PLAN NOs : D.P 36345

OTHER:

AREA: 1596.6m²

DATE OF SURVEY: 24.06.24

SURVEY CONSULTANT:

Norton Survey Partners
SURVEYORS & LAND TITLE CONSULTANTS
PH +61 2 9555 2744
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SUITE 1 /505 BALMAIN ROAD
LILYFIELD N.S.W. 2040

REGISTERED SURVEYOR JACK HUGHES REF: 31470-1.DWG

NSW GOVERNMENT Family & Community Services Land & Housing Corporation

DRAWING TITLE

DETAIL & LEVEL SURVEY

LOCATION

MAROUBRA

STREET ADDRESS

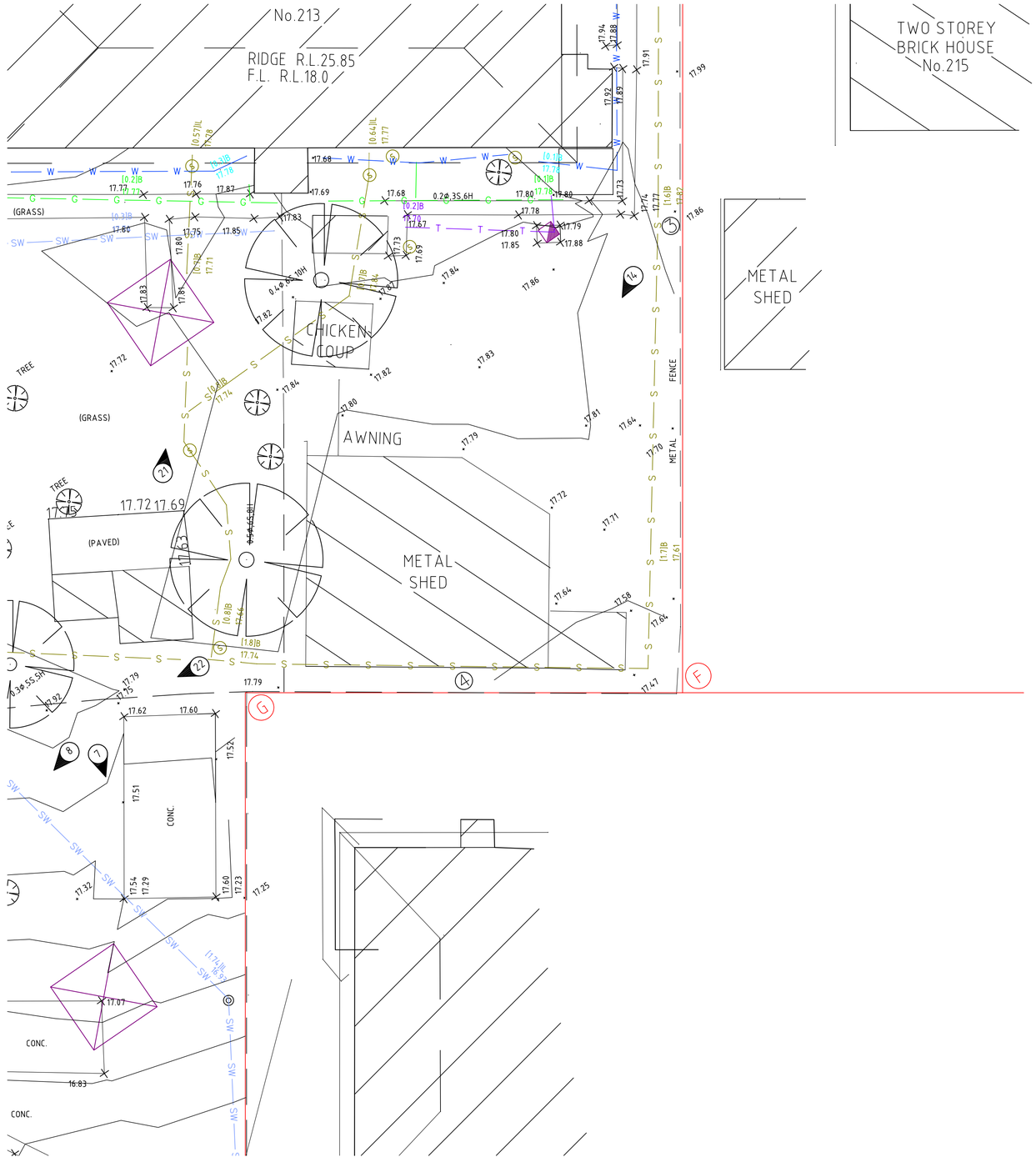
195-213 FITZGERALD AVENUE
40-64 YORKTOWN PARADE

TYPE S

JOB NUMBER 31470

SHT. 6 OF 10

L.G.A. BAYSIDE COUNCIL



No.	DATE	NOTATION/AMENDMENT	No.	DATE	NOTATION/AMENDMENT

FILE	FILE SIZE (MB)	CHECKED BY

CONTOUR INTERVAL:

DATUM: A.H.D.

ORIGIN OF DATUM: SSM 163664 RL17.68 SCIMS

100 YEAR FLOOD RL: N/A

RECOMMENDED MINIMUM FLOOR RL: N/A

SOURCE OF FLOOD INFO: N/A

LEGEND OF COMMONLY USED SYMBOLS

WATER W
SEWER S
ELECTRICITY O/H P
ELECTRICITY U/G E
TELECOM O/H T / U/G T
GAS G
STORMWATER SW

BENCH MARK △ SURVEY CONTROL MARK ◘ PM SSM

REDUCTION RATIO 1 : 100 (A1)

0 5 10 15 20

LAND TITLE INFORMATION

LOTS: 248-249

PLAN NOs : D.P. 36345

OTHER:

AREA: 9596.6m²

DATE OF SURVEY: 24.06.24

SURVEY CONSULTANT:

Norton Survey Partners
SURVEYORS & LAND TITLE CONSULTANTS
PH +61 2 9555 2744
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LILYFIELD N.S.W. 2040

REGISTERED SURVEYOR JACK HUGHES REF. 31470-1.DWG

NSW GOVERNMENT Family & Community Services Land & Housing Corporation

DRAWING TITLE

DETAIL & LEVEL SURVEY

LOCATION

MAROUBRA

STREET ADDRESS

195-213 FITZGERALD AVENUE
40-64 YORKTOWN PARADE

TYPE S

JOB NUMBER 31470

SHT. 7 OF 10

L.G.A. BAYSIDE COUNCIL

50

DP36345

TWO STOREY BRICK RESIDENTIAL UNITS No.42-48

RIDGE R.L.34.85

F.L. R.L.17.00

BRICK COTTAGE NO 40

BRICK COTTAGE No.38

CONC. TERRACE

(GRASS)

(HEDGE)

(PAVED)

(LOOSE PEBBLES)

CONC.

SHRUB

D'WAY

RAMP

FOOTPATH

PIT

TREE

YORKTOWN

No.	DATE	NOTATION/AMENDMENT	No.	DATE	NOTATION/AMENDMENT

FILE	FILE SIZE (MB)	CHECKED BY

CONTOUR INTERVAL:

DATUM: A.H.D.

ORIGIN OF DATUM: SSM 163664 RL17.68 SCIMS

100 YEAR FLOOD RL: N/A

RECOMMENDED MINIMUM FLOOR RL: N/A

SOURCE OF FLOOD INFO: N/A

LEGEND OF COMMONLY USED SYMBOLS

WATER W
SEWER S
ELECTRICITY O/H P
ELECTRICITY U/G E
TELECOM O/H T / U/G T
GAS G
STORMWATER SW
BENCH MARK
SURVEY CONTROL MARK PM SSM

REDUCTION RATIO 1 : 100 (A1)

0 5 10 15 20

LAND TITLE INFORMATION

LOTS: 248-249

PLAN NOs : D.P 36345

OTHER:

AREA: 9596.6m²

DATE OF SURVEY: 24.06.24

SURVEY CONSULTANT:

Norton Survey Partners
SURVEYORS & LAND TITLE CONSULTANTS
PH +61 2 9555 2744
office@nspartners.com.au
SUITE 1 /505 BALMAIN ROAD
LILYFIELD N.S.W. 2040

REGISTERED SURVEYOR JACK HUGHES

REF: 31470-1.DWG

NSW GOVERNMENT Family & Community Services Land & Housing Corporation

DRAWING TITLE

DETAIL & LEVEL SURVEY

LOCATION

MAROUBRA

STREET ADDRESS

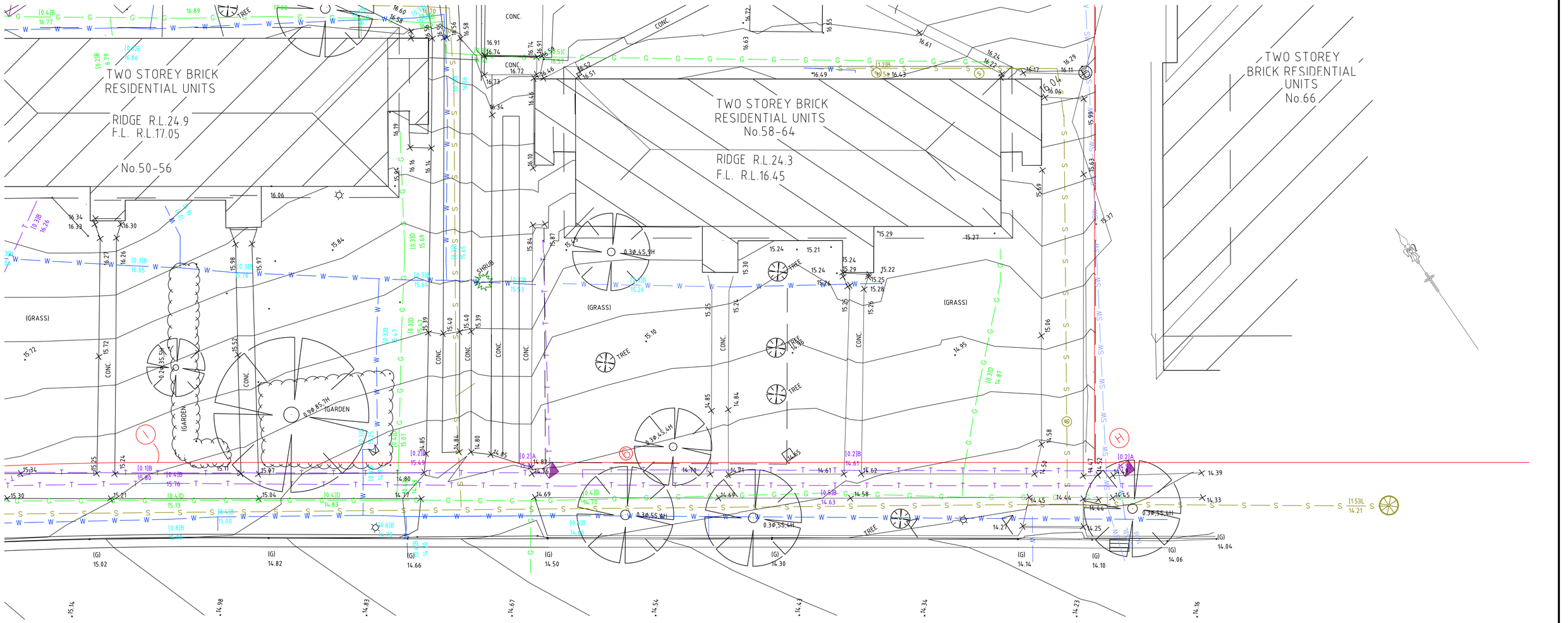
195-213 FITZGERALD AVENUE
40-64 YORKTOWN PARADE

TYPE S

JOB NUMBER 31470

SHT. 8 OF 10

L.G.A. BAYSIDE COUNCIL



No.	DATE	NOTATION/AMENDMENT	No.	DATE	NOTATION/AMENDMENT

FILE	FILE SIZE (MB)	CHECKED BY

CONTOUR INTERVAL:

DATUM: A.H.D.

ORIGIN OF DATUM: SSM 163664 RL17.68 SCIMS

100 YEAR FLOOD RL: N/A

RECOMMENDED MINIMUM FLOOR RL: N/A

SOURCE OF FLOOD INFO: N/A

LEGEND OF COMMONLY USED SYMBOLS

WATER W
SEWER S
ELECTRICITY O/H P
ELECTRICITY U/G E
TELECOM O/H T / U/G T
GAS G
STORMWATER SW
BENCH MARK
SURVEY CONTROL MARK PM SSM

REDUCTION RATIO 1 : 100 (A1)

0 5 10 15 20

LAND TITLE INFORMATION

LOTS: 248-249

PLAN NOs : D.P 36345

OTHER:

AREA: 1596.6m²

DATE OF SURVEY: 24.06.24

SURVEY CONSULTANT:

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SURVEYORS & LAND TITLE CONSULTANTS
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office@nspartners.com.au
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LILYFIELD N.S.W. 2040

REGISTERED SURVEYOR JACK HUGHES

REF: 31470-1.DWG

NSW GOVERNMENT Family & Community Services Land & Housing Corporation

DRAWING TITLE

DETAIL & LEVEL SURVEY

LOCATION

MAROUBRA

STREET ADDRESS

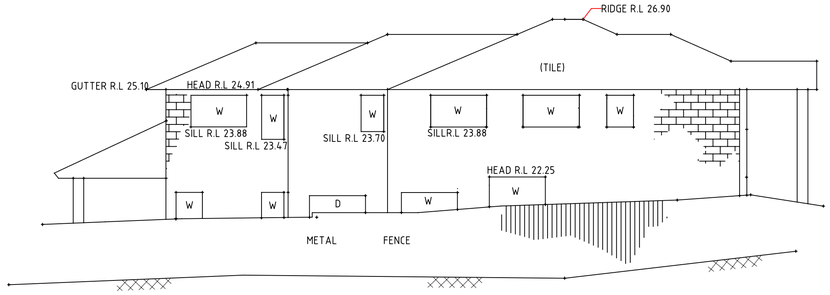
195-213 FITZGERALD AVENUE
40-64 YORKTOWN PARADE

TYPE S

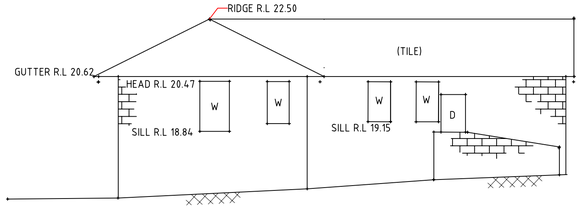
JOB NUMBER 31470

SHT. 9 OF 10

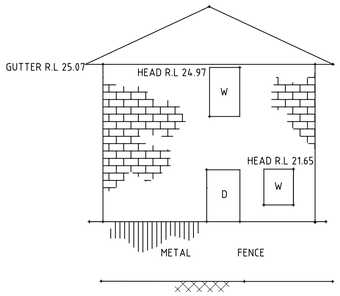
L.G.A. BAYSIDE COUNCIL



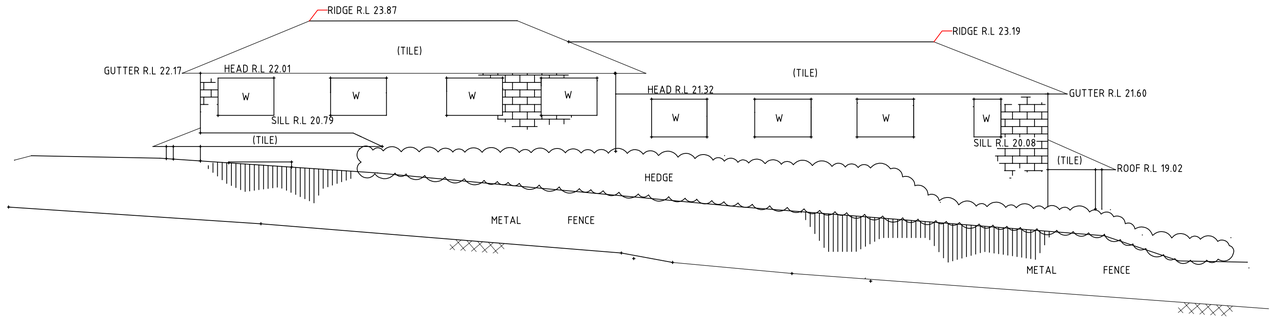
EASTERN ELEVATION No. 193 FITZGERALD AVENUE



EASTERN ELEVATION No. 38 YORKTOWN PARADE



WESTERN ELEVATION No. 215 FITZGERALD AVENUE



WESTERN ELEVATION No. 66 YORKTOWN PARADE

No.	DATE	NOTATION/AMENDMENT

No.	DATE	NOTATION/AMENDMENT

FILE	FILE SIZE (MB)	CHECKED BY

CONTOUR INTERVAL:

DATUM: A.H.D.

ORIGIN OF DATUM: SSM 163664 RL17.68 SCIMS

100 YEAR FLOOD RL: N/A

RECOMMENDED MINIMUM FLOOR RL: N/A

SOURCE OF FLOOD INFO: N/A

LEGEND OF COMMONLY USED SYMBOLS

WATER W
SEWER S
ELECTRICITY O/H P
ELECTRICITY U/G E
TELECOM O/H U/G T
GAS G
STORMWATER SW
BENCH MARK
SURVEY CONTROL MARK PM SSM

REDUCTION RATIO 1 : 100 (A1)

0 5 10 15 20

LAND TITLE INFORMATION

LOTS: 248-249

PLAN NOs : D.P 36345

OTHER:

AREA: 9596.6m²

DATE OF SURVEY: 24.06.24

SURVEY CONSULTANT:

Norton Survey Partners
SURVEYORS & LAND TITLE CONSULTANTS
PH +61 2 9555 2744
office@nspartners.com.au
SUITE 1 /505 BALMAIN ROAD
LILYFIELD N.S.W. 2040

REGISTERED SURVEYOR
JACK HUGHES

REF: 31470-1.DWG

NSW GOVERNMENT Family & Community Services Land & Housing Corporation

DRAWING TITLE

DETAIL & LEVEL SURVEY

LOCATION

MAROUBRA

STREET ADDRESS

195-213 FITZGERALD AVENUE
40-64 YORKTOWN PARADE

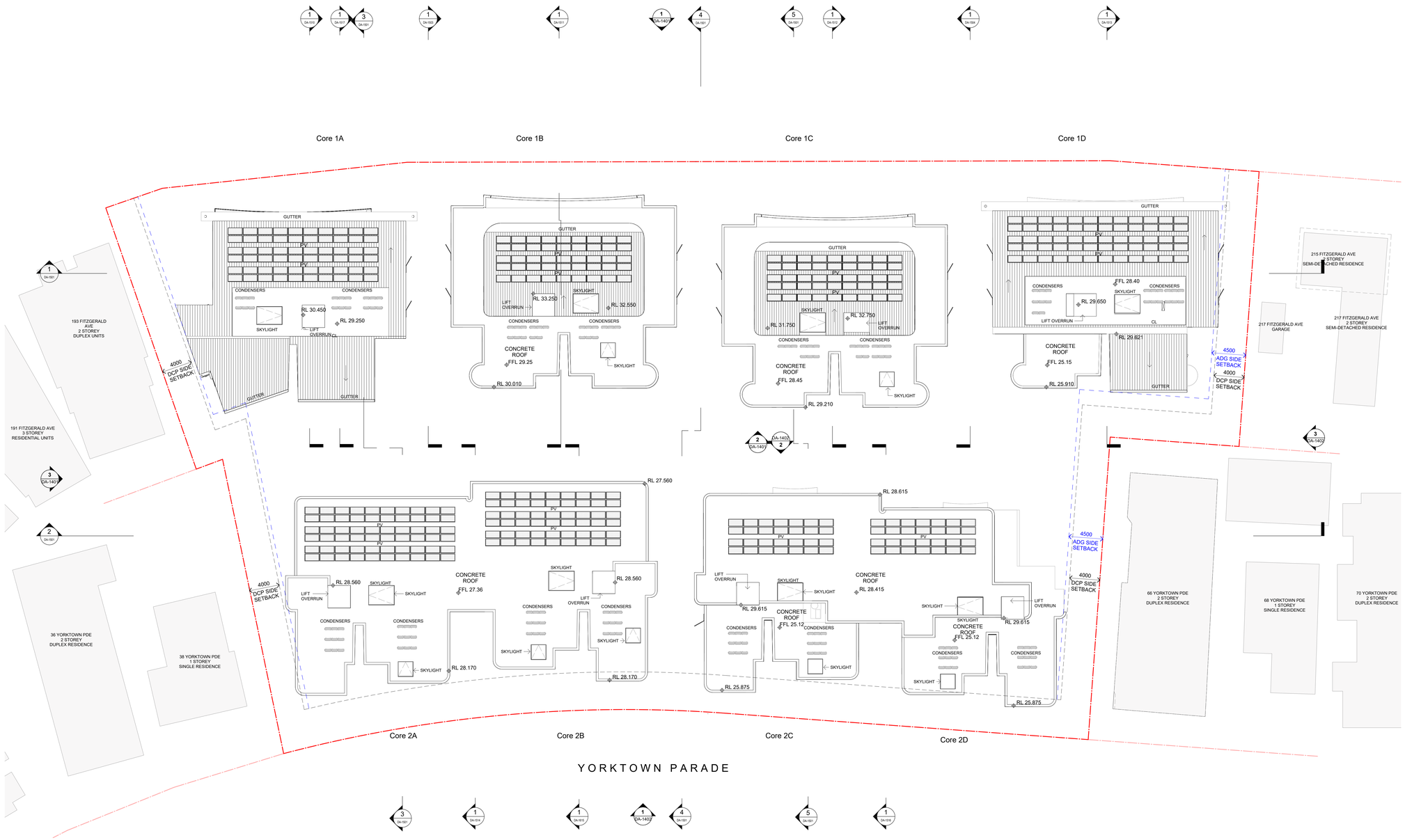
TYPE S

JOB NUMBER 31470

SHT. 10 OF 10

APPENDIX F – Proposed Development Plan

FITZGERALD AVENUE



YORKTOWN PARADE

KEY

- Parking
- Balcony
- 1Bed
- 2Bed
- 3Bed

NOT FOR CONSTRUCTION

FOR INFORMATION

0 1 2 5m
1:100 @A0

Nominated Architects: Adam Haddow-7188 | John Pradel-7004

Rev	Date	Revision	By	Chk.
A	2024-08-02	FOR INFORMATION		
B	2024-08-08	FOR INFORMATION		
C	2024-08-28	FOR INFORMATION		
D	2024-09-23	FOR INFORMATION		
E	2024-09-26	DRAFT DA		
F	2024-10-01	FOR INFORMATION		

Client: NSW GOVERNMENT — Homes NSW

Project: 6962 - MAROUBRA
195-213 Fitzgerald Avenue &
40-64 Yorktown Parade
Maroubra NSW 2035
Country: Gadigal

Drawing Name: FLOOR PLAN - ROOF

Date	Scale	Sheet Size
2024-10-01	1 : 200	@ A0
Drawn	Chk.	Job No.
MV	SH	6962
Drawing No.		Revision
DA-1010		/ F

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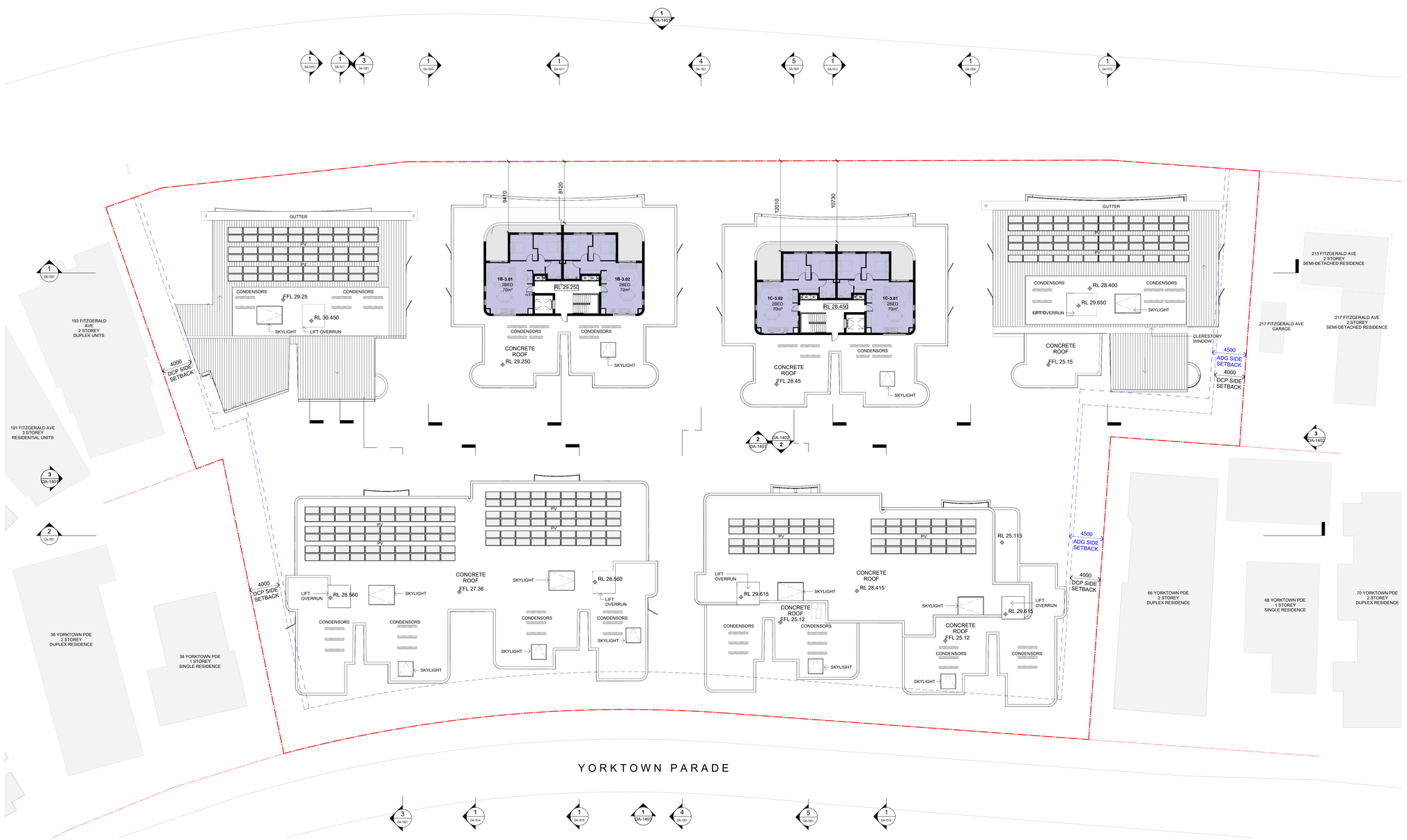
FITZGERALD AVENUE



YORKTOWN PARADE

KEY

- Parking
- Balcony
- 1Bed
- 2Bed
- 3Bed

NOT FOR CONSTRUCTION

FOR INFORMATION

0 1 2 5m
1:100 @A0

Nominated Architects: Adam Haddow-7188 | John Pradel-7004

Rev	Date	Revision	By	Chk.
A	2024-09-23	FOR INFORMATION		
B	2024-09-26	DRAFT DA		
C	2024-10-01	FOR INFORMATION		

Client
NSW GOVERNMENT
Homes NSW

Project
6962 - MAROUBRA

195-213 Fitzgerald Avenue &
40-64 Yorktown Parade
Maroubra NSW 2035
Country: Gadigal

Drawing Name
FLOOR PLAN - LEVEL 03

Date	Scale	Sheet Size
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Drawn	Chk.	Job No.
MV	SH	6962
Drawing No.		Revision
DA-1006		/ C

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NOT FOR CONSTRUCTION

FOR INFORMATION

0 1 2 5m
1:100 @A0

Nominated Architects: Adam Haddow-7188 | John Pradel-7004

Rev	Date	Revision	By	Chk.
A	2024-08-02	FOR INFORMATION		
B	2024-08-08	FOR INFORMATION		
C	2024-08-28	FOR INFORMATION		
D	2024-09-13	FOR INFORMATION		
E	2024-09-23	FOR INFORMATION		
F	2024-09-26	DRAFT DA		
G	2024-10-01	FOR INFORMATION		

Client
NSW GOVERNMENT
Homes NSW

Project
6962 - MAROUBRA
195-213 Fitzgerald Avenue &
40-64 Yorktown Parade
Maroubra NSW 2035
Country: Gadigal

Drawing Name
FLOOR PLAN - LEVEL 02

Date	Scale	Sheet Size
2024-10-01	1 : 200	@ A0
Drawn	Chk.	Job No.
MV	SH	6962
Drawing No.		Revision
DA-1005		/ G

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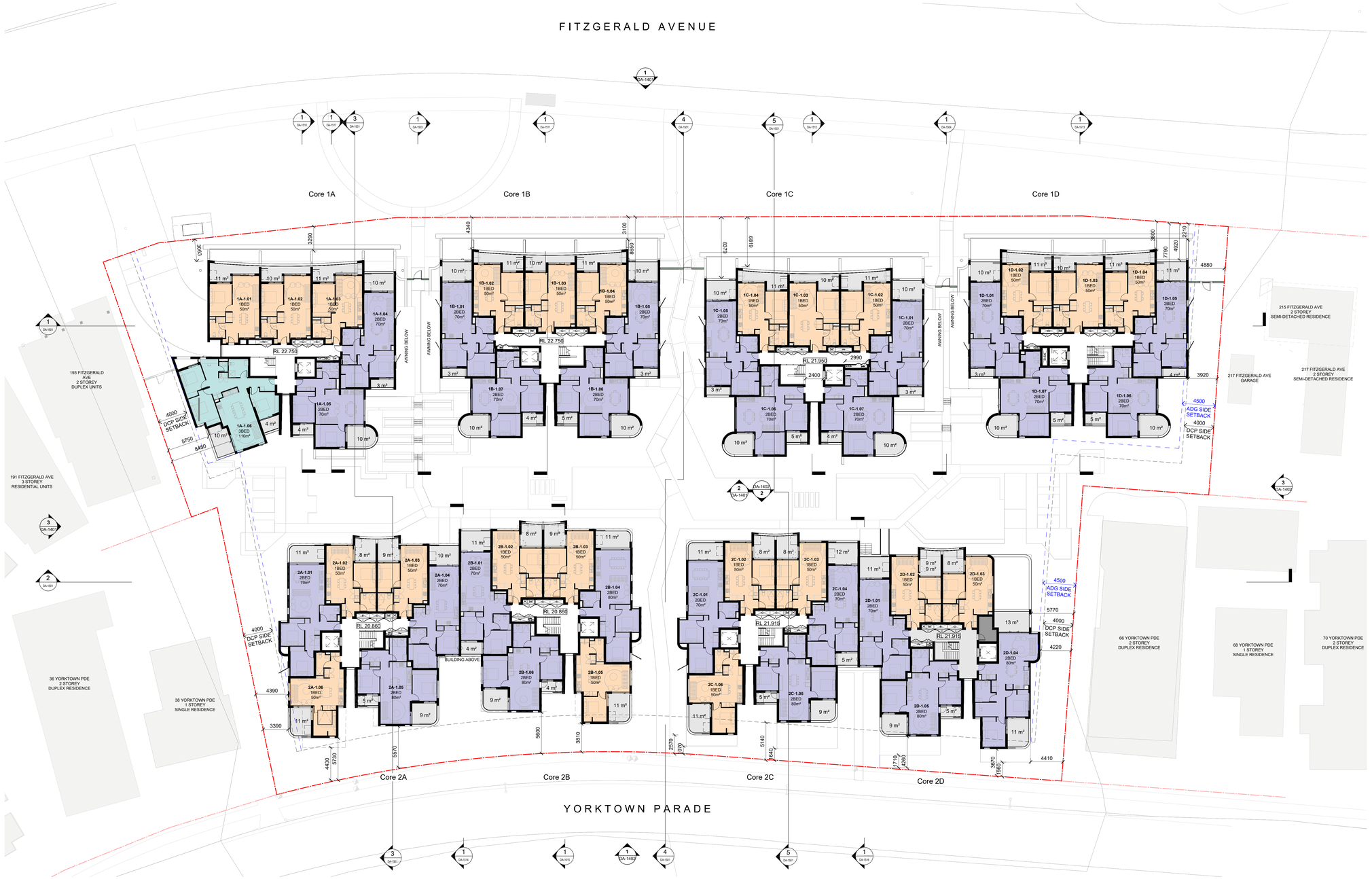

KEY

- Parking
- Balcony
- 1Bed
- 2Bed
- 3Bed

NOT FOR CONSTRUCTION

FOR INFORMATION

0 1 2 5m
1:100 @A0

Nominated Architects: Adam Haddow-7188 | John Pradel-7004

Rev	Date	Revision	By	Chk.
A	2024-08-02	FOR INFORMATION		
B	2024-08-08	FOR INFORMATION		
C	2024-08-28	FOR INFORMATION		
D	2024-09-13	FOR INFORMATION		
E	2024-09-23	FOR INFORMATION		
F	2024-09-26	DRAFT DA		
G	2024-10-01	FOR INFORMATION		

Client: NSW GOVERNMENT — Homes NSW

Project: 6962 - MAROUBRA
195-213 Fitzgerald Avenue &
40-64 Yorktown Parade
Maroubra NSW 2035
Country: Gadigal

Drawing Name: FLOOR PLAN - LEVEL 01

Date	Scale	Sheet Size
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Drawn	Chk.	Job No.
MV	SH	6962
Drawing No.		Revision
DA-1004		/ G

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KEY

- Parking
- Balcony
- 1Bed
- 2Bed
- 3Bed

NOT FOR CONSTRUCTION

FOR INFORMATION

1:100 @A0

Nominated Architects: Adam Haddow-7188 | John Pradel-7004

Rev	Date	Revision	By	Chk.
A	2024-08-02	FOR INFORMATION		
B	2024-08-08	FOR INFORMATION		
C	2024-08-28	FOR INFORMATION		
D	2024-09-10	FOR INFORMATION		
E	2024-09-13	FOR INFORMATION		
F	2024-09-23	FOR INFORMATION		
G	2024-09-26	DRAFT DA		
H	2024-10-01	FOR INFORMATION		

Client: NSW GOVERNMENT — Homes NSW

Project: 6962 - MAROUBRA
195-213 Fitzgerald Avenue &
40-64 Yorktown Parade
Maroubra NSW 2035
Country: Gadigal

Drawing Name: FLOOR PLAN - GROUND

Date	Scale	Sheet Size
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Drawn	Chk.	Job No.
MV	SH	6962
Drawing No.		Revision
DA-1003		/ H

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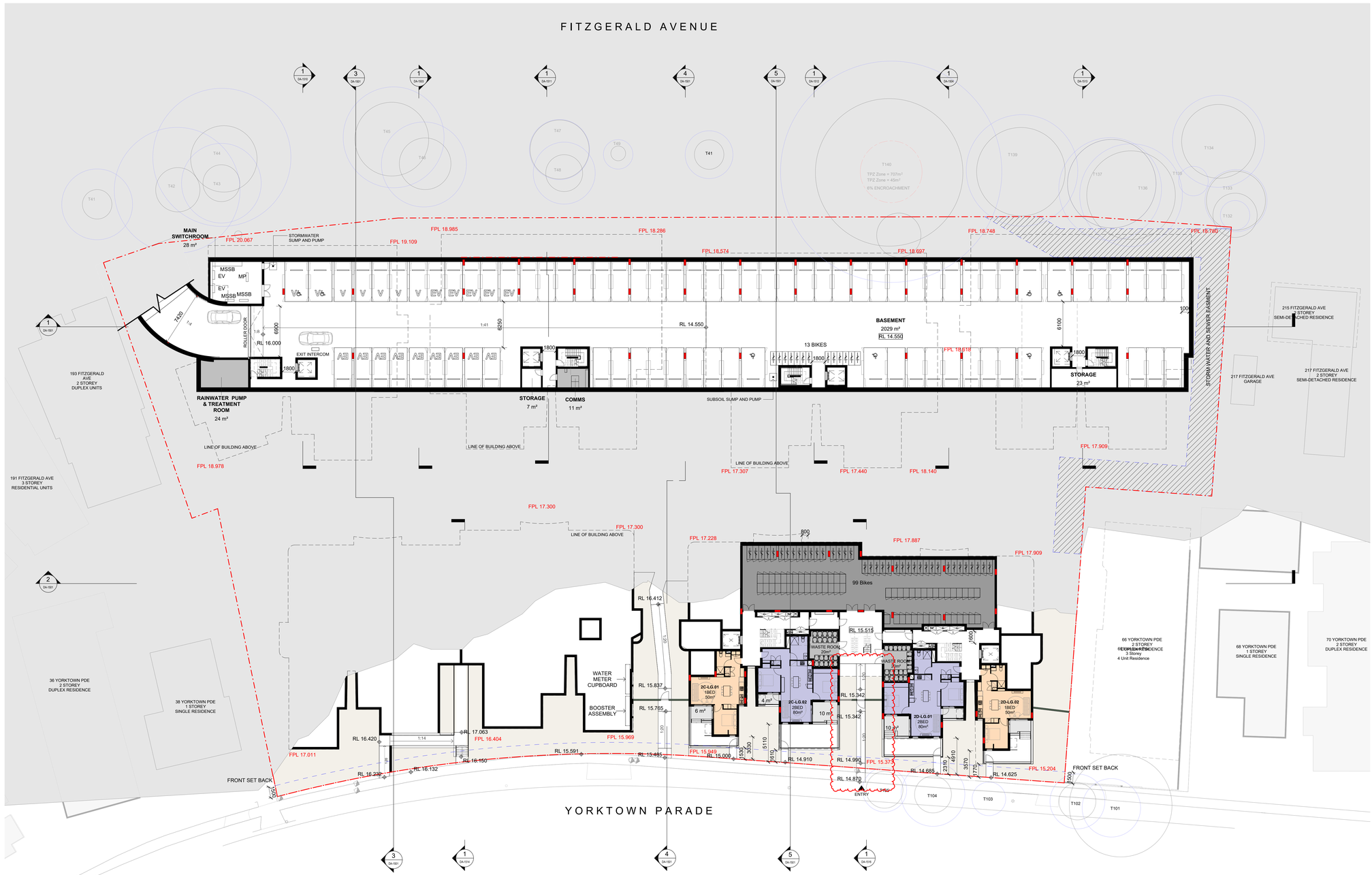

TOTAL BIKE NUMBERS

CORE 1A	G	Residential - 4
CORE 1B	G	Residential - 4
CORE 1C	LG	Residential - 13
	G	Residential - 4
CORE 1D	G	Residential - 4
CORE 2C-D	LG	Residential - 99
	G	Residential - 16
		Residential - 144

TOTAL VISITOR BIKE NUMBERS

CORE 1C	G	Visitor - 1
CORE 2A-B	G	Visitor - 14
		Visitor - 15

TOTAL PARKING NUMBERS

AFFORDABLE - PARKING	Standard - 42 Accessible - 3
SOCIAL - PARKING	Standard - 23 Accessible - 2
VISITOR - PARKING	Standard - 5 Accessible - 2
RESIDENTIAL TOTAL	77

NOT FOR CONSTRUCTION

FOR INFORMATION

0 2 4 10m
1:200 @A0

Nominated Architects: Adam Haddow-7188 | John Pradel-7004

Rev	Date	Revision	By	Chk
A	2024-08-02	FOR INFORMATION		
B	2024-08-08	FOR INFORMATION		
C	2024-08-28	FOR INFORMATION		
D	2024-09-10	FOR INFORMATION		
E	2024-09-13	FOR INFORMATION		
F	2024-09-23	FOR INFORMATION		
G	2024-09-26	DRAFT DA		
H	2024-10-01	FOR INFORMATION		

Client: NSW GOVERNMENT — Homes NSW

Project: 6962 - MAROUBRA
195-213 Fitzgerald Avenue &
40-64 Yorktown Parade
Maroubra NSW 2035
Country: Gadigal

Drawing Name: FLOOR PLAN - LOWER GROUND

Date	Scale	Sheet Size
2024-10-01	As indicated	@ A0
Drawn	Chk.	Job No.
MV	SH	6962
Drawing No.		Revision
DA-1002		/ H

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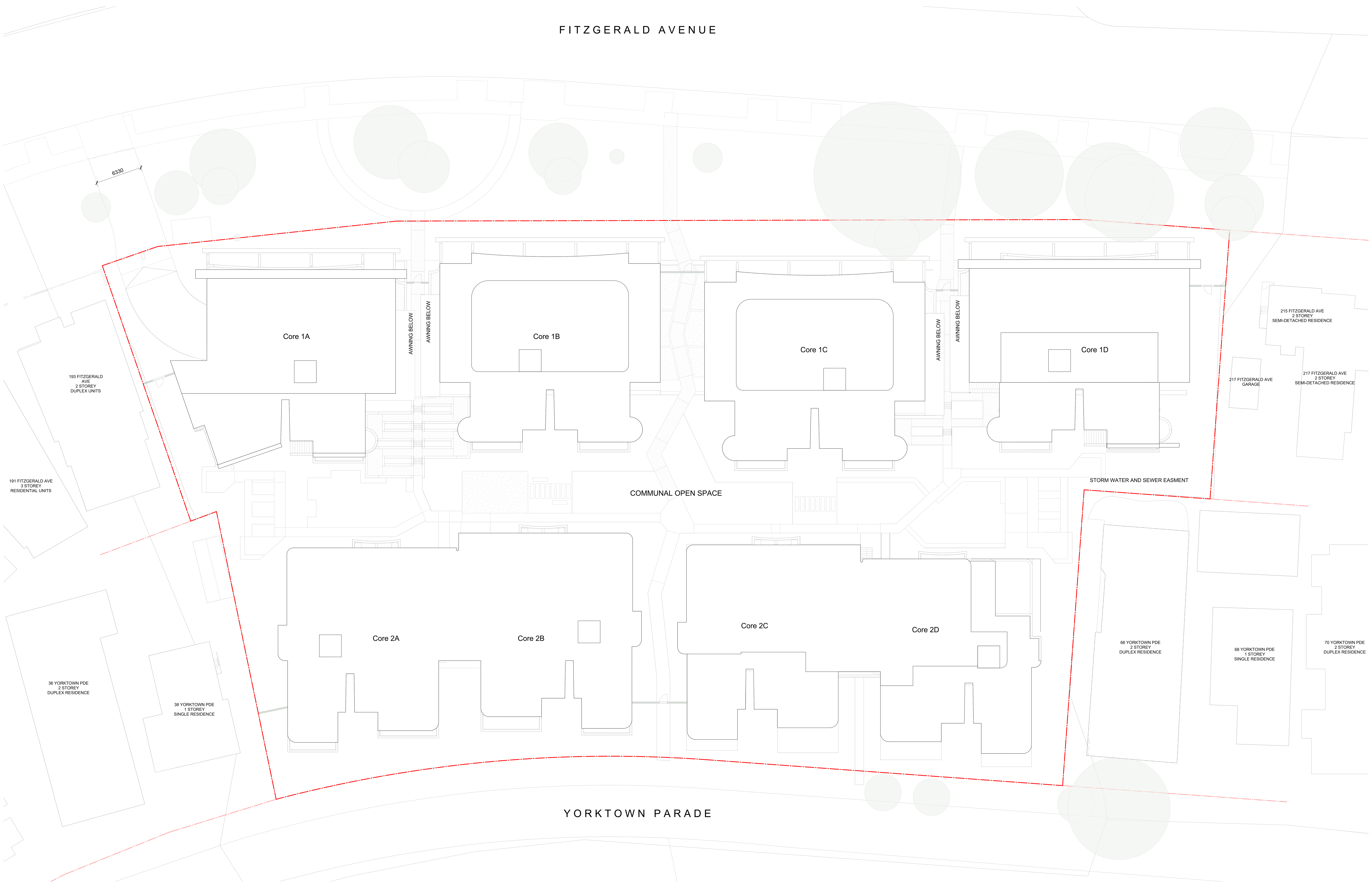

NOT FOR CONSTRUCTION

FOR INFORMATION

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Nominated Architects: Adam Haddow-7188 | John Pradel-7004

Rev	Date	Revision	By	Chk.
A	2024-09-10	FOR INFORMATION		
B	2024-09-26	DRAFT DA		
C	2024-10-01	FOR INFORMATION		

Client: NSW Government; Homes NSW

Project
6962 - MAROUBRA

195-213 Fitzgerald Avenue &
40-64 Yorktown Parade
Maroubra NSW 2035
Country: Gadigal

Drawing Name
SITE PLAN

Date	Scale	Sheet Size
2024-10-01	1 : 200	@ A0
Drawn	**Chk.**	**Job No.**
MV	SH	6962
Drawing No.		**Revision**
DA-0103		/ C

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