REPORT TO

GOOD TIME HOLDINGS

ON

PRELIMINARY (STAGE 1) SITE INVESTIGATION (PSI)

FOR

PROPOSED MIXED USE DEVELOPMENT

AT

277 THE GRAND PARADE, RAMSGATE, NSW

Date: 9 January 2024

Ref: E34871PTrptRev1

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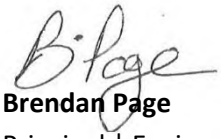

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E34871PTrpt	Final Report	28 June 2022
E34871PTrptRev1	Revision – Client requested update to proposed development description	9 January 2024

Executive Summary

Good Time Holdings NSW ('the client'), care of Bronxx Pty Limited, commissioned JK Environments (JKE) to undertake a Preliminary (Stage 1) Site Investigation (PSI) for the proposed mixed use development at 277 The Grand Parade, Ramsgate, NSW ('the site'). The purpose of the investigation is to make a preliminary assessment of site contamination. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

This report has been prepared to support the lodgement of a Development Application (DA) for the proposed mixed use development, with regards to State Environmental Planning Policy (Resilience and Hazards) 2021 (formerly known as SEPP55).

A geotechnical investigation was undertaken in conjunction with this PSI by JK Geotechnics (JKG). The results of the geotechnical investigation are presented in a separate report (Ref: 34871PHrpt). This report should be read in conjunction with the JKG report.

It is understood that following demolition of the existing Coles supermarket building, the proposed development includes construction of a six storey building underlain by three basement levels. The lowest basement level (Basement 3) will be constructed at RL-6.4m requiring excavation to a depth of approximately 9.8m plus the slab thickness, and will extend to the site boundaries, as shown on the attached Figure 2. Six lifts are also proposed. Selected development plans issued to JKE are attached in the appendices.

The primary aims of the investigation were to identify any past or present potentially contaminating activities at the site, identify the potential for site contamination, and make a preliminary assessment of the soil and groundwater contamination conditions. Secondary aims were to provide a preliminary waste classification for disposal of waste soil to be generated during the proposed development works, and to assess the potential for acid sulfate soil (ASS) occurrence and the need for an ASS management plan (ASSMP). The objectives were to:

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and use(s) via a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
- Assess the soil and groundwater contamination conditions via implementation of a preliminary sampling and analysis program;
- Prepare a conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- Provide a preliminary assessment of the occurrence of ASS and assess the need for an ASSMP;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

The scope of work included the following:

- Review of site information, including background and site history information from various sources outlined in the report;
- Preparation of a CSM;
- Design and implementation of a sampling, analysis and quality plan (SAQP);
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The site history information and site walkover inspection identified the following AEC: imported fill material; historic onsite mechanics workshop; use of pesticides; hazardous building materials; and an off-site service station (located in close proximity to site).

Soil samples were obtained from seven boreholes and groundwater sampling was undertaken from two monitoring wells installed at the site. The boreholes encountered fill materials to depths of approximately 0.3m below ground level

(BGL) to 1.5mBGL, underlain by sandy marine soils. The fill contained inclusions of igneous gravel, silt, concrete and terracotta fragments and ash. Asbestos and nickel were identified in soil at concentrations that exceeded the human health and ecological SAC respectively. Heavy metals (arsenic, copper and zinc) were also identified in groundwater above the ecological (marine) SAC.

The PSI has not identified contamination that would preclude the proposed development/use of the site. However, a Detailed Site Investigation (DSI) is required to address the data gaps identified in Section 10.4, characterise the risks and establish whether remediation is necessary (and inform the preparation of a remediation action plan (RAP) where required). We recommend the following:

1. Prepare a Sampling, Analysis and Quality Plan (SAQP) for the DSI;
2. Undertake a DSI in accordance with the SAQP; and
3. Where required (i.e. if triggered following the DSI risk assessment), develop and implement a RAP. Any requirements documented in a RAP are to be implemented and the site is to be remediated and validated.

The natural soil below a depth of 5mBGL is considered to be potential acid sulfate soils (PASS). An ASSMP should be prepared once specific details of the development are known, including final depths of disturbance etc. The need for additional sampling and analysis for ASS characteristics should be assessed as the design progresses.

At this stage, JKE consider that there is currently no requirement to report any site contamination to the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015). This will be further evaluated as part of the DSI.

The conclusions and recommendations should be read in conjunction with the limitations presented in the body of this report.

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Attachments

Abbreviations

Asbestos Fines/Fibrous Asbestos	**AF/FA**
Ambient Background Concentrations	**ABC**
Added Contaminant Limits	**ACL**
Asbestos Containing Material	**ACM**
Australian Drinking Water Guidelines	**ADWG**
Area of Environmental Concern	**AEC**
Australian Height Datum	**AHD**
Acid Sulfate Soil	**ASS**
Below Ground Level	**BGL**
Benzo(a)pyrene Toxicity Equivalent Factor	**BaP TEQ**
Bureau of Meteorology	**BOM**
Benzene, Toluene, Ethylbenzene, Xylene	**BTEX**
Cation Exchange Capacity	**CEC**
Contaminated Land Management	**CLM**
Contaminant(s) of Potential Concern	**CoPC**
Chain of Custody	**COC**
Conceptual Site Model	**CSM**
Development Application	**DA**
Dial Before You Dig	**DBYD**
Data Quality Indicator	**DQI**
Data Quality Objective	**DQO**
Detailed (Stage 2) Site Investigation	**DSI**
Ecological Investigation Level	**EIL**
Ecological Screening Level	**ESL**
Environment Protection Authority	**EPA**
Health Investigation Level	**HILs**
Health Screening Level	**HSL**
Health Screening Level-Site Specific Assessment	**HSL-SSA**
International Organisation of Standardisation	**ISO**
JK Environments	**JKE**
Lab Control Spike	**LCS**
Light Non-Aqueous Phase Liquid	**LNAPL**
Map Grid of Australia	**MGA**
National Association of Testing Authorities	**NATA**
National Environmental Protection Measure	**NEPM**
Organochlorine Pesticides	**OCP**
Organophosphate Pesticides	**OPP**
Polycyclic Aromatic Hydrocarbons	**PAH**
Polychlorinated Biphenyls	**PCB**
Per-and Polyfluoroalkyl Substances	**PFAS**
Photo-ionisation Detector	**PID**
Protection of the Environment Operations	**POEO**
Practical Quantitation Limit	**PQL**
Quality Assurance	**QA**
Quality Control	**QC**
Remediation Action Plan	**RAP**
Relative Percentage Difference	**RPD**
Site Assessment Criteria	**SAC**
Sampling, Analysis and Quality Plan	**SAQP**
State Environmental Planning Policy	**SEPP**
Site Specific Assessment	**SSA**
Source, Pathway, Receptor	**SPR**
Standard Penetration Test	**SPT**
Standing Water Level	**SWL**

Trip Blank	**TB**
Toxicity Characteristic Leaching Procedure	**TCLP**
Total Recoverable Hydrocarbons	**TRH**
Trip Spike	**TS**
Upper Confidence Limit	**UCL**
United States Environmental Protection Agency	**USEPA**
Underground Storage Tank	**UST**
Virgin Excavated Natural Material	**VENM**
Volatile Organic Compounds	**VOC**
World Health Organisation	**WHO**
Work Health and Safety	**WHS**

Units

Litres	**L**
Metres BGL	**mBGL**
Metres	**m**
Millivolts	**mV**
Millilitres	**ml or mL**
Milliequivalents	**meq**
micro Siemens per Centimetre	**µS/cm**
Micrograms per Litre	**µg/L**
Milligrams per Kilogram	**mg/kg**
Milligrams per Litre	**mg/L**
Parts Per Million	**ppm**
Percentage	**%**
Percentage weight for weight	**%w/w**

1 INTRODUCTION

Good Time Holdings NSW ('the client'), care of Bronxx Pty Limited, commissioned JK Environments (JKE) to undertake a Preliminary (Stage 1) Site Investigation (PSI) for the proposed mixed use development at 277 The Grand Parade, Ramsgate, NSW ('the site'). The purpose of the investigation is to make a preliminary assessment of site contamination. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

This report has been prepared to support the lodgement of a Development Application (DA) for the proposed mixed use development, with regards to State Environmental Planning Policy (Resilience and Hazards) 2021[1] (formerly known as SEPP55).

A geotechnical investigation was undertaken in conjunction with this PSI by JK Geotechnics (JKG). The results of the geotechnical investigation are presented in a separate report (Ref: 34871PHrpt)[2]. This report should be read in conjunction with the JKG report.

1.1 Proposed Development Details

It is understood that following demolition of the existing Coles supermarket building, the proposed development includes construction of a six-storey building underlain by three basement levels. The lowest basement level (Basement 3) will be constructed at RL-6.4m requiring excavation to a depth of approximately 9.8m plus the slab thickness, and will extend to the site boundaries, as shown on the attached Figure 2. Six lifts are also proposed.

Selected development plans issued to JKE are attached in the appendices.

1.2 Aims and Objectives

The primary aims of the investigation were to identify any past or present potentially contaminating activities at the site, identify the potential for site contamination, and make a preliminary assessment of the soil and groundwater contamination conditions. Secondary aims were to provide a preliminary waste classification for disposal of waste soil to be generated during the proposed development works, and to assess the potential for acid sulfate soil (ASS) occurrence and the need for an ASS management plan (ASSMP). The objectives were to:

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and use(s) via a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
- Assess the soil and groundwater contamination conditions via implementation of a preliminary sampling and analysis program;
- Prepare a conceptual site model (CSM);

[1] *State Environmental Planning Policy (Resilience and Hazards) 2021* (NSW) (referred to as SEPP Resilience and Hazards 2021)

[2] JKG, (2022). *Report to Good Times Holdings NSW on Preliminary Geotechnical Investigation for Proposed Mixed Use Development at 277 The Grand Parade, Ramsgate, NSW*. (referred to as JKG report)

- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- Provide a preliminary assessment of the occurrence of ASS and assess the need for an ASSMP;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

1.3 Scope of Work

The investigation was undertaken generally in accordance with a JKE proposal (Ref: EP55661PTrev1) of 1 March 2022 and written acceptance from Bronxx on behalf of the client of 8 March 2022. The scope of work included the following:

- Review of site information, including background and site history information from various sources outlined in the report;
- Preparation of a CSM;
- Design and implementation of a sampling, analysis and quality plan (SAQP);
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)[3], National Acid Sulfate Soil Guidance (2018) documents, the Acid Sulfate Soil Management Advisory Committee (ASSMAC) Acid Sulfate Soil Manual (1998)[4]other guidelines made under or with regards to the Contaminated Land Management Act (1997)[5] and SEPP Resilience and Hazards 2021. A list of reference documents/guidelines is included in the appendices.

[3] National Environment Protection Council (NEPC), (2013). *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).* (referred to as NEPM 2013)

[4] Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). *Acid Sulfate Soils Manual* (ASS Manual 1998)

[5] Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)

2 SITE INFORMATION

2.1 Site Identification

Table 2-1: Site Identification

Current Site Owner (certificate of title):	Moside Pty Limited
Site Address:	277 The Grand Parade, Ramsgate, NSW
Lot & Deposited Plan:	Lots 6 to 11 in DP11037, Lot 8 Section D in DP10747, and Lot 55 in DP613007
Current Land Use:	Commercial (supermarket and associated car park)
Proposed Land Use:	Mixed use (residential/commercial)
Local Government Authority:	Bayside Council
Current Zoning:	B4 – Mixed use
Site Area (m^2) (approx.):	4,470
Geographical Location (decimal degrees) (approx.):	Latitude: -33.9863743 Longitude: 151.146206
Site Plans:	Appendix A

2.2 Site Location and Regional Setting

The site is located in a mixed use area of Ramsgate and is bound by The Grand Parade to the east. The site is located approximately 75m to the west of Lady Robinsons Beach and Botany Bay.

2.3 Topography

The site and regional topography are relatively flat, with a very gentle slope towards Botany Bay to the east. Given the surrounding topography, parts of the site appear to have been levelled to accommodate the existing development.

2.4 Site Inspection

A walkover inspection of the site was undertaken by JKE on 2 May 2022. The inspection was limited to accessible areas of the site and immediate surrounds. An internal inspection of buildings was not undertaken. Selected site photographs obtained during the inspection are attached in the appendices.

A summary of the inspection findings is outlined in the following subsections:

2.4.1 Current Site Use and/or Indicators of Former Site Use

At the time of the inspection, the site was occupied by a Coles Supermarket (in the eastern area), associate outbuildings and an on-grade carpark (in the western area).

2.4.2 Buildings, Structures and Roads

A large single storey commercial style building covered the eastern half of the site. In the central south of the site was a single storey, concrete block-constructed building and further to the west of this was a shipping container. None of the structures were internally inspected. The western half of the site comprised an asphaltic and concrete paved car park with a central section of pavers (pedestrian access).

2.4.3 Boundary Conditions, Soil Stability and Erosion

The site building formed the eastern boundary, and colourbond and brick fencing formed the southern and western boundaries. The northern boundary was unfenced and included vehicle access and egress to the carpark.

2.4.4 Presence of Drums/Chemical Storage and Waste

General waste contained in appropriate municipal receptacles was observed to be stored in the central south of the site. No other drums/chemical storage was observed during the site inspection.

2.4.5 Evidence of Cut and Fill

Fill materials (i.e. igneous gravels), was observed within garden beds and landscaped areas generally located along the north, west and south boundaries of the site.

2.4.6 Visible or Olfactory Indicators of Contamination (odours, spills etc)

No visible (e.g. spills, staining) or olfactory (i.e. odours) indicators of contamination were observed during the site inspection.

2.4.7 Drainage and Services

Onsite drainage was not observed and excess surface water flows would be expected to flow towards the north and into the regional stormwater system on Ramsgate Road.

2.4.8 Sensitive Environments

Sensitive environments such as wetlands, ponds, creeks or extensive areas of natural vegetation were not identified on site or in the immediate surrounds.

2.4.9 Landscaped Areas and Visible Signs of Plant Stress

Small to medium grasses and shrubs were located in the limited areas of landscaping and garden beds to the north, west and south of the car park. No obvious signs of plant stress or dieback were observed.

2.5 Surrounding Land Use

During the site inspection, JKE observed the following land uses in the immediate surrounds:

- North – On-grade car parking, Ramsgate Road and a Shell Service Station;
- South – Low density residential properties;
- East – The Grand Parade, parkland, Lady Robinsons Beach and Botany Bay beyond; and
- West – commercial properties including retail outlets, cafes and medical offices.

JKE is of the opinion that the service station located approximately 60m to the north of the site is considered to be a potential (albeit, unlikely) off-site source of contamination given the regional geology and the proximity to the site.

2.6 Underground Services

The 'Dial Before You Dig' (DBYD) plans were reviewed for the investigation in order to establish whether any major underground services exist at the site or in the immediate vicinity that could act as a preferential pathway for contamination migration. Major services were not identified that would be expected to act as preferential pathways for contamination migration.

2.7 Section 10.7 Planning Certificate

The section 10.7 (2 and 5) planning certificates were reviewed for the investigation. Copies of the certificates are attached in the appendices. A summary of the relevant information is outlined below:

- The land is not deemed to be: significantly contaminated; subject to a management order; subject of an approved voluntary management proposal; or subject to an on-going management order under the provisions of the CLM Act 1997;
- The land is not the subject of a Site Audit Statement (SAS);
- Clause 6.1 of the Bayside Local Environmental Plan 2021 - Acid Sulfate Soils applies to the land;
- The land is not located in a conservation area and does not include an item of environmental heritage;
- The Annual Noise Exposure Forecast (ANEF) affectation of the land is less than 15. The ANEF level may restrict the development of the land due to the risk of exposure to aircraft noise; and
- The Council is aware of various information that suggests the land may be affected by the 1% annual exceedance probability flood. The Council is unaware of the accuracy of this information, although further enquiries may be made with the Council's City Services Department in relation to this.

3 GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology

Regional geological information was reviewed for the investigation. The information was sourced from the Lotsearch report attached in the appendices. The report indicates that the majority of the site is underlain by Quaternary aged deposits of quartz sand, minor shell content, interdune (swale) silt and fine sand. The north-east corner of the site was indicated to be underlain by Quaternary aged deposits of quartz sand, with varying amounts of shell fragment.

3.2 Acid Sulfate Soil (ASS) Risk and Planning

A review of the ASS risk map prepared by Department of Land and Water Conservation (1997)[6] indicated that the site is located in an area classed as having a 'low probability' of ASS occurrence at depths of between 1 and 3m below the ground surface.

ASS information presented in the Lotsearch report indicated that the site is located within a Class 3 ASS risk area. Works in a Class 3 risk area that could pose an environmental risk in terms of ASS include works at depths beyond 1m below existing ground level or works by which the water table is likely to be lowered beyond 1m below existing ground level.

3.3 Hydrogeology

Hydrogeological information presented in the Lotsearch report indicated that the regional aquifer on-site and in the areas immediately surrounding the site includes porous, extensive aquifers of low to moderate productivity. There was a total of 603 registered bores within the report buffer of 2,000m. In summary:

- A bore onsite was register for general use;
- The next closest bore was registered 5m to the south-west of the site. This bore was registered for domestic purposes;
- The majority of the bores were registered for domestic purposes; and
- The drillers log information from the closest registered bores typically identified fill and/or sand soils to the maximum depth of 12.5m. Standing water levels (SWLs) in the bores ranged from 1.52mBGL to 5.49mBGL.

The information reviewed for the PSI indicates that the subsurface conditions at the site are expected to consist of high permeability (marine) soils overlying relatively deep bedrock. Abstraction and use of groundwater at the site or in the immediate surrounds appears to be viable under these conditions based on the numerous registered bores in the vicinity of the site, however the use of groundwater is not proposed as part of the development. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur.

Considering the local topography and surrounding land features, JKE anticipate groundwater to flow towards the east.

[6] Department of Land and Water Conservation, (1997). *1:25,000 Acid Sulfate Soil Risk Map (Series 9130N3, Ed 2)*

3.4 Receiving Water Bodies

The closest surface water body is Botany Bay located approximately 75m to the east of the site. This is considered to be a potential receptor given the regional geology and proximity of the water body.

4 SITE HISTORY INFORMATION

4.1 Review of Historical Aerial Photographs

Historical aerial photographs were reviewed for the investigation. The information was sourced from the Lotsearch report. JKE has reviewed the photographs and summarised relevant information in the following table:

Table 4-1: Summary of Historical Aerial Photographs

Year	Details
1930	The photograph was of poor quality. **On-site:** A large structure appeared to cover a majority of the northern portion of the site, from the north-east corner. Several other smaller structures were visible in the western section of the site, with what appeared to be open areas across the majority of the southern portion of the site. **Off-site:** The surrounds appeared to comprise beachside foreshore area to the east and residential plots to the north, west and south of the site.
1943	**On-site:** The site appeared similar to the previous photograph with defined rectangular structures of different sizes (potentially swimming baths) in the southern portion of the site. **Off-site:** The surrounds appeared to have been further developed for residential land use.
1950 1955, 56	**On-site:** The site appeared generally similar to the previous photograph. **Off-site:** Further development of the surrounding area for low and medium residential land use was visible.
1961	**On-site:** The site appeared generally similar to the previous photograph. **Off-site:** The property to the immediate north of the site appeared to contain a small structure in the east (consistent with existing fuel bowsers) and a larger building in the west (consistent with existing shop/workshop) which were consistent with a service station-type use. Buildings were also visible on the foreshore to the north-east o the site (consistent with existing structures).
1965	The site and surrounding area generally appeared similar to the previous photograph.
1970	**On-site:** The site appeared generally similar to the previous photograph. **Off-site:** To the north-west and south-west of the site, redevelopment of some low density residential land into medium density residential land use was observed.
1978	**On-site:** The site appeared to have undergone complete redevelopment. A large building was now visible covering the eastern half of the site and the western half of the site appeared to be a paved car park which appeared largely consistent with the existing (2022) layout of the supermarket. **Off-site:** The properties to the immediate west of the site also appeared to have undergone complete redevelopment with larger commercial style buildings now present.
1982 1986 1991	The site and surrounding area generally appeared similar to the previous photograph.

Year	Details
1994	**On-site:** The site appeared generally similar to the previous photograph. **Off-site:** Development of the properties to the immediate south and south-west of the site was evident.
2000	**On-site:** A structure was now visible in the central south of the site (consistent with existing concrete block storage building). **Off-site:** Further expansion of the beachfront buildings to the north-east of the site was observed. Rock groynes were visible in the shallow areas of the beach and bay.
2005	The site and surrounds appeared generally similar to the previous photograph.
2011	**On-site:** New paving in the central southern section of the site was observed (consistent with existing 2022 pavement finishes in this section). **Off-site:** Further developed for residential plots was visible in the surrounding areas.
2016	**On-site:** The site appeared generally similar to the previous photograph. **Off-site:** The service station to the north and the neighbouring residential plots to the west of this all appeared to have undergone extensive redevelopment.
2022	The site and surrounds appeared generally similar to the previous photograph.

4.2 Review of Historical Land Title Records

Historical land title records were reviewed for the investigation. The record search was undertaken by InfoTrack. Copies of the title records are attached in the appendices. The title records indicate the following:

- A number of individuals, with professions listed as clerk, manufacturer, mechanic, carpenter owned the lots within the site between 1915 and 1958;
- From 1958 onwards the lots have all been owned by businesses including Pemberton investments Pty Limited, G.J.Coles & Coy Limited (Coles Supermarket), and Barkly Square Shopping Centre Pty Limited; and
- The current owner of the entire site (including all lots) is Moside Pty Limited.

A mechanic was identified as owning the north-east corner lot for a period of five years between 1915 and 1920. Given the limited period of ownership and the time that has elapsed since this period of ownership, it is considered to be unlikely that this potential site-based activity would have resulted in any residual contamination impacts. However, for completeness this site-based activity will be included as an AEC in the CSM.

Additional information sourced from Bayside Library[7], indicates the site was utilised as the Ramsgate Baths (colloquially known as Pemberton's Baths) between 1924 and 1970. At this time the site owners were listed as Arthur Ashley Pemberton (Manufacturer) and Pemberton Investments Pty Limited. This use is consistent with the aerial photographs during this period.

[7] Public lecture on history of Pemberton's Baths at Ramsgate | St George & Sutherland Shire Leader | St George, NSW (theleader.com.au)

4.3 NSW EPA and Department of Defence Records

A review of the NSW EPA and Department of Defence databases was undertaken for the PSI. Information from the following databases were sourced from the Lotsearch report:

- Records maintained in relation to contaminated land under Section 58 of the CLM Act 1997;
- Records of sites notified in accordance with the Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)[8];
- Licensed activities under the Protection of the Environment Operations Act (1997)[9];
- Sites being investigated under the NSW EPA per-and polyfluoroalkyl substances (PFAS) investigation program;
- Sites being investigated by the Department of Defence for PFAS contamination; and
- Sites being managed by the Department of Defence for PFAS contamination.

The search included the site and surrounding areas in the report buffer. A summary of the information is provided below:

Table 4-2: NSW EPA and Department of Defence Records

Records	On-site	Off-site
Records under Section 58 of the CLM Act 1997	None	There were three properties listed in the report buffer. Two of these were service stations, one located 60m cross-gradient to the north of the site and one located 920m upgradient to the west of the site. Given the regional geology and topography, the property to the north is considered to represent a potential off-site source of contamination (as noted in Section 2.5). The service station to the west is not considered to represent an off-site source of contamination due to the distance from site. The third property was a landfill located approximately 815m cross-gradient and to the north-west of the site. Due to the distance and position, this property is not considered to represent an off-site source of contamination.
Records under the Duty to Report Contamination under Section 60 of the CLM Act 1997	None	There was one property listed in the report buffer. This property was a (former) service station located approximately 920m to the west. This property is discussed above, and is not considered to represent an off-site source of contamination.
Licences under the POEO Act 1997	None	Former licenses were identified for several areas within the report buffer, including the application of herbicides along waterways and water-based extractive activities. However, these activities are not considered unlikely to pose a contamination risk to the site or represent and off-site source of contamination in the context of identified receptors.

[8] NSW EPA, (2015). *Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997.* (referred to as Duty to Report Contamination)

[9] Protection of the Environment Operations Act 1997 (NSW) (referred to as POEO Act 1997)

Records	On-site	Off-site
Records relating to the NSW EPA PFAS Investigation Program	None	The Botany Bay area and Georges River located approximately 75m to the east of the site at its closest point, is within the NSW EPA PFAS investigation program. This area is not considered to represent an off-site source of contamination that would pose an unacceptable risk to the site in the context of the identified receptors and proposed development details.
Records relating to the Department of Defence PFAS management and investigation programs	None	None

4.4 Historical Business Directory and Additional Lotsearch Information

Historical business records and other relevant information were reviewed for the investigation. The information was sourced from the Lotsearch report and summarised in the following table:

Table 4-3: Historical Business Directory and other Records

Records	On-site	Off-site
Historical dry cleaners, motor garages and service stations	None	There were two service station/motor garages listed in the report buffer between 1950-1990. These two properties were service stations, one located 60m to the north of the site and previously discussed in Table 4-3 above as a potential offsite source of contamination, and one located approximately 195m to the south of the site. Given the regional geology and topography, the property to the south is not considered to represent an off-site source of contamination.
Other historical businesses that could represent potential sources of contamination	None	None
National waste management site database	None	None
National liquid fuel facilities	None	There were two properties listed in the report buffer. One property 60m to the north of the site and one 920m to the west of the site. These have both previously been discussed in Table 4-3. The property to the north is considered to represent a potential off-site source of contamination.
Mapped heritage items	None	Various heritage items were mapped in the report buffer. These are not considered to have any relevance in the context of the PSI objectives.

Records	On-site	Off-site
Mapped ecological constraints	None	Various ecological items were mapped in the report buffer. These are not considered to have any relevance in the context of the PSI objectives.
Mapped naturally occurring asbestos	None	None

4.5 Summary of Site History Information

A time line summary of the historical land uses and activities is presented in the following table. The information presented in the table is based on a weight of evidence assessment of the site history documentation and observations made by JKE.

Table 4-4: Summary of Historical Land Uses / Activities

Year(s)	On-site - Potential Land Use / Activities	Off-site - Potential Land Use / Activities
1915-1923	• Mixed use (residential and commercial), possibly including a mechanic between 1915 and 1920 in the north-east corner.	• Mixed use (residential and commercial).
1924-1970	• Ramsgate baths; • Cut and fill works to generate required levels across the site; • Use of pesticides around site; and • Use of hazardous building materials within site structures.	• Mixed use (residential and commercial); and • Service station operating from circa 1960, located 60m to the north.
1970-present	• Site use - Supermarket and associated car park; • Demolition of baths and associated structures; • Filling of the site likely to have occurred; • Use of pesticides around site; and • Use of hazardous building materials within site structures.	• Mixed use (residential and commercial); and • Service station continuing to operate 60m to north of site.

4.6 Integrity of Site History Information

The majority of the site history information was obtained from government organisations as outlined in the relevant sections of this report. The veracity of the information from these sources is considered to be relatively high. A certain degree of information loss can be expected given the lack of specific land use details over time. JKE has relied upon the Lotsearch report and have not independently verified any information contained within. However, it is noted that the Lotsearch report is generated based on databases maintained by various government agencies and is expected to be reliable.

5 CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM for the site is presented in the following sub-sections and is based on the site information (including the site inspection information) and the review of site history information. Reference should also be made to the figures attached in the appendices.

A review of the CSM in relation to source, pathway and receptor (SPR) linkages has been undertaken as part of the Tier 1 risk assessment process, as outlined in Section 10.

5.1 Potential Contamination Sources/AEC and CoPC

The potential contamination sources/AEC and CoPC are presented in the following table:

Table 5-1: Potential (and/or known) Contamination Sources/AEC and Contaminants of Potential Concern

Source / AEC	CoPC
Fill material – The site appears to have been historically filled to achieve the existing levels. The fill may have been imported from various sources and could be contaminated. Fill material (i.e. igneous gravels) was observed in the landscaped areas and garden beds during the site inspection.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.
Mechanics Workshop – Historical title records indicate the north-eastern lot (Lot 9 in DP11037), was owned by a mechanic between 1915-1920. While it is unlikely residual contamination remains from this land use, for completeness it has been included as an AEC.	Heavy metals, TRH, naphthalene and BTEX
Use of pesticides – Pesticides may have been used beneath the buildings and/or around the site.	Heavy metals and OCPs
Hazardous Building Material – Hazardous building materials may be present as a result of former building and demolition activities. These materials may also be present in the existing buildings/ structures on site.	Asbestos and lead
Off-site area 1 – A service station is located within 60m of the northern boundary of the site and is considered to be a potential off-site source of contamination due to the regional geology and topography. This property has been a service station since at least 1950.	Heavy metals (lead), TRH, BTEX and PAHs

Based on the site history information, JKE is of the opinion that there are no onsite point sources for Per- and Polyfluoroalkyl Substances (PFAS). We note that the Botany Bay area and Georges River located approximately 75m to the east of the site at its closest point, is within the NSW EPA PFAS investigation program. This was considered and discussed previously in Table 4-2.

It is noted that a broader suite of volatile organic compounds (VOCs) has been considered in groundwater for the PSI for screening purposes.

5.2 Mechanism for Contamination, Affected Media, Receptors and Exposure Pathways

The mechanisms for contamination, affected media, receptors and exposure pathways relevant to the potential contamination sources/AEC are outlined in the following CSM table:

Table 5-2: CSM

Potential mechanism for contamination	Potential mechanisms for contamination include: • Fill material – importation of impacted material, 'top-down' impacts (e.g. placement of fill, leaching from surficial material etc), or sub-surface release (e.g. impacts from buried material); • Use of pesticides – 'top-down' and spills (e.g. during normal use, application and/or improper storage); • Hazardous building materials – 'top-down' (e.g. demolition resulting in surficial impacts in unpaved areas); and • Off-site land uses – 'top-down', spill or sub-surface release. Impacts to the site could occur via migration of contaminated groundwater.
Affected media	Soil and groundwater have been identified as potentially affected media. It is noted that some of the CoPC for fill are potentially volatile. The need to consider soil vapour as a potentially affected medium would be assessed based on the findings of the PSI and the final proposed development details.
Receptor identification	Human receptors include site occupants/users (including adults and children in a residential scenario and adults in a commercial scenario), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users, groundwater users and recreational water users within Botany Bay. Ecological receptors include terrestrial organisms and plants within unpaved areas, and freshwater/marine ecology in Botany Bay. Whilst the proposed development scenario includes a basement cover the majority of the site and no on-ground landscaping, the PSI has considered terrestrial ecological receptors for screening purposes.
Potential exposure pathways	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRH, naphthalene and BTEX). The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Potential exposure pathways for ecological receptors include primary/direct contact and ingestion. Exposure during future site use could occur via direct contact with soil in unpaved areas such as gardens, inhalation of airborne asbestos fibres during soil disturbance, or inhalation of vapours within enclosed spaces such as buildings and basements. Exposure to groundwater could occur in Botany Bay via direct migration. Groundwater also has the potential to enter the bay via the stormwater system (which is expected to discharge into the bay) during construction dewatering.

Potential exposure mechanisms	The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into the proposed basement and/or building (i.e. from volatilisation of contaminants from groundwater – depending on the basement taking/waterproofing solution); • Contact (dermal, ingestion or inhalation) with exposed soils; • Migration of groundwater off-site and into nearby water bodies, including aquatic ecosystems and those being used for recreation; and • Migration of groundwater off-site into areas where groundwater is being utilised as a resource (i.e. for irrigation).
Presence of preferential pathways for contaminant movement	Local services (i.e. those not shown on the DBYD plans) such as stormwater pipe trenches could act as preferential pathways for contaminant migration. This could occur through fill soil and/or via groundwater/seepage. This would be dependent on the contaminant type and transport mechanisms.

6 SAMPLING, ANALYSIS AND QUALITY PLAN

6.1 Data Quality Objectives (DQO)

Data Quality Objectives (DQOs) were developed to define the type and quality of data required to achieve the project objectives outlined in Section 1.2. The DQOs were prepared with reference to the process outlined in Schedule B2 of NEPM (2013). The seven-step DQO approach for this project is outlined in the following sub-sections.

The DQO process is validated in part by the Data Quality Assurance/Quality Control (QA/QC) Evaluation. The Data (QA/QC) Evaluation is summarised in Section 8.1 and the detailed evaluation is provided in the appendices.

6.1.1 Step 1 - State the Problem

The CSM identified potential sources of contamination/AEC at the site that may pose a risk to human health and the environment. Investigation data is required to assess the contamination status of the site, assess the risks posed by the contaminants in the context of the proposed development/intended land use, and assess whether remediation is required. This information will be considered by the consent authority in exercising its planning functions in relation to the development proposal.

A waste classification is required prior to off-site disposal of excavated soil and an assessment of ASS is also required to establish whether management of ASS materials will be necessary.

6.1.2 Step 2 - Identify the Decisions of the Study

The objectives of the investigation are outlined in Section 1.2. The decisions to be made reflect these objectives and are as follows:

- Did the site inspection, or does the historical information identify potential contamination sources/AEC at the site?
- Are any results above the SAC?
- Do potential risks associated with contamination exist, and if so, what are they?
- Is further investigation or remediation required?
- Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?
- Are PASS/ASS likely to be disturbed during the proposed development?

6.1.3 Step 3 - Identify Information Inputs

The primary information inputs required to address the decisions outlined in Step 2 include the following:

- Site information, including site observations and site history documentation;
- Sampling of potentially affected media, including soil and groundwater;
- Observations of sub-surface variables such as soil type, photo-ionisation detector (PID) concentrations, odours and staining, and groundwater physiochemical parameters;
- Laboratory analysis of soils and groundwater for the CoPC identified in the CSM, as well as soils for ASS properties; and

- Field and laboratory QA/QC data.

6.1.4 Step 4 - Define the Study Boundary

The sampling will be confined to the site boundaries as shown in Figure 2 and will be limited vertically to a depth of 7m below ground level (spatial boundary). The sampling was completed on 2 May 2022 (temporal boundary). The assessment of potential risk to adjacent land users has been made based on data collected within the site boundary.

Sampling was not undertaken within the existing building footprint due to access constraints.

6.1.5 Step 5 - Develop an Analytical Approach (or Decision Rule)

6.1.5.1 Tier 1 Screening Criteria

The laboratory data will be assessed against relevant Tier 1 screening criteria (referred to as SAC), as outlined in Section 7. Exceedances of the SAC do not necessarily indicate a requirement for remediation or a risk to human health and/or the environment. Exceedances are considered in the context of the CSM and valid SPR-linkages.

For this investigation, the individual results have been assessed as either above or below the SAC. Statistical evaluation of the dataset via calculation of mean values and/or 95% upper confidence limit (UCL) values has not been undertaken due to the spatial distribution of the data and the number of samples submitted for analysis.

6.1.5.2 Field and Laboratory QA/QC

Field QA/QC included analysis of intra-laboratory duplicates, trip spike, trip blank and rinsate samples. Further details regarding the sampling and analysis undertaken, and the acceptable limits adopted, is provided in the Data Quality (QA/QC) Evaluation in the appendices.

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the attached laboratory reports. These criteria were developed and implemented in accordance with the laboratory's National Association of Testing Authorities, Australia (NATA) accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence are reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory is undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, JKE typically adopt the most conservative concentration reported (or in some cases, consider the data from the affected sample as an estimate).

6.1.5.3 Appropriateness of Practical Quantitation Limits (PQLs)

The PQLs of the analytical methods are considered in relation to the SAC to confirm that the PQLs are less than the SAC. In cases where the PQLs are greater than the SAC, a discussion of this is provided.

6.1.6 Step 6 – Specify Limits on Decision Errors

To limit the potential for decision errors, a range of quality assurance processes are adopted. A quantitative assessment of the potential for false positives and false negatives in the analytical results is undertaken with reference to Schedule B(3) of NEPM (2013) using the data quality assurance information collected.

Decision errors can be controlled through the use of hypothesis testing. The test can be used to show either that the baseline condition is false or that there is insufficient evidence to indicate that the baseline condition is false. The null hypothesis is an assumption that is assumed to be true in the absence of contrary evidence. For this investigation, the null hypothesis has been adopted which is that, there is considered to be a complete SPR linkage for the CoPC identified in the CSM unless this linkage can be proven not to (or unlikely to) exist. The null hypothesis has been adopted for this investigation.

Quantitative limits on decision errors were not established as the sample plan was not probabilistic.

6.1.7 Step 7 - Optimise the Design for Obtaining Data

The most resource-effective design will be used in an optimum manner to achieve the investigation objectives. Adjustment of the investigation design can occur following consultation or feedback from project stakeholders. For this investigation, the design was optimised via consideration of the various lines of evidence used to select the sample locations, the media being sampled, and also by the way in which the data were collected.

The sampling plan and methodology are outlined in the following sub-sections.

6.2 Soil Sampling Plan and Methodology

The soil sampling plan and methodology adopted for this investigation is outlined in the table below:

Table 6-1: Soil Sampling Plan and Methodology

Aspect	Input
Sampling Density	Samples were collected from seven locations as shown on the attached Figure 2. Based on the site area (4,470m^2), this number of locations corresponded to a sampling density of approximately one sample per 639m^2. The sampling plan was not designed to meet the minimum sampling density for hotspot identification, as outlined in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995)[10]. It should be noted that sampling locations were only positioned in the western half of the site due to access constraints imposed by the buildings and structures in the east.
Sampling Plan	The sampling locations were placed on a judgemental sampling plan and were broadly positioned for coverage, taking into consideration areas that were not easily accessible. This sampling plan was considered suitable to make a preliminary assessment of potential risks associated with the AEC and CoPC identified in the CSM, and assess whether further investigation is warranted.

[10] NSW EPA, (1995), *Contaminated Sites Sampling Design Guidelines.* (referred to as EPA Sampling Design Guidelines 1995)

Aspect	Input
	Samples for ASS assessment were obtained and analysed from BH1 and BH5 only.
Set-out and Sampling Equipment	Sampling locations were set out using a tape measure. In-situ sampling locations were checked for underground services by an external contractor prior to sampling. Samples were collected using a drill rig equipped with spiral flight augers (150mm diameter). Soil samples were obtained from a Standard Penetration Test (SPT) split-spoon sampler, and/or directly from the auger.
Sample Collection and Field QA/QC	Soil samples were obtained on 2 May 2022 in accordance with our standard field procedures. Soil samples were collected from the fill and natural profiles based on field observations. The sample depths are shown on the logs attached in the appendices. Samples were placed in glass jars with plastic caps and teflon seals with minimal headspace. Samples for asbestos analysis were placed in zip-lock plastic bags and samples for ASS analysis were placed in plastic bags sealed with twist ties. During sampling, soil at selected depths was split into primary and duplicate samples for field QA/QC analysis. The field splitting procedure included alternately filling the sampling containers to obtain a representative split sample.
Field Screening	A portable Photoionisation Detector (PID) fitted with a 10.6mV lamp was used to screen the samples for the presence of volatile organic compounds (VOCs). PID screening for VOCs was undertaken on soil samples using the soil sample headspace method. VOC data was obtained from partly filled zip-lock plastic bags following equilibration of the headspace gases. PID calibration records are maintained on file by JKE. The field screening for asbestos quantification included the following: • A representative bulk sample was collected from fill at 1m intervals, or from each distinct fill profile. The quantity of material for each sample varied based on whatever return could be achieved using the auger. The bulk sample intervals are shown on the attached Table S5; • Each sample was weighed using an electronic scale; • Each bulk sample was passed through a sieve with a 7.1mm aperture and inspected for the presence of fibre cement; • The condition of fibre cement or any other suspected asbestos materials was noted on the field records; and • If observed, any fragments of fibre cement in the bulk sample were collected, placed in a zip-lock bag and assigned a unique identifier. Calculations for asbestos content were undertaken based on the requirements outlined in Schedule B1 of NEPM (2013), as summarised in Section 7.1. Bulk 10L samples could not be obtained during soil sampling from all fill profiles due to the lack of sample return from augers. However, 500mL samples were obtained from all sampling locations for asbestos analysis. A calibration/check of the accuracy of the scale used for weighing the fibre cement fragments was undertaken using a set of calibration weights. Calibration/check records are maintained on file by JKE. The scale used to weigh the 10L samples was not calibrated, however this is not considered significant as this method of providing a weight for the bulk sample is considered to be considerably more accurate than applying a nominal soil density conversion.

Aspect	Input
Decontami-nation and Sample Preservation	Sampling personnel used disposable nitrile gloves during sampling activities. Re-usable sampling equipment was decontaminated using Decon and potable water. Soil samples were preserved by immediate storage in an insulated sample container with ice. ASS samples were placed in bags with minimal head-space (i.e. with the air squeezed out). On completion of the fieldwork, the samples were stored temporarily in fridges in the JKE warehouse (or in freezers in the case of the ASS samples) before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard chain of custody (COC) procedures.

6.3 Groundwater Sampling Plan and Methodology

The groundwater sampling plan and methodology is outlined in the table below:

Table 6-2: Groundwater Sampling Plan and Methodology

Aspect	Input
Sampling Plan	Groundwater monitoring wells were installed in BH1 (MW1) and BH5 (MW5). The wells were positioned to gain a snap-shot of the groundwater conditions. Considering the topography and the location of the nearest down-gradient water body, MW1 and MW5 were considered to be in the up-gradient to intermediate area of the site and would be expected to provide an indication of groundwater flowing onto (beneath) the site from the west.
Monitoring Well Installation Procedure	The monitoring well construction details are documented on the appropriate borehole logs attached in the appendices. Both of the monitoring wells were installed to depths of approximately 6m below ground level. The wells were generally constructed as follows: • 50mm diameter Class 18 PVC (machine slotted screen) was installed in the lower section of the well to intersect groundwater; • 50mm diameter Class 18 PVC casing was installed in the upper section of the well (screw fixed); • A 2mm sand filter pack was used around the screen section for groundwater infiltration; • A hydrated bentonite seal/plug was used on top of the sand pack to seal the well; and • A gatic cover was installed at the surface with a concrete plug to limit the inflow of surface water.
Monitoring Well Development	The monitoring wells were developed on 2 May 2022 using a submersible electrical pump. The monitoring wells were developed until steady state conditions were achieved. Steady state conditions were considered to have been achieved when the difference in the pH measurements was less than 0.2 units, the difference in conductivity was less than 10%, and when the SWL was not in drawdown. The field monitoring records and calibration data are attached in the appendices.
Groundwater Sampling	The monitoring wells were allowed to recharge for approximately three days after development. Groundwater samples were obtained on 5 May 2022. Prior to sampling, the monitoring wells were checked for the presence of Light Non-Aqueous Phase Liquids (LNAPLs) using an inter-phase probe electronic dip meter. The monitoring well head space was checked for VOCs using a calibrated PID unit. The samples were obtained using a peristaltic pump. During sampling, the following parameters were monitored using calibrated field instruments:

Aspect	Input
	• SWL using an electronic dip meter; and • pH, temperature, electrical conductivity (EC), dissolved oxygen (DO) and redox potential (Eh) using a YSI Multi-probe water quality meter. Steady state conditions were considered to have been achieved when the difference in the pH measurements was less than 0.2 units, the difference in conductivity was less than 10%, and when the SWL was not in drawdown. Groundwater samples were obtained directly from the single use PVC tubing and placed in the sample containers. Duplicate samples were obtained by alternate filling of sample containers. This technique was adopted to minimise disturbance of the samples and loss of volatile contaminants associated with mixing of liquids in secondary containers, etc. Groundwater removed from the wells during development and sampling was transported to JKE in jerry cans and stored in holding drums prior to collection by a licensed waste water contractor for off-site disposal. The field monitoring record and calibration data are attached in the appendices.
Sample Preservation	During development, the pump was flushed between monitoring wells with potable water (single-use tubing was used for each well). The pump tubing was discarded after each sampling event and replaced therefore no decontamination procedure was considered necessary. The samples were preserved with reference to the analytical requirements and placed in an insulated container with ice or ice bricks. On completion of the fieldwork, the samples were temporarily stored in a fridge at the JKE office, before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard COC procedures.

6.3.1 Laboratory Analysis

Samples were analysed by an appropriate, NATA Accredited laboratory using the analytical methods detailed in Schedule B(3) of NEPM 2013. Reference should be made to the laboratory reports attached in the appendices for further details.

Table 6-3: Laboratory Details

Samples	Laboratory	Report Reference
All primary samples and field QA/QC samples including (intra-laboratory duplicates, trip blanks, trip spikes and field rinsate samples)	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	294592, 294592-A, 294586, 294586-A, and 294828.

7 SITE ASSESSMENT CRITERIA (SAC)

The SAC were derived from the NEPM 2013 and other guidelines as discussed in the following sub-sections. The guideline values for individual contaminants are presented in the attached report tables and further explanation of the various criteria adopted is provided in the appendices.

7.1 Soil

Soil data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013) as outlined below.

7.1.1 Human Health

- Health Investigation Levels (HILs) for a 'Residential with minimal opportunities for soil access; including dwellings with fully/permanently paved yards like high-rise buildings' exposure scenario (HIL-B). These criteria are considered suitable given the proposed development is still in the concept stage;
- Health Screening Levels (HSLs) for a 'low-high density residential' exposure scenario (HSL-A & HSL-B). HSLs were calculated based on conservative assumptions including a 'sand' type and a depth interval of 0m to 1m;
- HSLs for direct contact presented in the CRC Care Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document (2011)[11]; and
- Asbestos was assessed on the basis of presence/absence and against the HSL-B criteria. A summary of the asbestos criteria is provided in the table below:

Table 7-1: Details for Asbestos SAC

Guideline	Applicability
Asbestos in Soil	The HSL-B criteria were adopted for the assessment of asbestos in soil. The SAC adopted for asbestos were derived from the NEPM 2013 and are based on the Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2021)[12]. The SAC include the following: • No visible asbestos at the surface/in the top 10cm of soil; • <0.04% w/w bonded asbestos containing material (ACM) in soil; and • <0.001% w/w asbestos fines/fibrous asbestos (AF/FA) in soil. Concentrations for bonded ACM concentrations in soil are based on the following equation which is presented in Schedule B1 of NEPM (2013): $$\text{\% w/w asbestos in soil} = \frac{\text{\% asbestos content x bonded ACM (kg)}}{\text{Soil volume (L) x soil density (kg/L)}}$$ However, we are of the opinion that the actual soil volume in a 10L bucket varies considerably due to the presence of voids, particularly when assessing cohesive soils. Therefore, each bucket sample was weighed using electronic scales and the above equation was adjusted as follows (we note that the units have also converted to grams):

[11] Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC Care), (2011). Technical Report No. 10 - *Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document*

[12] Western Australian (WA) Department of Health (DoH), (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. (referred to as WA DoH 2021)

Guideline	Applicability
	% w/w asbestos in soil = $\frac{\text{**% asbestos content x bonded ACM (g)**}}{\text{Soil weight (g)}}$

7.1.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for an 'urban residential and public open space' (URPOS) exposure scenario. These have only been applied to the top 2m of soil as outlined in NEPM (2013). The criterion for benzo(a)pyrene has been increased from the value presented in NEPM (2013) based on the Canadian Soil Quality Guidelines[13];
- ESLs were adopted based on the 'coarse' soil type; and
- EILs for selected metals were calculated based on the most conservative added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013) and published ambient background concentration (ABC) values presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)[14]. These data were used to select the added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013), and published ambient background concentration (ABC) presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)[15]. This method is considered to be adequate for the Tier 1 screening.

7.1.3 Management Limits for Petroleum Hydrocarbons

Management limits for petroleum hydrocarbons (as presented in Schedule B1 of NEPM 2013) were considered.

7.1.4 Waste Classification

Data for the waste classification assessment were assessed in accordance with the Waste Classification Guidelines, Part 1: Classifying Waste (2014)[16] as outlined in the following table:

Table 7-2: Waste Categories

Category	Description
General Solid Waste (non-putrescible)	• If Specific Contaminant Concentration (SCC) ≤ Contaminant Threshold (CT1) then Toxicity Characteristics Leaching Procedure (TCLP) not needed to classify the soil as general solid waste; and • If TCLP ≤ TCLP1 and SCC ≤ SCC1 then treat as general solid waste.
Restricted Solid Waste (non-putrescible)	• If SCC ≤ CT2 then TCLP not needed to classify the soil as restricted solid waste; and • If TCLP ≤ TCLP2 and SCC ≤ SCC2 then treat as restricted solid waste.

[13] Canadian Council of Ministers of the Environment, (1999). *Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)* (referred to as the Canadian Soil Quality Guidelines)

[14] Olszowy, H., Torr, P., and Imray, P., (1995), *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4*. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

[15] Olszowy, H., Torr, P., and Imray, P., (1995), *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4*. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission.

[16] NSW EPA, (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* (referred to as Waste Classification Guidelines 2014)

Category	Description
Hazardous Waste	• If SCC > CT2 then TCLP is needed to classify the soil as hazardous waste; and • If TCLP > TCLP2 and/or SCC > SCC2 then treat as hazardous waste.
Virgin Excavated Natural Material (VENM)	Natural material (such as clay, gravel, sand, soil or rock fines) that meet the following: • That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial mining or agricultural activities; • That does not contain sulfidic ores or other waste; and • Includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette.

7.1.5 Acid Sulfate Soil

The action criteria presented in the *National Acid Sulfate Soil Guidance: National acid sulfate soils sampling and identification methods manual* (2018) are summarised in the following table. The action criteria for 'coarse textured soils' were adopted.

Table 7-3: ASS Action Criteria

Type of material		**Net Acidity**			
Texture range* (NCST 2009)	Approximate clay content (%)	1–1000 t materials disturbed		> 1000 t materials disturbed	
		% S-equiv. (oven-dried basis)	mol H^+/t (oven-dried basis)	% S-equiv. (oven-dried basis)	mol H^+/t (oven-dried basis)
Fine - light medium to heavy clays	>40	≥0.10	≥62	≥0.03	≥18
Medium - clayey sand to light clays	5–40	≥0.06	≥36	≥0.03	≥18
Coarse and Peats - sands to loamy sands	<5	≥0.03	≥18	≥0.03	≥18

* If bulk density values are not available for the conversion of cubic meters to tonnes of soil, then default bulk densities, based on the soil texture, may be used.

7.2 Groundwater

Groundwater data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013), following an assessment of environmental values in accordance with the Guidelines for the Assessment and Management of Groundwater Contamination (2007)[17]. Environmental values for this investigation include aquatic ecosystems, human uses, and human-health risks in non-use scenarios.

7.2.1 Human Health

- The NEPM (2013) HSLs were not applicable for this project as the groundwater was recorded at depths shallower than 2m. On this basis, JKE has undertaken a site-specific assessment (SSA) for the Tier 1 screening of human health risks posed by volatile contaminants in groundwater. The assessment

[17] NSW Department of Environment and Conservation, (2007). *Guidelines for the Assessment and Management of Groundwater Contamination.*

included selection of alternative Tier 1 criteria that were considered suitably protective of human health. These criteria are based on drinking water guidelines and have been referred to as HSL-SSA. The criteria were based on the following (as shown in the attached report tables):

  - Australian Drinking Water Guidelines 2011 (updated 2021)[18] for BTEX compounds and selected VOCs;
  - World Health Organisation (WHO) document titled Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality (2008)[19] for petroleum hydrocarbons;
  - USEPA Region 9 screening levels for naphthalene (threshold value for tap water); and
  - The use of the laboratory PQLs for other contaminants where there were no Australian guidelines; and

- The ADWG 2011 were multiplied by a factor of 10 to assess potential risks associated with incidental/recreational-type exposure to groundwater (e.g. within down-gradient water bodies, or with seepage water in the basement). These have been deemed as 'recreational' SAC.

7.2.2 Environment (Ecological - aquatic ecosystems)

Groundwater Investigation Levels (GILs) for 95% protection of marine species were adopted based on the Default Guideline Values in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018)[20]. The 99% trigger values were adopted where required to account for bioaccumulation. Low and moderate reliability trigger values were also adopted for some contaminants where high-reliability trigger values don't exist.

[18] National Health and Medical Research Council (NHMRC), (2021). *National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011* (referred to as ADWG 2011)

[19] World Health Organisation (WHO), (2008). *Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality* (referred to as WHO 2008)

[20] Australian and New Zealand Governments (ANZG), (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia (referred to as ANZG 2018)

8 RESULTS

8.1 Summary of Data (QA/QC) Evaluation

The data evaluation is presented in the appendices. In summary, JKE is of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

8.2 Subsurface Conditions

A summary of the subsurface conditions encountered during the investigation is presented in the following table. Reference should be made to the borehole logs attached in the appendices for further details.

Table 8-1: Summary of Subsurface Conditions

Profile	Description
Pavement	Asphaltic Concrete (AC)/Concrete pavement was encountered at the surface in all boreholes and was between 30mm and 160mm in thickness.
Fill	Fill was encountered beneath the pavement in all boreholes and extended to depths of approximately 0.3mBGL to 1.5mBGL. The fill typically comprised silty clayey sand, silty sandy clay, and silty clay with inclusions of igneous gravel, silt, concrete and terracotta fragments and ash. Neither staining nor odours were encountered in the fill material during the fieldwork. No suspected ACM was encountered in the fill material during the fieldwork.
Natural Soil	Natural marine sandy soils were encountered beneath the fill in all boreholes and extended to the maximum depth of the investigation at approximately 7mBGL. Neither staining nor odours were encountered in the natural soil during the fieldwork.
Groundwater	Groundwater seepage was encountered in boreholes BH1, BH2, BH4, BH5, BH6 and BH7 during drilling at depths of approximately 1.6mBGL to 2mBGL. The SWLs measured in the boreholes ranged from 1.6mBGL to 2mBGL a short time after completion of drilling. BH3 remained dry during and a short time after drilling.

8.3 Field Screening

A summary of the field screening results is presented in the following table:

Table 8-2: Summary of Field Screening

Aspect	Details
PID Screening of Soil Samples for VOCs	PID soil sample headspace readings are presented in attached report tables and the COC documents attached in the appendices. The results ranged from 0ppm to 0.1ppm equivalent isobutylene. These results indicate a general lack of PID detectable VOCs.
Bulk Screening for Asbestos	The bulk field screening results are summarised in the attached report Table S5. All results were below the SAC. Suspected ACM was not identified in any of the samples during field work.

Aspect	Details
Groundwater Depth & Flow	With the exception of BH3, groundwater seepage was encountered in all boreholes during drilling at depths of approximately 1.6mBGL to 2mBGL. A standing water level (SWL) was measured in the boreholes at depths ranging from 1.6mBGL to 2mBGL a short time after completion of drilling. SWLs measured in the monitoring wells installed at the site ranged from 1.72mBGL to 1.93mBGL. The SWLs indicate that excavation for the proposed basement is likely to intercept groundwater. The groundwater flow direction was not established however we consider it likely that groundwater flows eastward towards the bay.
Groundwater Field Parameters	Field measurements recorded during sampling were as follows: - pH ranged from 7.26 to 7.3; - EC ranged from 258.5µS/cm to 407.8µS/cm; - Eh ranged from 89.5mV to 108.8mV; and - DO ranged from 0.4mg/L to 1mg/L; and - PID in well headspace ranged from 0.2ppm to 0.4ppm.
LNAPLs petroleum hydrocarbons	Phase separated product (i.e. LNAPL) were not detected using the interphase probe during groundwater sampling.

8.4 Soil Laboratory Results

The soil laboratory results were assessed against the SAC presented in Section 7.1. Individual SAC are shown in the report tables attached in the appendices. A summary of the results is presented below:

8.4.1 Human Health and Environmental (Ecological) Assessment

Table 8-3: Summary of Soil Laboratory Results – Human Health and Environmental (Ecological)

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Arsenic	9	<4	0	0	-
Cadmium	9	<0.4	0	NSL	-
Chromium (total)	9	71	0	0	-
Copper	9	49	0	0	-
Lead	9	50	0	0	-
Mercury	9	<0.1	0	NSL	-

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Nickel	9	68	0	4	Nickel concentrations in SDUP1/BH1 (0.15-0.25), BH4 (0.2-0.3m), BH5 (0.16-0.3m) and BH6 (1.3-1.5m) exceeded the ecological SAC of 35mg/kg.
Zinc	9	96	0	0	-
Total PAHs	9	1.4	0	NSL	-
Benzo(a)pyrene	9	0.1	NSL	0	-
Carcinogenic PAHs (as BaP TEQ)	9	<0.5	0	NSL	-
Naphthalene	9	<1	0	NSL	-
DDT+DDE+DDD	7	<0.1	0	NSL	-
DDT	7	<0.1	NSL	0	-
Aldrin and dieldrin	7	<0.1	0	NSL	-
Chlordane	7	<0.1	0	NSL	-
Heptachlor	7	<0.1	0	NSL	-
Chlorpyrifos (OPP)	7	<0.1	0	NSL	-
PCBs	7	<0.1	0	NSL	-
TRH F1	9	<25	0	0	-
TRH F2	9	<50	0	0	-
TRH F3	9	<100	0	0	-
TRH F4	9	<100	0	0	-
Benzene	9	<0.2	0	0	-
Toluene	9	<0.5	0	0	-
Ethylbenzene	9	<1	0	0	-
Xylenes	9	<1	0	0	-

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Asbestos (in soil) (%w/w)	7	0.0792%w/w ACM <0.001%w/w AF/FA	2	NA	The reported ACM concentration of 0.0792%w/w in BH6 (0.3-0.5m) exceeded the HSL-B criterion. ACM was also detected in BH2 (0.8-1m).

Notes:

N: Total number (primary samples)

NSL: No set limit

NL: Not limiting

8.4.2 Waste Classification Assessment

The laboratory results were assessed against the criteria presented in Section 7.1.4. The results are presented in the report tables attached in the appendices. A summary of the results is presented in the following table:

Table 8-4: Summary of Soil Laboratory Results Compared to CT and SCC Criteria

Analyte	N	N > CT Criteria	N > SCC Criteria	Comments
Arsenic	9	0	0	-
Cadmium	9	0	0	-
Chromium	9	0	0	-
Copper	9	NSL	NSL	-
Lead	9	0	0	-
Mercury	9	0	0	-
Nickel	9	2	0	Nickel concentrations exceeded the CT1 criterion in two fill samples collected from BH4 (0.2-0.3m) and BH6 (0.15-0.25m). The maximum nickel concentration was 68mg/kg.
Zinc	9	NSL	NSL	-
TRH (C_6-C_9)	9	0	0	-
TRH (C_{10}-C_{36})	9	0	0	-
BTEX	9	0	0	-
Total PAHs	9	0	0	-
Benzo(a)pyrene	9	0	0	-
OCPs & OPPs	7	0	0	-

Analyte	N	N > CT Criteria	N > SCC Criteria	Comments
PCBs	7	0	0	-
Asbestos	7	-	-	Asbestos was detected in two fill samples collected from BH2 (0.8-1.0m) and BH6 (0.3-0.5m).

N: Total number (primary samples)

NSL: No set limit

Table 8-5: Summary of Soil Laboratory Results Compared to TCLP Criteria

Analyte	N	N > TCLP Criteria	Comments
Nickel	2	0	The two fill samples with nickel concentrations above the CT1 criterion were analysed for TCLP lead.

N: Total number (primary samples)

8.4.3 Acid Sulfate Soil Assessment

The soil laboratory results were assessed against the action criteria adopted for the assessment. The results are presented in the attached report table A1 and summarised fin the following table:

Table 8-6: Summary of ASS Results

Analysis	N	Comments
pH_F and pH_{FOX}	18	None of the pH_F results were below pH 4 and therefore none of the samples were indicative of actual ASS (AASS). The pH_{FOX} results ranged from pH 6.0 to pH 8.2. The calculated change in pH was between 1.1 and 2.8.
pH_{FOX} reaction rates	18	Reaction rates of the samples were generally in the low range with the shallow fill sample from BH1 in the high range. A total of seven samples were targeted for further acid base accounting analysis due to the pH_{FOX} results and/or for spatial/vertical coverage across the site to a maximum depth of 7mBGL.
Net Acidity % S-equiv.	7	The results ranged from <0.005%w/w to 0.05%w/w. One of the results was greater than the action criterion of 0.03%w/w. This occurred in BH5 at a depth of 6.9-7.0mBGL.
Net Acidity mol H^+/t	7	The results ranged from less than the PQL to 69moles H^+/tonnes. One of the results was greater than the action criterion of 18 moles H^+/tonnes. This occurred in BH5 at a depth of 6.9-7.0mBGL.
S_{CR}%	7	The S_{CR}% results ranged from less than the PQL to 0.05% SCr. These results indicated that the soils generally did not contain significant oxidisable sulfur concentrations. An appreciable concentration of oxidisable sulfur was encountered in the BH5 (6.9-7.0m) sample, with an S_{CR}% result of 0.05%.
Liming Rate	7	The liming rate required for neutralisation ranged from less than the PQL to 2.2kg $CaCO_3$/tonne.

N: Total number (primary samples)

8.5 Groundwater Laboratory Results

The groundwater laboratory results were assessed against the SAC presented in Section 7.2. Individual SAC are shown in the report tables attached in the appendices. A summary of the results is presented below:

Table 8-7: Summary of Groundwater Laboratory Results – Human Health and Environmental (Ecological)

Analyte	N ^	Max. (µg/L)	N> Human Health SAC	N> Ecological SAC	Comments
Arsenic	2	6	0	2	The reported arsenic concentrations in MW1, MW5, and the field duplicate WDUP1 (primary sample MW1) of between 4µg/L and 6µg/L, exceeded the marine GIL for arsenic of 2.3µg/L.
Cadmium	2	<0.1	0	0	-
Chromium (total)	2	16	0	0	-
Copper	2	35	0	1	The reported copper concentrations in MW5 and the field duplicate WDUP1, of between 2µg/L and 35µg/L, exceeded the ecological GIL of 1.3µg/L.
Lead	2	<1	0	0	-
Mercury	2	<0.05	0	0	-
Nickel	2	<1	0	0	-
Zinc	2	26	0	1	The reported zinc concentration in MW5 of 26µg/L exceeded the marine GIL of 15µg/L.
Total PAHs	2	<0.1	0	0	-
Benzo(a)pyrene	2	<0.1	0	0	-
Naphthalene	2	<0.2	0	0	-
TRH F1	2	<10	0	NSL	-
TRH F2	2	<50	0	NSL	-
TRH F3	2	<100	NSL	NSL	-
TRH F4	2	<100	NSL	NSL	-
Benzene	2	<1	0	0	-
Toluene	2	<1	0	0	-
Ethylbenzene	2	<1	0	0	-
m+p-Xylene	2	<2	0	0	-

Analyte	N ^	Max. (µg/L)	N> Human Health SAC	N> Ecological SAC	Comments
o-Xylene	2	<1	0	0	-
Total Xylenes	2	<1	0	NSL	-
VOCs	2	<1	0	0	-
pH	2	7.6	0	0	-
EC	2	500	0	0	-

Notes:

^: Primary samples

N: Total number

NSL: No set limit

NL: Not limiting

9 WASTE CLASSIFICATION ASSESSMENT

9.1 Preliminary Waste Classification of Fill

Based on the results of the waste classification assessment, and at the time of reporting, the fill material is assigned a preliminary classification of **General Solid Waste (non-putrescible) containing Special Waste (asbestos)**.

Once the final development design is known, additional sampling and analysis should be undertaken to confirm the above classification prior to off-site disposal.

9.2 Preliminary Classification of Natural Soil

Based on the scope of work undertaken for this assessment, and at the time of reporting, JKE is of the opinion that a majority of the natural soil at the site down to a likely depth of approximately 5mBGL is likely to meet the definition of **VENM** for off-site disposal or re-use purposes. Natural soils below this depth appear to include potential ASS (PASS). This VENM classification should be confirmed via visual inspection and further sampling and analysis following removal of fill material and delineation of PASS at the site once the final design levels are confirmed.

10 DISCUSSION

10.1 Contamination Sources/AEC and Potential for Site Contamination

Based on the scope of work undertaken for this investigation, JKE identified the following potential contamination sources/AEC:

- Fill material;
- Historic onsite mechanics workshop;
- Use of pesticides;
- Hazardous building materials; and
- Off-site service station (located in close proximity to site).

Considering the above, and based on a qualitative assessment of various lines of evidence as discussed throughout this report, JKE is of the opinion that there is a potential for site contamination. The preliminary soil and groundwater data collected for the investigation is discussed further in the following subsection, as part of the Tier 1 risk assessment.

10.2 Tier 1 Risk Assessment and Review of CSM

For a contaminant to represent a risk to a receptor, the following three conditions must be present:

1. Source – The presence of a contaminant;
2. Pathway – A mechanism or action by which a receptor can become exposed to the contaminant; and
3. Receptor – The human or ecological entity which may be adversely impacted following exposure to contamination.

If one of the above components is missing, the potential for adverse risks is relatively low.

10.2.1 Soil

10.2.1.1 Asbestos

Asbestos as ACM was detected at a concentration above the human health SAC in fill material at one location, (BH6). It is also noted that ACM was detected in another location (BH2), although the concentration was below the human health SAC (see Figure 3). All asbestos detected at the site was in the bonded form. The source of the asbestos is considered likely to be associated with imported fill material, or with historical demolition activities. All ACM at the site was encountered in fill soils beneath paved areas, as such there is not considered to be a complete SPR-linkage to human receptors in the current site configuration.

Sampling was completed using a narrow diameter auger or pushtube drilling methods which limits disturbance of the soil. On this basis, there is uncertainty regarding the extent of potential of asbestos impacts within fill at the site. There was no significant evidence of demolition materials present within the fill at the site, however, the asbestos detected appeared to be within uncontrolled fill, which was present to varying depths across the site. It is not clear whether the asbestos detected on site is the result of historical onsite activities (e.g. demolition), or the result of imported uncontrolled filling material. Further assessment, management and remediation of asbestos in fill at the site is considered to be necessary.

10.2.1.2 Nickel

Nickel was detected at concentrations in fill that exceeded the ecological SAC. The elevations are shown on Figure 3. The source of the elevated nickel is considered likely to be associated with imported fill material. JKE had adopted the most conservative EIL values. Soil properties (pH and CEC) was not used in deriving the ACL for nickel. In the current site configuration, there is not considered to be a complete SPR linkage to the nickel impacted fill material and a complete SPR linkage is unlikely to exist in a proposed development scenario where a basement extends across the majority of the site. On this basis, the presence of nickel in fill is considered to pose a low ecological risk. This risk assessment must be reviewed when the proposed development details are finalised.

10.2.2 Groundwater

Elevations of arsenic, copper and zinc were encountered in the groundwater at concentrations greater than the GIL-ANZECC-Marine criteria which are applicable to marine ecological receptors. These elevations are not considered to represent a significant ecological risk for the following reasons:

- Elevated heavy metal concentrations (including copper and zinc) associated with leaking water infrastructure and surface water runoff are typically encountered in urban groundwater;
- The arsenic concentrations were consistent across the two wells, suggesting that the concentrations may be consistent with regional conditions;
- The site is predominantly paved and the fill was recorded above the water table, therefore there are limited leaching mechanisms; and
- Significantly elevated heavy metals (nominally arsenic, copper and zinc) concentrations (i.e. above the HILs) were not encountered in the fill soil at the site, therefore fill is not considered to be a point source.

A complete SPR linkage could exist in the event that construction dewatering activities are not appropriately managed. However, we note that a proposed development involving dewatering is expected to be an integrated development and the construction dewatering process would be regulated to minimise potential environmental risks in this regard.

The PSI did not identify any actual risks associated with off-site sources of potential groundwater contamination, such as the service station to the north.

10.2.3 ASS

The results of the net acidity analysis for one sample obtained from BH5 (6.9-7m) were greater than the action criteria. An elevated concentration of oxidisable sulfur, demonstrated by the low S_{CR}% result, was also encountered in this sample, suggesting that this material is PASS. PASS indicators were not encountered in the other samples collected from shallower depths.

Based on these results, PASS is considered to present in the deeper soils at the site (>5mBGL). Further assessment of the natural soils will be required to appropriately delineate the lateral and vertical extent. Disturbed PASS will require management during the works where natural soils are excavated/exposed to air. The management requirements are to be document in an ASSMP, once further specific details of the development are known, including final depths of disturbance etc.

10.3 Decision Statements

The decision statements are addressed below:

Did the site inspection, or does the historical information identify potential contamination sources/AEC at the site?

Refer to Section 10.1.

Are any results above the SAC?

Yes. ACM in fill was reported above the health based SAC and nickel was reported in fill above the ecological SAC. Arsenic, copper and zinc were reported in groundwater above the marine GILs.

Do potential risks associated with contamination exist, and if so, what are they?

Yes, potential human health risk associated with ACM in fill, potential ecological risk associated with nickel in fill exist at the site.

Is further investigation or remediation required?

The PSI identified ACM at concentrations in the fill soil which will require remediation. JKE recommend undertaking a DSI including additional soil and groundwater sampling to better characterise the site conditions and contamination issues, and inform the preparation of a remediation action plan (RAP).

Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

JKE is of the opinion that the site can be made suitable for the proposed development.

Are PASS/ASS likely to be disturbed during the proposed development?

Yes.

10.4 Data Gaps

An assessment of data gaps is provided in the following table:

Table 10-1: Data Gap Assessment

Data Gap	Assessment
SafeWork records not reviewed	Given the history of the site, it is considered possible that records relating to the storage of dangerous goods may exist. Additional work to address this data gap is recommended.

Data Gap	Assessment
Soil sampling density below minimum guideline density	Sampling was limited to approximately 54% of the minimum sampling density recommended in the EPA Sampling Design Guidelines 1995 and to the west half of the site due to the existing buildings and structures. It is also noted that a majority of sampling occurred from boreholes which poses limitation for identifying asbestos in fill. As this was a preliminary intrusive investigation, a detailed investigation will be required to assess the full extent of soil contamination risks on site. Any risks associated with historical and current land-use should be assessed, along with other identified AEC. It is recommended that additional sampling is undertaken via test pits if practicable. Recommendations are included in Section 11 to address this data gap.
Groundwater flow direction not confirmed / groundwater assessment limited in scope	Groundwater characterisation was limited. Only two groundwater monitoring wells were installed in the up to cross gradient section of the site. This created a data gap for site coverage and could not facilitate the generation of a groundwater contour plot. Additional work to address this data gap is recommended and outlined in Section 11 to address this data gap.

11 CONCLUSIONS AND RECOMMENDATIONS

The PSI included a review of limited site history information, a site inspection, soil sampling from seven boreholes and groundwater sampling from two monitoring wells installed at the site. The site history information and site walkover inspection identified the following AEC: imported fill material; historic onsite mechanics workshop; use of pesticides; hazardous building materials; and an off-site service station (located in close proximity to site).

The boreholes encountered fill materials to depths of approximately 0.3mBGL to 1.5mBGL, underlain by sandy marine soils. The fill contained inclusions of igneous gravel, silt, concrete and terracotta fragments and ash. Asbestos and nickel were identified in soil at concentrations that exceeded the human health and ecological SAC respectively. Heavy metals (arsenic, copper and zinc) were also identified in groundwater above the ecological (marine) SAC.

The PSI has not identified contamination that would preclude the proposed development/use of the site. However, a Detailed Site Investigation (DSI) is required to address the data gaps identified in Section 10.4, characterise the risks and establish whether remediation is necessary (and inform the preparation of a RAP where required). We recommend the following:

1. Prepare a Sampling, Analysis and Quality Plan (SAQP) for the DSI;
2. Undertake a DSI in accordance with the SAQP; and
3. Where required (i.e. if triggered following the DSI risk assessment), develop and implement a RAP. Any requirements documented in a RAP are to be implemented and the site is to be remediated and validated.

The natural soil below a depth of 5mBGL is considered to be PASS. An ASSMP should be prepared once specific details of the development are known, including final depths of disturbance etc. The need for additional sampling and analysis for ASS characteristics should be assessed as the design progresses.

At this stage, JKE consider that there is currently no requirement to report any site contamination to the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015). This will be further evaluated as part of the DSI.

JKE consider that the report objectives outlined in Section 1.2 have been addressed.

12 LIMITATIONS

The report limitations are outlined below:

- JKE accepts no responsibility for any unidentified contamination issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work;
- This report has been prepared based on site conditions which existed at the time of the investigation; scope of work and limitation outlined in the JKE proposal; and terms of contract between JKE and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- The investigation and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;
- Where information has been provided by third parties, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- JKE accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- JKE have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or landuse. JKE should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa; and
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose.

Important Information About This Report

These notes have been prepared by JKE to assist with the assessment and interpretation of this report.

The Report is based on a Unique Set of Project Specific Factors
This report has been prepared in response to specific project requirements as stated in the JKE proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- The proposed land use is altered;
- The defined subject site is increased or sub-divided;
- The proposed development details including size, configuration, location, orientation of the structures or landscaped areas are modified;
- The proposed development levels are altered, eg addition of basement levels; or
- Ownership of the site changes.

JKE will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the investigation. If the subject site is sold, ownership of the investigation report should be transferred by JKE to the new site owners who will be informed of the conditions and limitations under which the investigation was undertaken. No person should apply an investigation for any purpose other than that originally intended without first conferring with the consultant.

Changes in Subsurface Conditions
Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (e.g. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. The conclusions of an investigation report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.

This Report is based on Professional Interpretations of Factual Data
Site investigations identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on the proposed development and appropriate remediation measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an investigation indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Investigation Limitations
Although information provided by a site investigation can reduce exposure to the risk of the presence of contamination, no environmental site investigation can eliminate the risk. Even a rigorous professional investigation may not detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.

Misinterpretation of Site Investigations by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an investigation report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

Logs Should not be Separated from the Investigation Report

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however contractors can still misinterpret the logs during bid preparation if separated from the text of the investigation. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the rest of the report to obtain a proper understanding of the investigation. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete investigation should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations such as contractors.

Read Responsibility Clauses Closely

Because an environmental site investigation is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are definitive clauses designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site investigation, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.

Appendix A: Report Figures

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

This plan should be read in conjunction with the Environmental report.

Title: **SITE LOCATION PLAN**

Location: 277 THE GRAND PARADE, RAMSGATE, NSW

Project No: E34871PT

Figure No: 1

JKEnvironments

PLOT DATE: 8/01/2024 12:42:35 PM DWG FILE: K:\SC EIS \JOBS\34000\SIE34871PT RAMSGATE\CAD\E34871PT.DWG

LEGEND

APPROXIMATE SITE BOUNDARY	
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 4 8 12 16 20
SCALE 1:400 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAMPLE LOCATION PLAN**

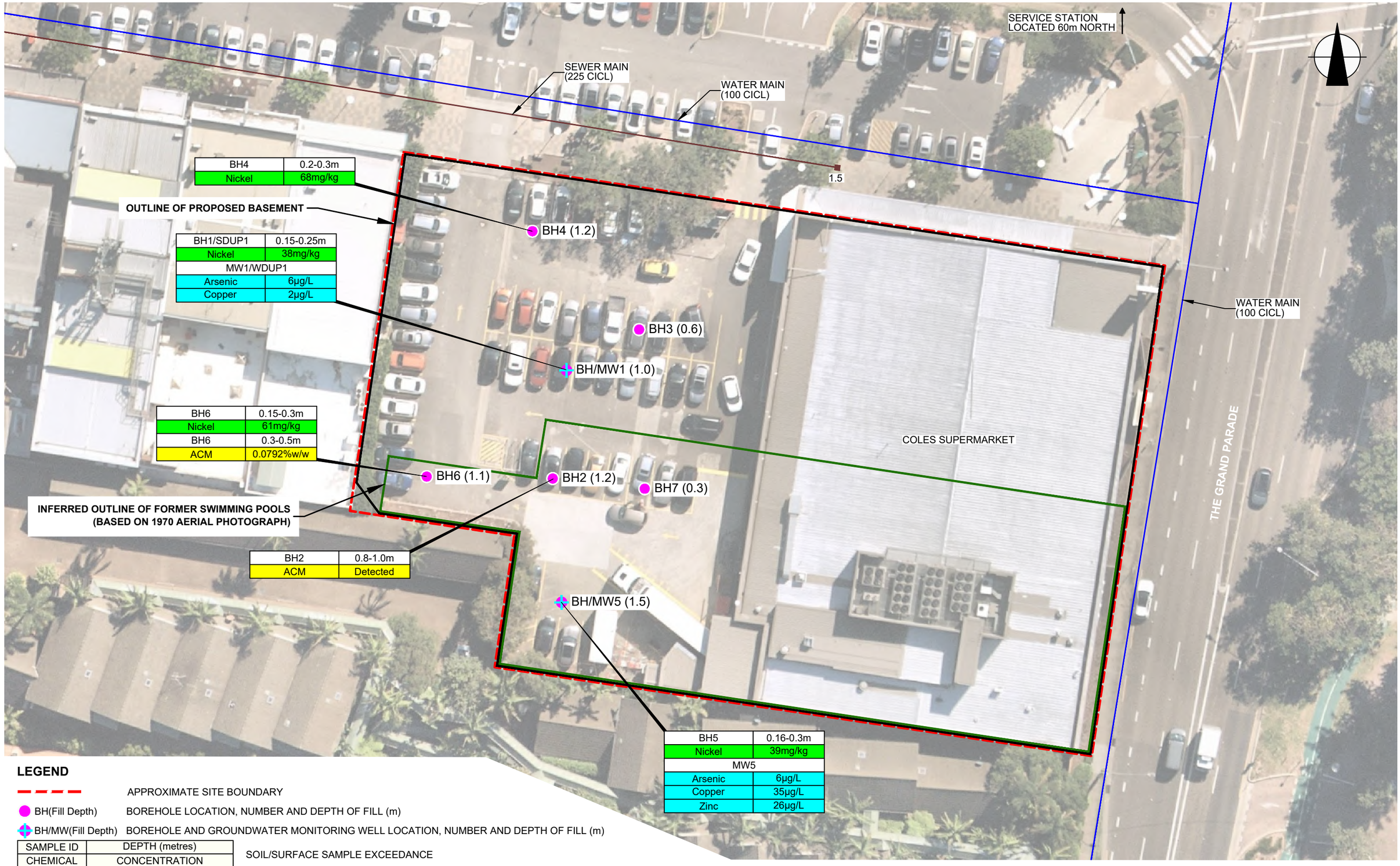
Location: 277 THE GRAND PARADE, RAMSGATE, NSW

Project No: E34871PT

Figure No: 2

JKEnvironments

PLOT DATE: 8/01/2024 12:42:42 PM DWG FILE: K:\SC EIS JOBS\34000\SIE34871PT RAMSGATE\CAD\E34871PT.DWG



BH4	0.2-0.3m
Nickel	68mg/kg

BH1/SDUP1	0.15-0.25m
Nickel	38mg/kg
MW1/WDUP1	
Arsenic	6µg/L
Copper	2µg/L

BH6	0.15-0.3m
Nickel	61mg/kg
BH6	0.3-0.5m
ACM	0.0792%w/w

BH2	0.8-1.0m
ACM	Detected

BH5	0.16-0.3m
Nickel	39mg/kg
MW5	
Arsenic	6µg/L
Copper	35µg/L
Zinc	26µg/L

LEGEND

- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
- BH/MW(Fill Depth) — BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)

SAMPLE ID	DEPTH (metres)
CHEMICAL	CONCENTRATION

SOIL/SURFACE SAMPLE EXCEEDANCE

SAMPLE ID	-
CHEMICAL	CONCENTRATION (µg/L)

GROUNDWATER SAMPLE EXCEEDANCE

- SOIL CONTAMINATION ABOVE HUMAN HEALTH SAC
- SOIL CONTAMINATION ABOVE ECOLOGICAL SAC
- GROUNDWATER CONTAMINATION ABOVE SAC

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 4 8 12 16 20

SCALE 1:400 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAC EXCEEDANCE PLAN**

Location: 277 THE GRAND PARADE, RAMSGATE, NSW

Project No: E34871PT

Figure No: 3

JKEnvironments

PLOT DATE: 8/01/2024 12:43:21 PM DWG FILE: K:\5C EIS JOBS\34000\SIE34871PT RAMSGATE\CAD\E34871PT.DWG

Appendix B: Site Information and Site History

Proposed Development Plans

December, 2023

RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

Development Application

Craft Architecture

Level 9, 187 Macquarie Street
Sydney 2000 NSW

craft-arch.com.au

CRAFT

Drawing List

Area Summary

SITE AREA	4,479 m^2
ALLOWABLE GFA	8,958 m^2
ALLOWABLE FSR	2:1
PROPOSED GFA	8958 m^2
PROPOSED FSR	2:1
APARTMENTS	44 APARTMENTS

BASIX Commitments

WATER		
Rainwater Tank		Nil
Fire Sprinkler Systems		Closed loop test systems
Bathroom Taps		5 Star
Kitchen Taps		5 Star
Showerheads		4 Star (6 - 7.5L/min)
Toilet Flusher		4 Star
Dishwasher		4 Star (Water)
ENERGY		
Basement (Residential)	Ventilation: Lighting:	Supply + Exhaust w/ CO monitor + VSD fan Fluorescent w/ motion sensors
Substation	Ventilation: Lighting:	Supply only w/ thermostatically controlled Fluorescent w/ motion sensors
Plant Rooms	Ventilation: Lighting:	Supply only w/ thermostatically controlled Fluorescent w/ motion sensors
Ground Floor Lobby	Ventilation: Lighting:	Supply only LED w/ motion sensors
Lift x 2	Type: Lighting:	Gearless traction w/ VVVF Motor LED w/ connected to lift call button
Solar PV		Min 10kW peak system
DWELLINGS		
Hot Water		Gas instantaneous 6 star
Dwelling Ventilation	Bathroom fan: Kitchen fan: Laundry fan:	Externally ducted w/ manual switch Externally ducted w/ manual switch Externally ducted w/ manual switch
AC Cooling and Heating	System Type:	1 Phase AC Efficiency – EER/COP above 3.5 Day / Night Zoning – No
Lighting		Dedicated LED throughout all units
Appliances		Electric oven Induction cooktop Dishwater (4 star)

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04	8/12/2023	DA Issue

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RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

LOCATION PLAN — NTS @ A1

Drawn	MO
Checked	CP
Project No.	23.09

A-0100 [04]

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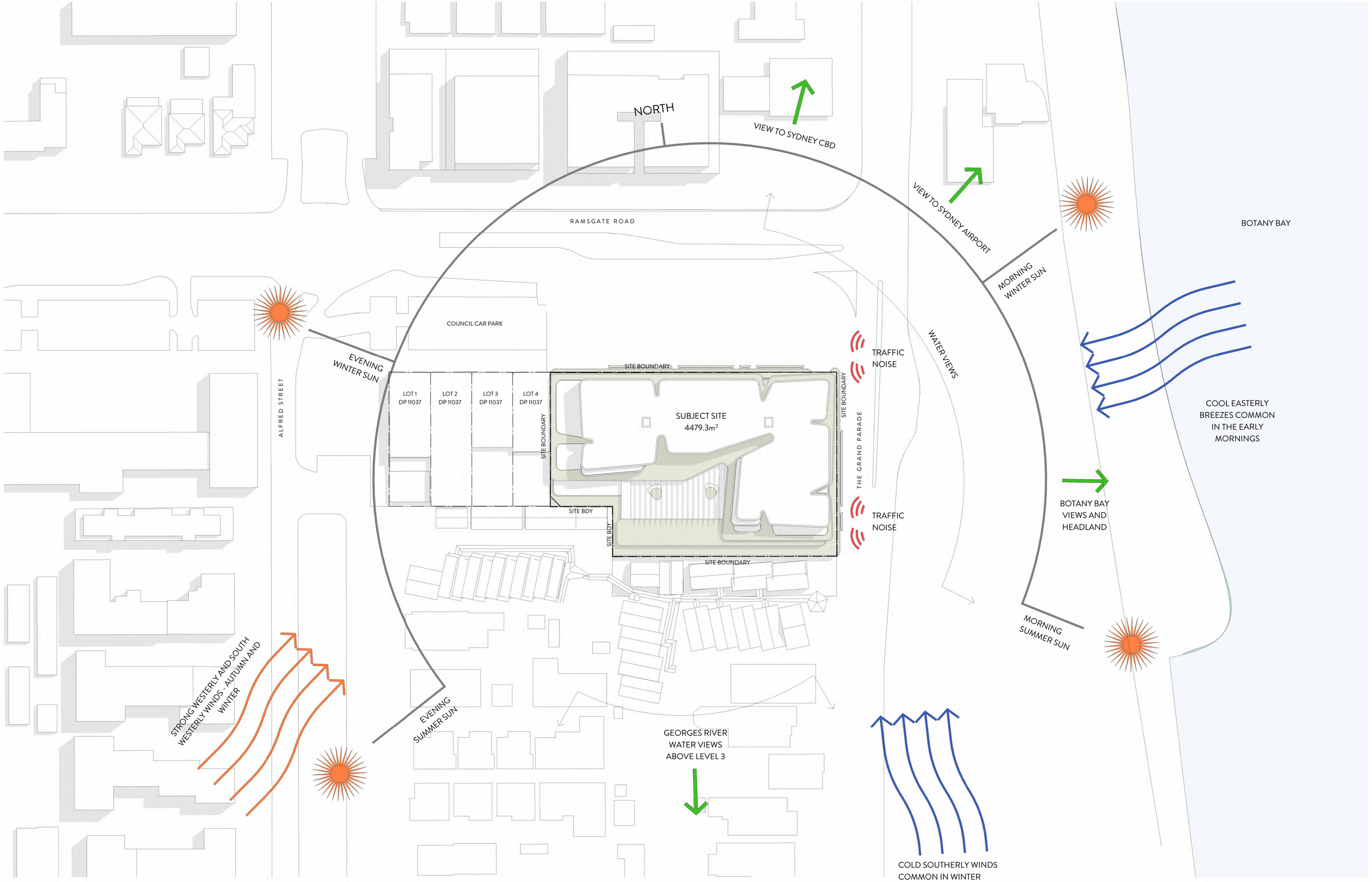

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SITE PLAN 1:500 @ A1
Drawn JO
Checked CP
Project No. 23.09
A-0101 [04]

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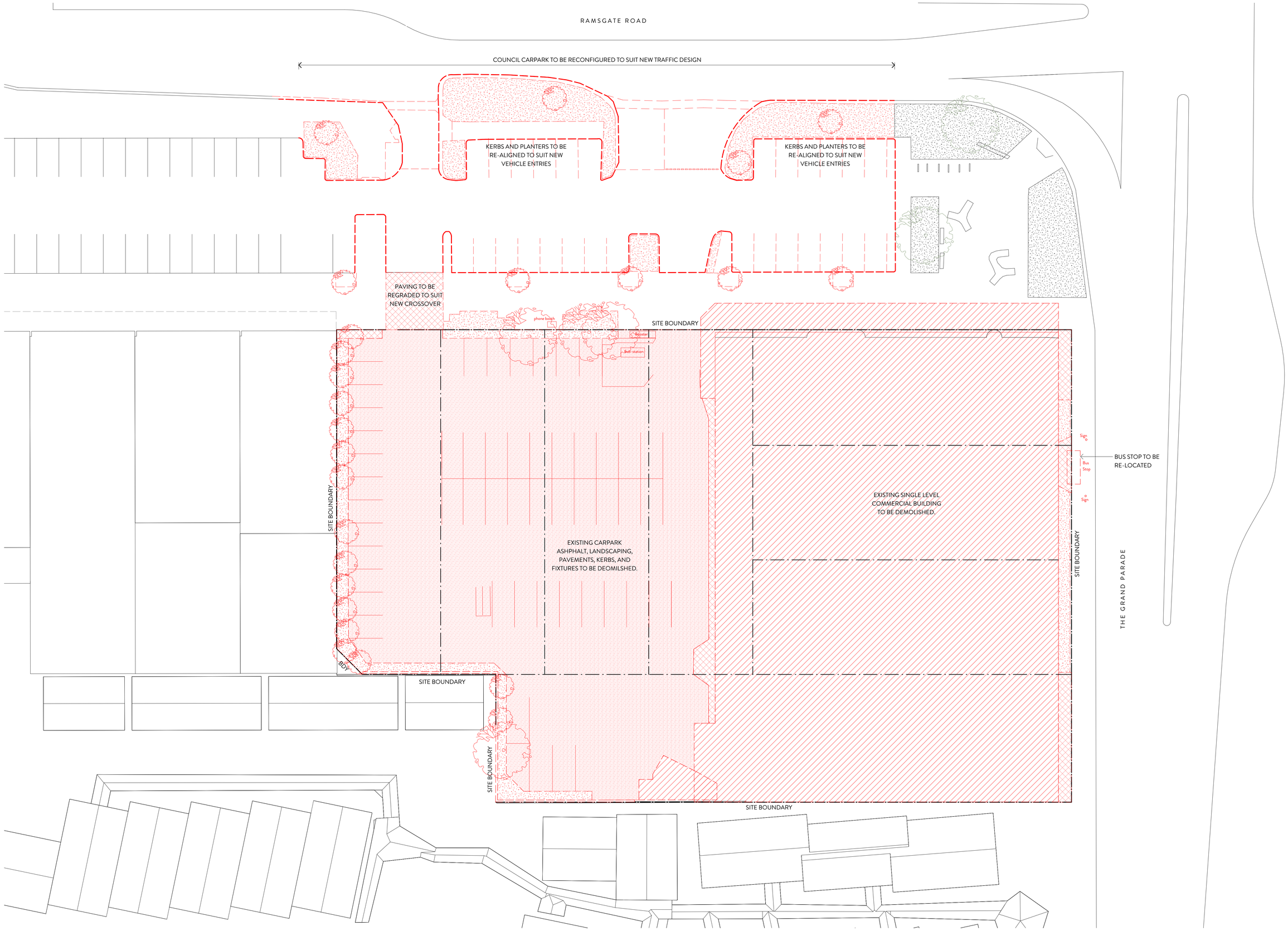

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DEMOLITION PLAN 1 : 200 @ A1

Drawn JO
Checked CP
Project No. 23.09

A-0103 [04]

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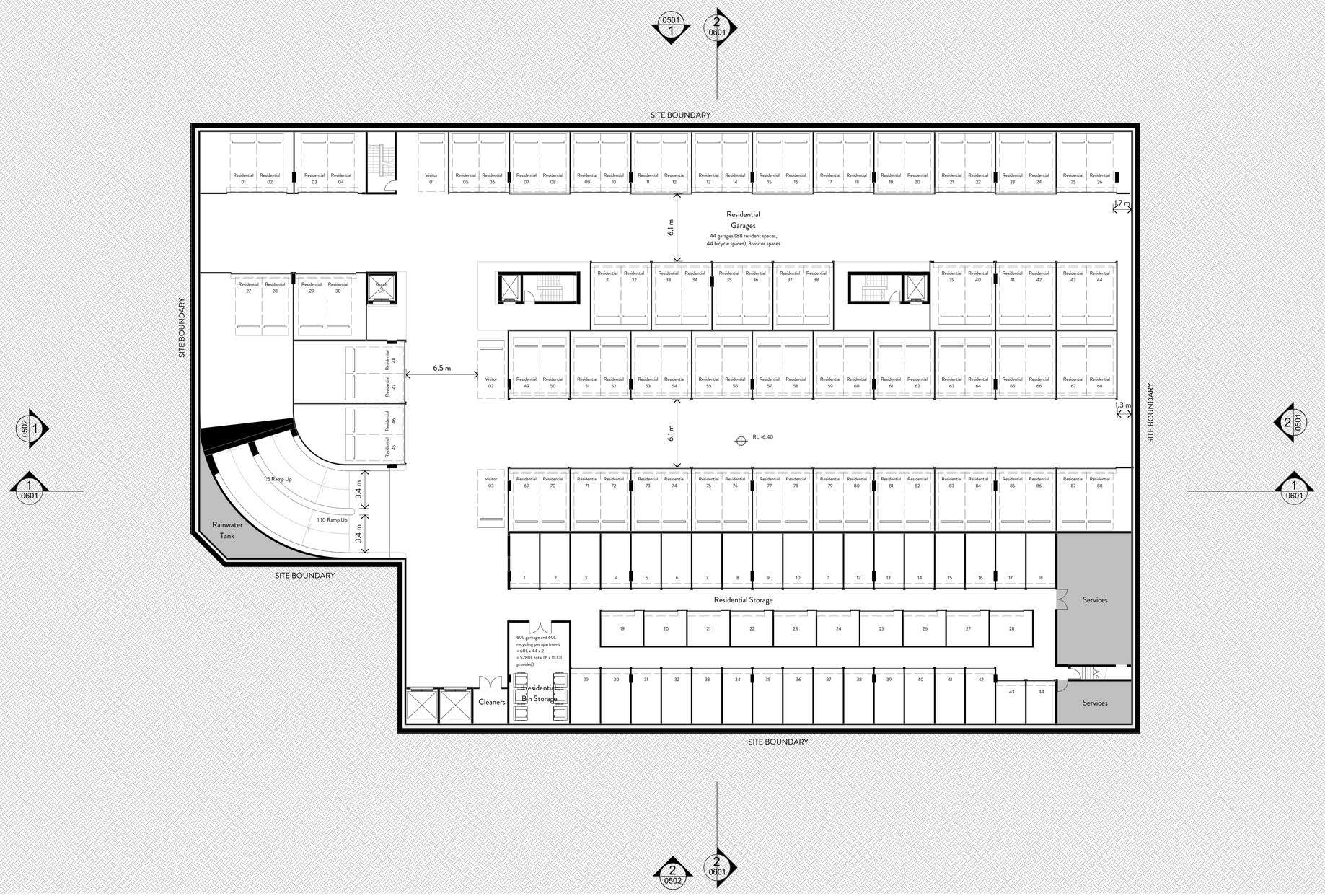

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FLOOR PLAN B3 — 1 : 200 @ A1
Drawn: JO
Checked: CP
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A-0200 [04]

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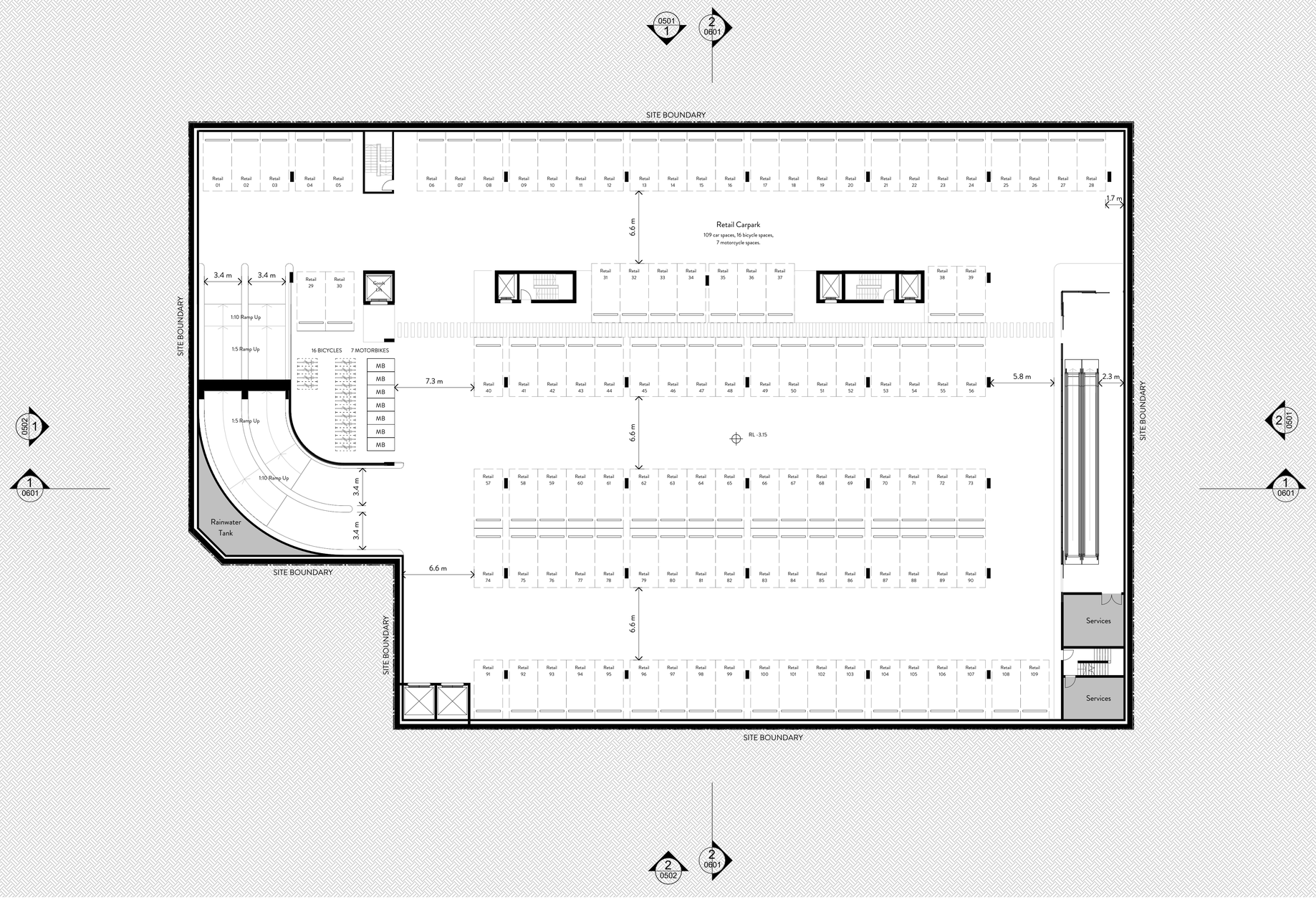

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FLOOR PLAN B2 — 1 : 200 @ A1

Drawn	JO
Checked	CP
Project No.	23.09

A-0201 [04]

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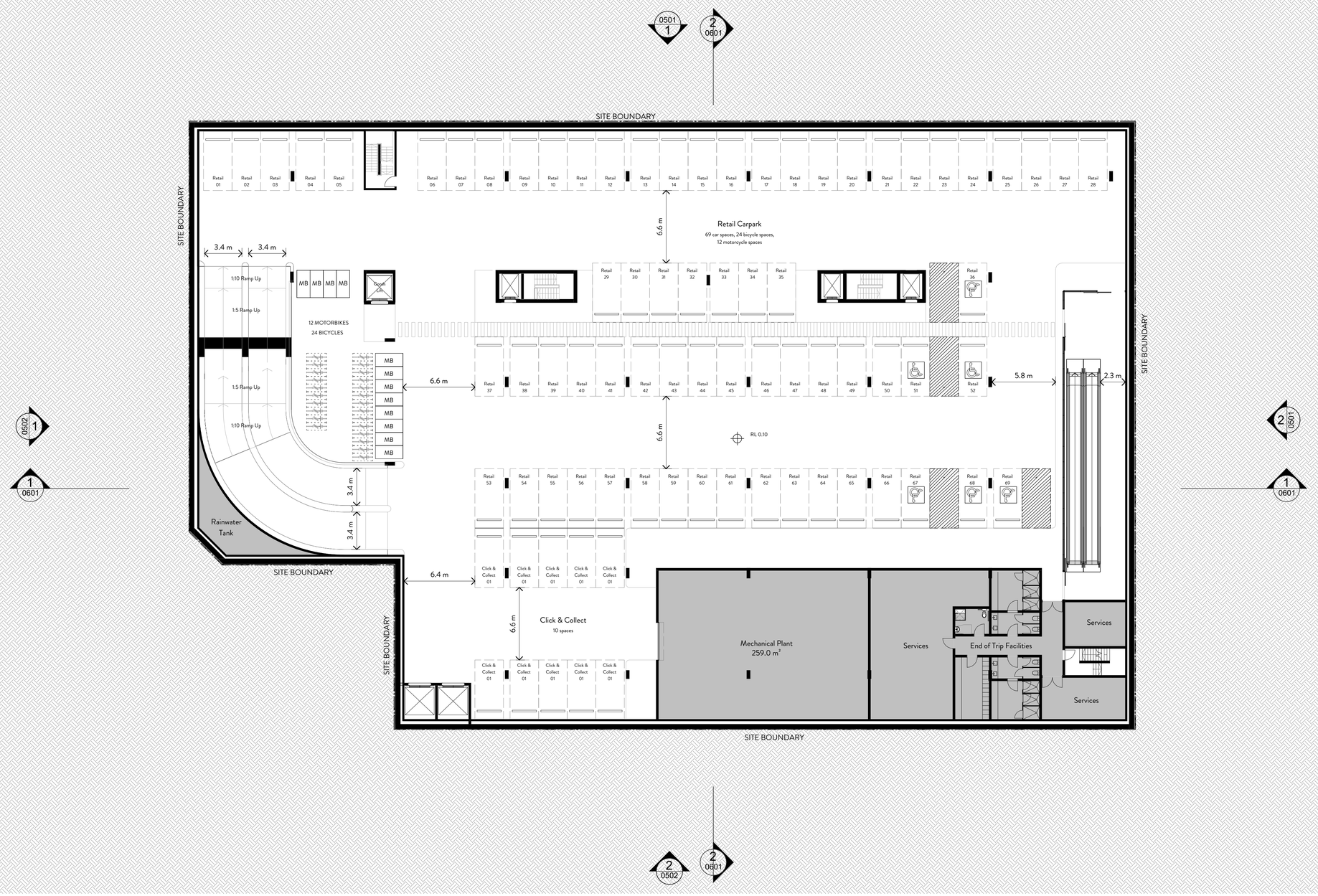

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FLOOR PLAN B1 — 1 : 200 @ A1

Drawn	JO
Checked	CP
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A-0202 [04]

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RAMSGATE ROAD

TRAFFIC DESIGN CURRENTLY IN DISCUSSION BETWEEN AUTHORITIES

COUNCIL CAR PARK

0501 / 1

2 / 0601

1.4 m | 3.4 m | 0.6 m | 3.4 m | 0.8 m | 3.4 m | 4.4 m | 14.1 m | 1.8 m | 3.2 m | 1.8 m | 15.2 m | 1.8 m | 3.2 m | 1.8 m | 14.2 m | 1.8 m | 8.2 m

EXIT | ENTRY | LOADING DOCK ACCESS

RL 2.64 | RL 2.68 | RL 2.72

AWNING OVER SHOWN AS DASHED LINE

AWNING OVER

RL 2.70 | RL 2.82 | RL 2.82 | RL 2.84 | RL 2.84 | RL 2.87 | RL 2.88 | RL 2.84

SITE BOUNDARY

2.0 m

RL 2.75

(MR LIQUOR)
TWO STOREY
COMMERICAL PREMISE
213 RAMSGATE RD,
RAMSGATE NSW 2217

RL 3.50 | RL 3.50

RAMP 1:8

RL 3.50

F&B Deliveries

Goods Lift

Fan Room

R01
Retail
149.3 m²
RL 3.10

R02
Retail
230.4 m²
RL 3.10

R03
Retail
210.2 m²
RL 3.10

RL 3.10 | RL 3.10

Lobby
15.3 m²

Lobby
20.6 m²

RL 3.50 | RL 3.50

Retail Plant

Planted awning over

1:20 walkway up

RL 2.75

16.5 m

THE GRAND PARADE

AUTO SLIDING DOOR

ENTRY
RL 3.50

New integrated seating

SIGN

Existing bus shelter to be replaced by integrated covered seating

3.0 m

SIGN

BUS

SITE BOUNDARY

6m Average (DCP)

23.9 m

1.80 m

2 / 0501

1 / 0601

AWNING OVER

RL 2.82

1.8 m

RL 2.66

5.5 m

RL 2.66

7.7 m

RL 2.55

PLANT DECK
RL 4.70

0502 / 1

1 / 0601

LOADING AREA

Loading Dock

Supermarket
Retail
2270.4 m²
RL 3.50

SITE BOUNDARY

SINGLE LEVEL GARAGES

SITE BOUNDARY

SITE BOUNDARY

Goods Lift | Goods Lift

Substation

SITE BOUNDARY

FOOTPATH

TWO STOREY RESIDENTIAL DEVELOPMENT
280 THE GRAND PARADE,
SANS SOUCI.

2 / 0502

2 / 0601

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FLOOR PLAN G — 1 : 200 @ A1

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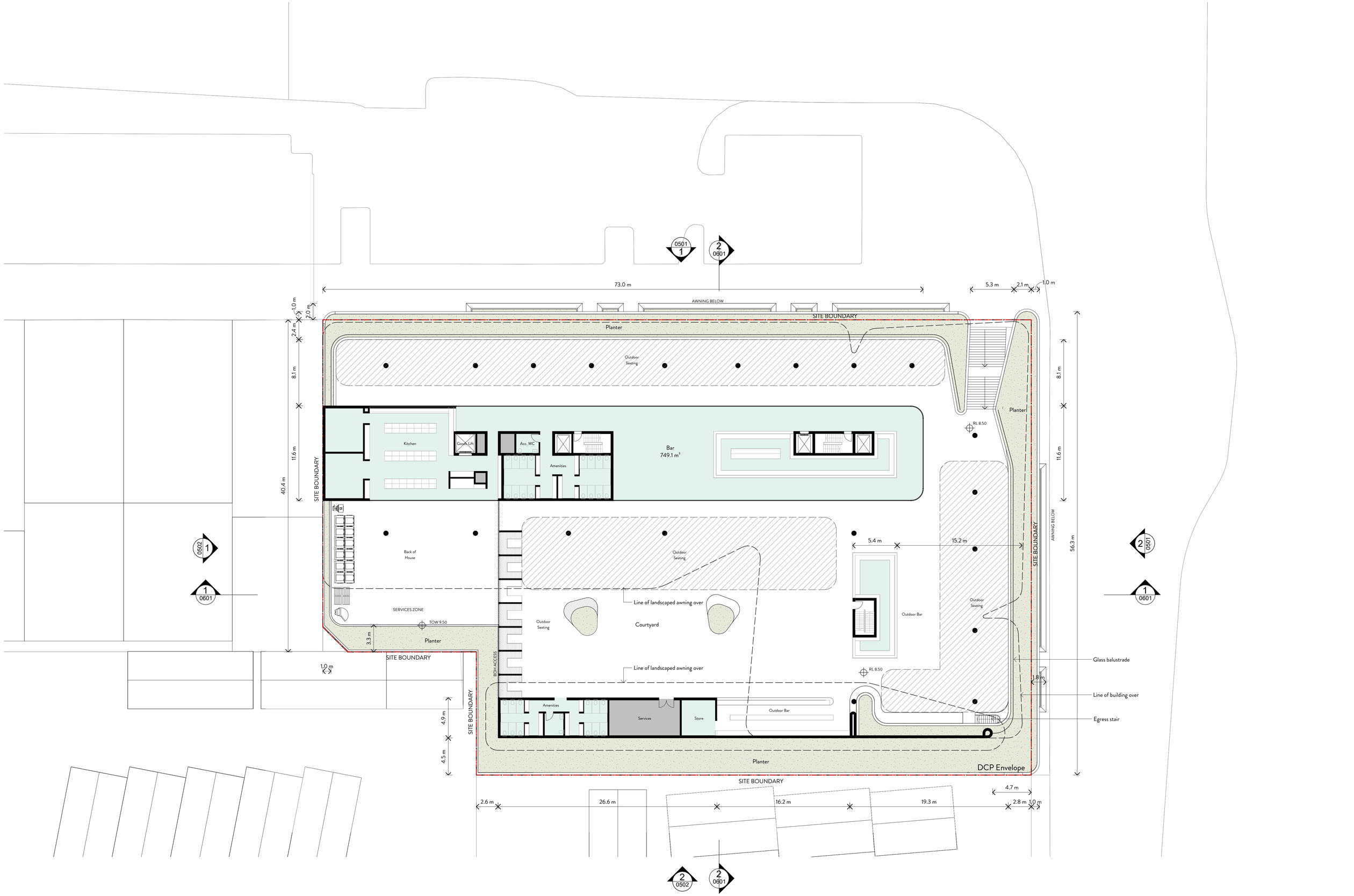

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FLOOR PLAN L1 — 1 : 200 @ A1
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FLOOR PLAN L2 — 1 : 200 @ A1
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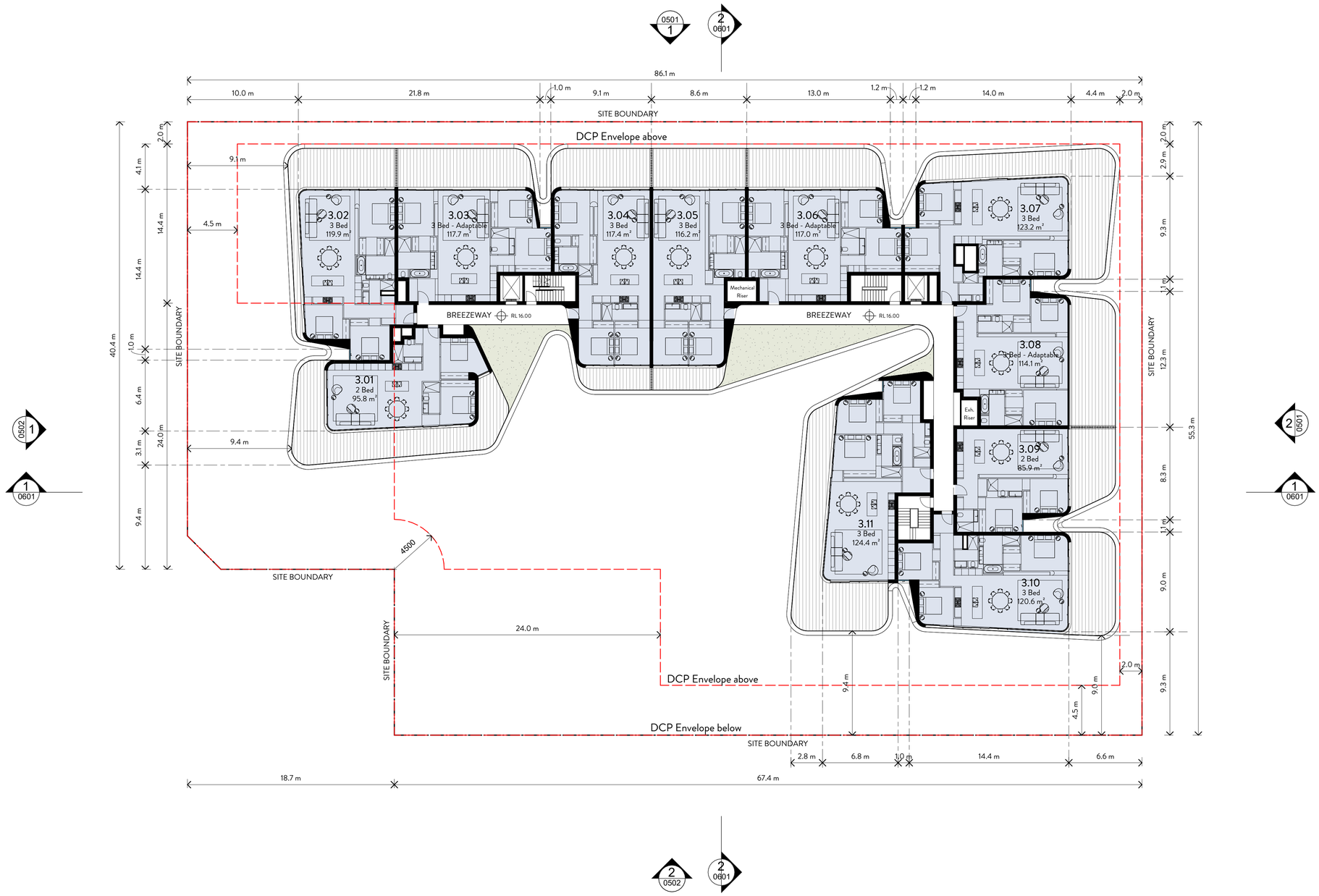

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FLOOR PLAN L3 — 1 : 200 @ A1
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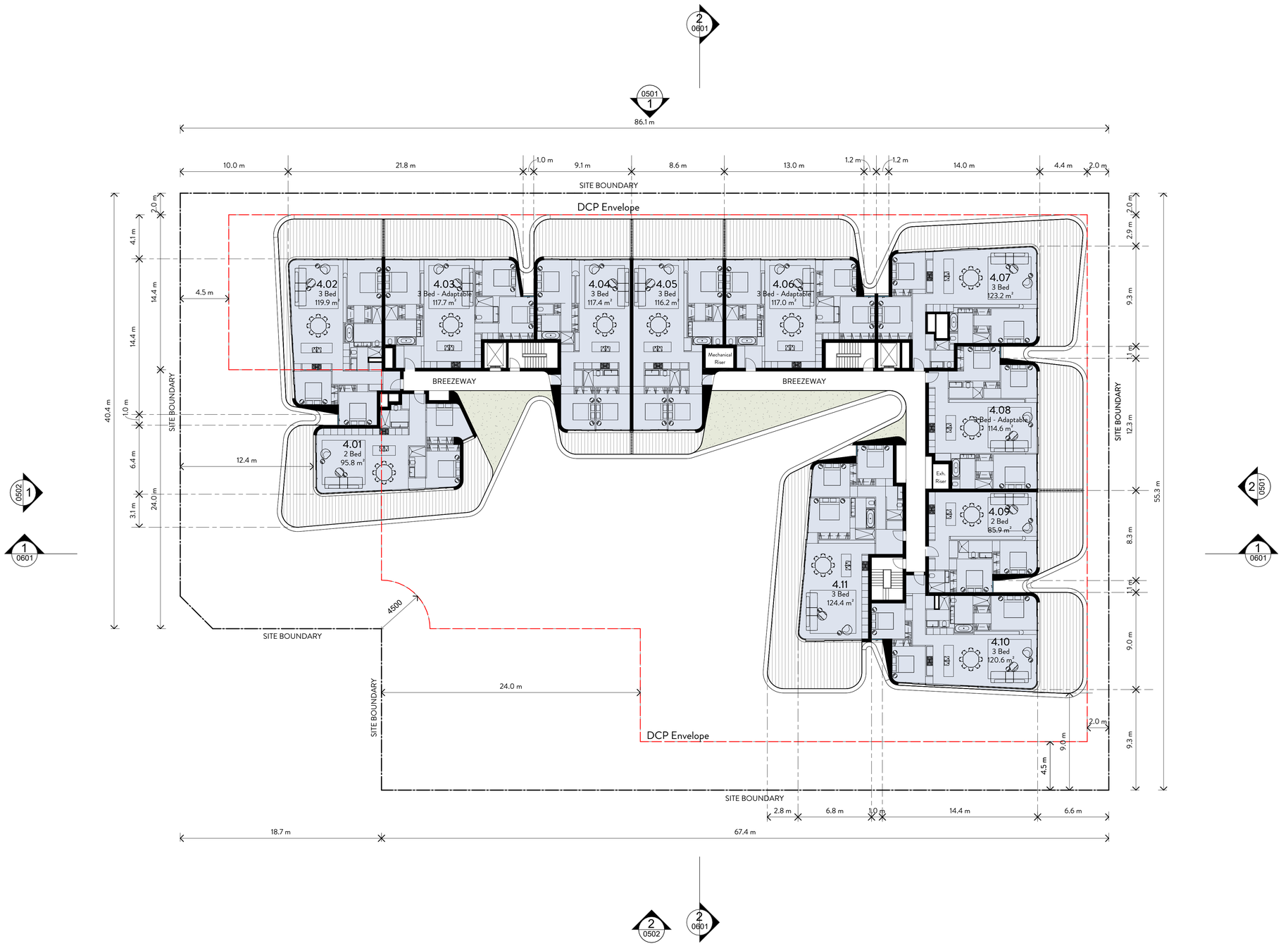

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FLOOR PLAN L4 — 1 : 200 @ A1
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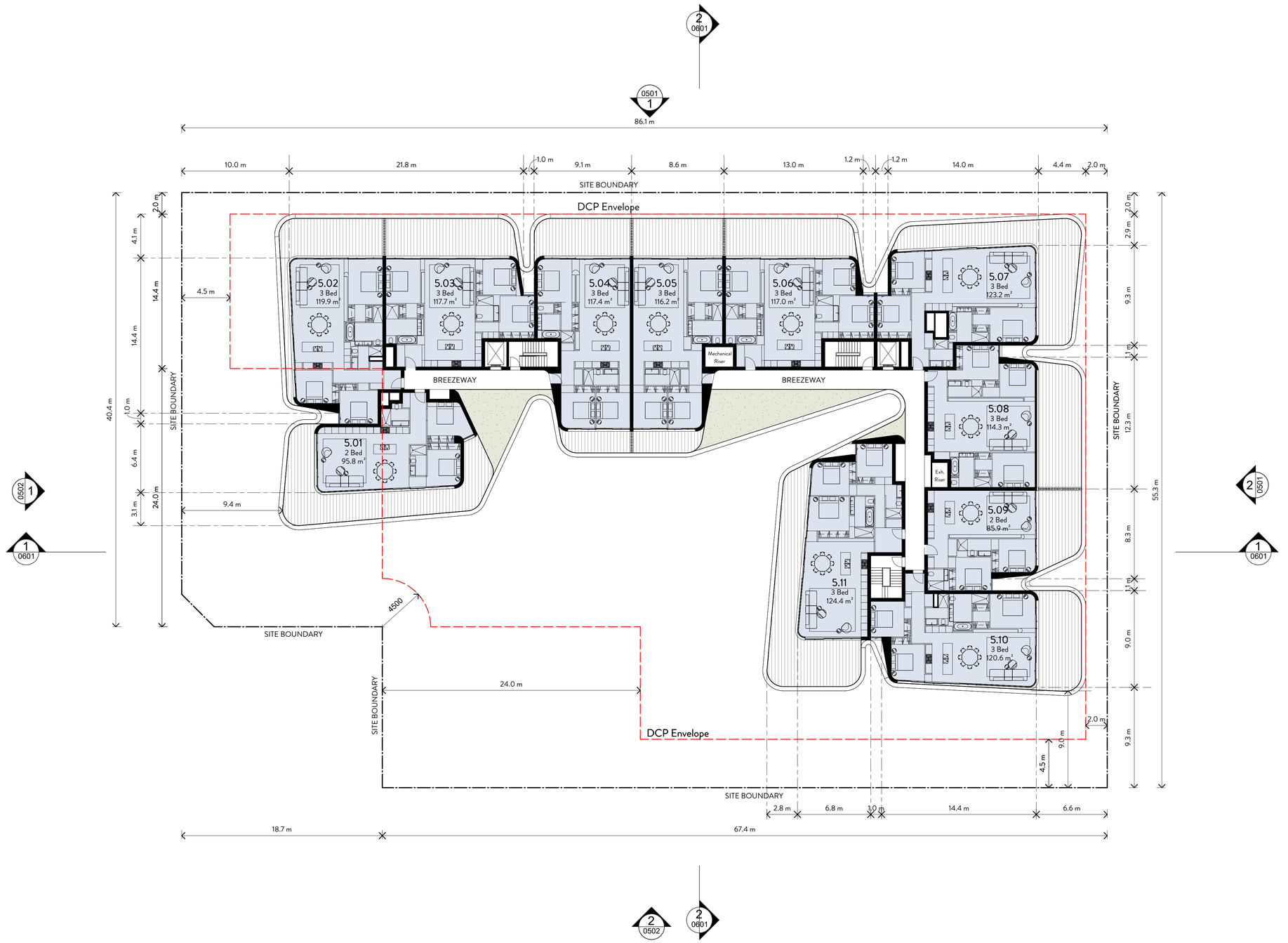

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FLOOR PLAN L5 — 1 : 200 @ A1
Drawn JO
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Project No. 23.09
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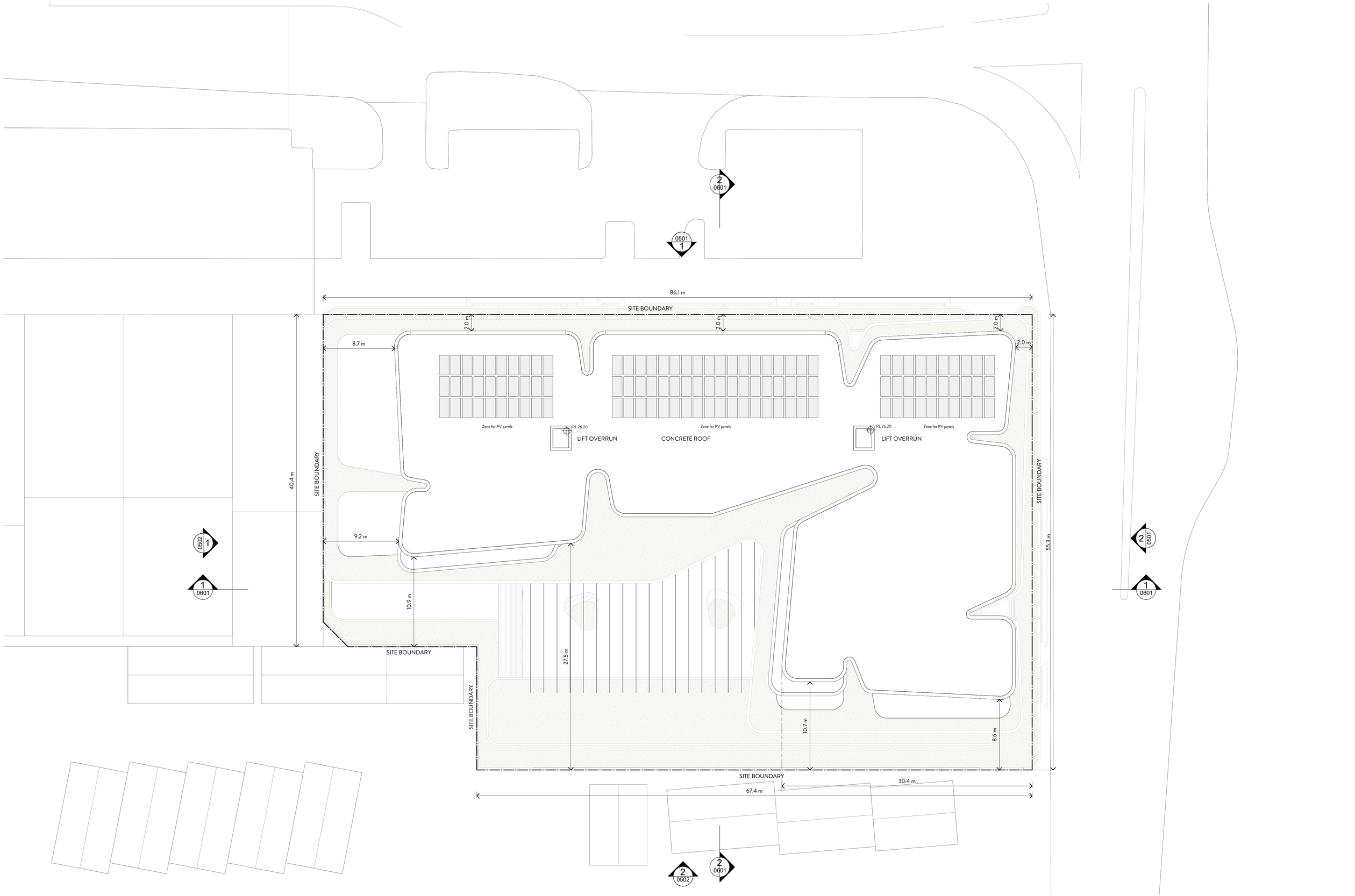

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ROOF PLAN 1 : 200 @ A1

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Checked	CP
Project No.	23.09

A-0210 [04]

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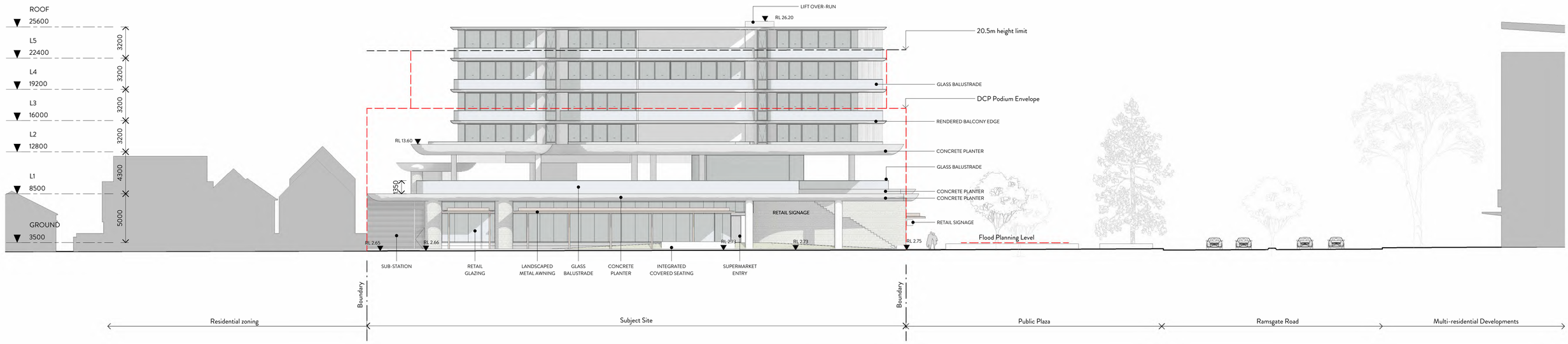
1 **ELEVATION_NORTH**
1 : 200



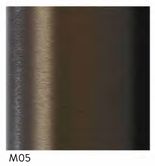
2 **ELEVATION_EAST**
1 : 200


M01 -
TRAVERTINE SILVER


M02 -
GRANITE PAVING


M03 -
LIGHT SANDSTONE CLADDING


M04 -
ALUMINIUM GLAZING SYSTEMS
(DARK BRONZE ANODIZED FINISH)


M05
DARK BRONZE ANODIZED FINISH


M06
OFF-WHITE CONCRETE

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ELEVATIONS SHEET 1 — 1 : 200 @ A1
Drawn: JO
Checked: CP
Project No.: 23.09
A-0501 [04]

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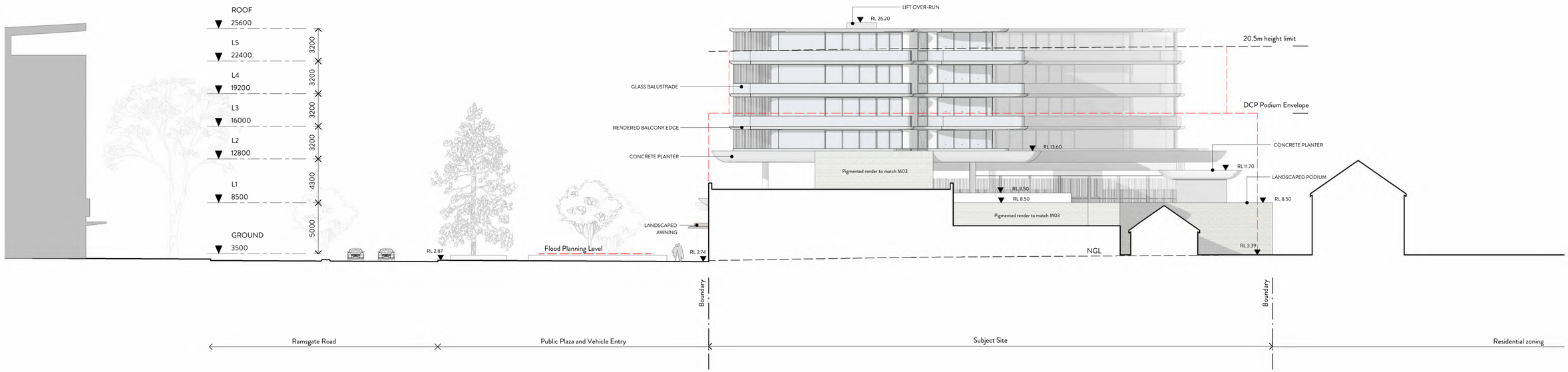
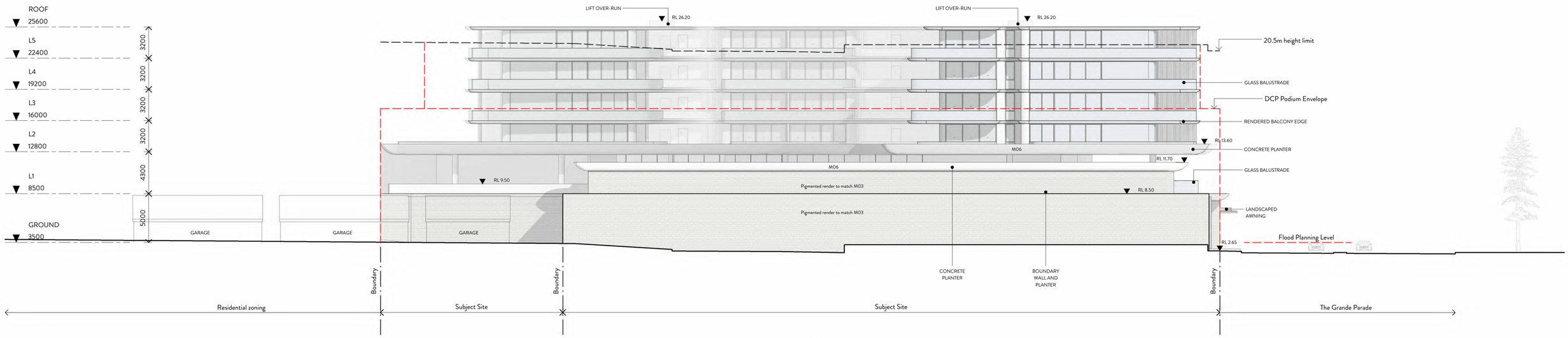


1 **ELEVATION_WEST**
1 : 200



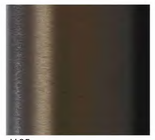
2 **ELEVATION_SOUTH**
1 : 200

M01 -
TRAVERTINE SILVER


M02 -
GRANITE PAVING


M03 -
LIGHT SANDSTONE CLADDING


M04 -
ALUMINIUM GLAZING SYSTEMS
(DARK BRONZE ANODIZED FINISH)


M05
DARK BRONZE ANODIZED FINISH

M06
OFF-WHITE CONCRETE

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ELEVATIONS SHEET 2 — 1 : 200 @ A1
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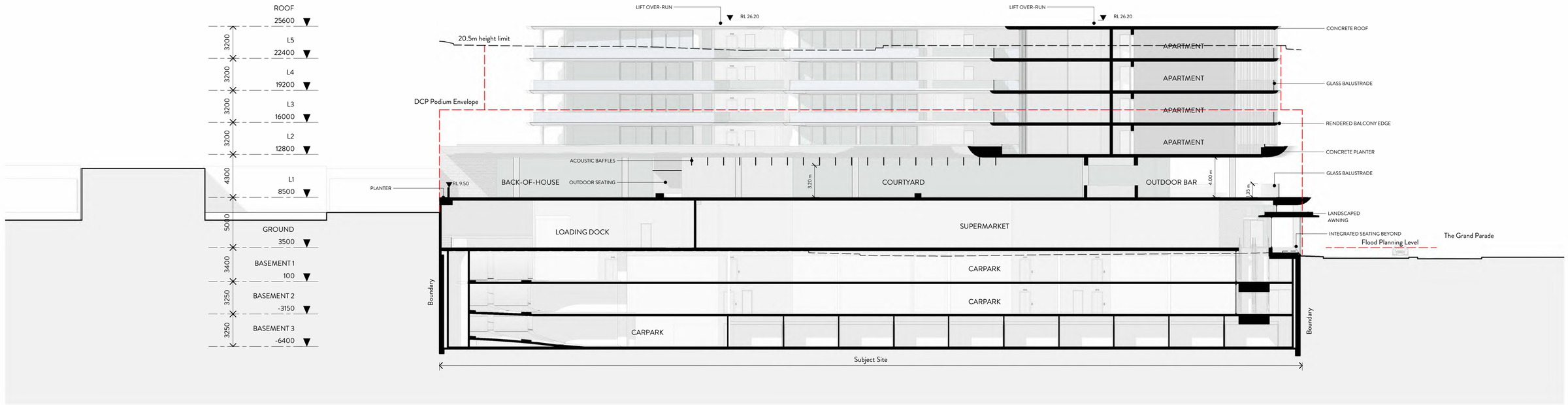
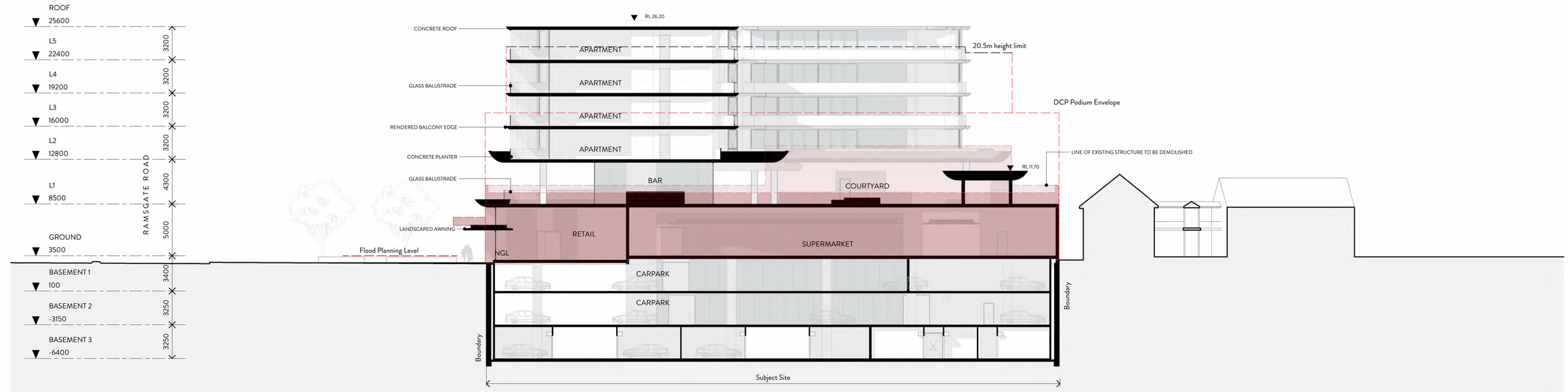


1 SITE SECTION_ EAST WEST

1 : 200



2 SITE SECTION_ NORTH SOUTH

1 : 200

CRAFT ARCHITECTURE SYDNEY
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+61 415 447 388
Nominated Architect: Charles Peters Reg. NSW 8102

REVISIONS

03	1/12/2023	Preliminary DA Issue
04	8/12/2023	DA Issue

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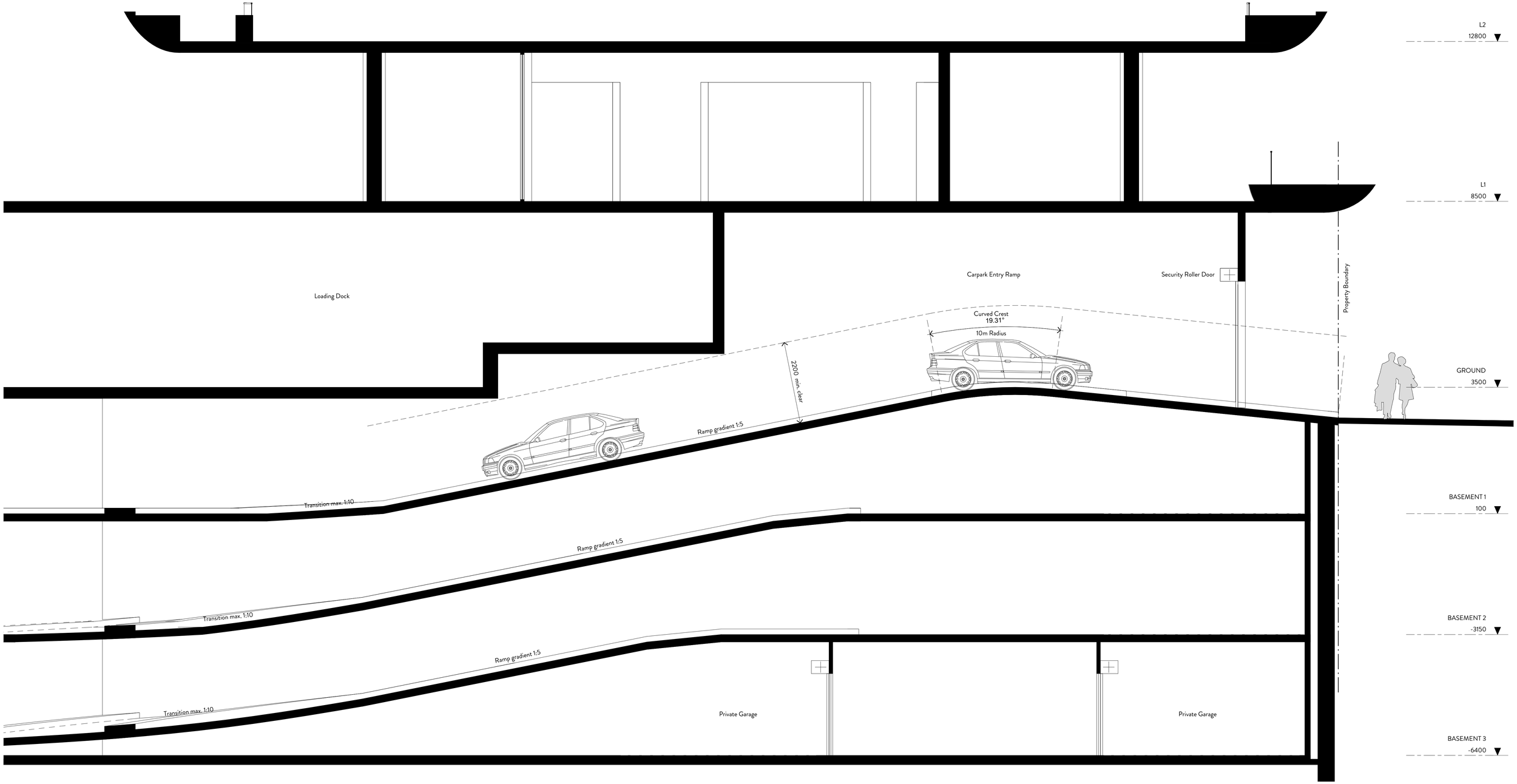
RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

SECTIONS SHEET 1 — 1 : 200 @ A1

Drawn	JO
Checked	CP
Project No.	23.09

A-0601 [04]

CRAFT



1

ENTRY RAMP SECTION

1 : 50

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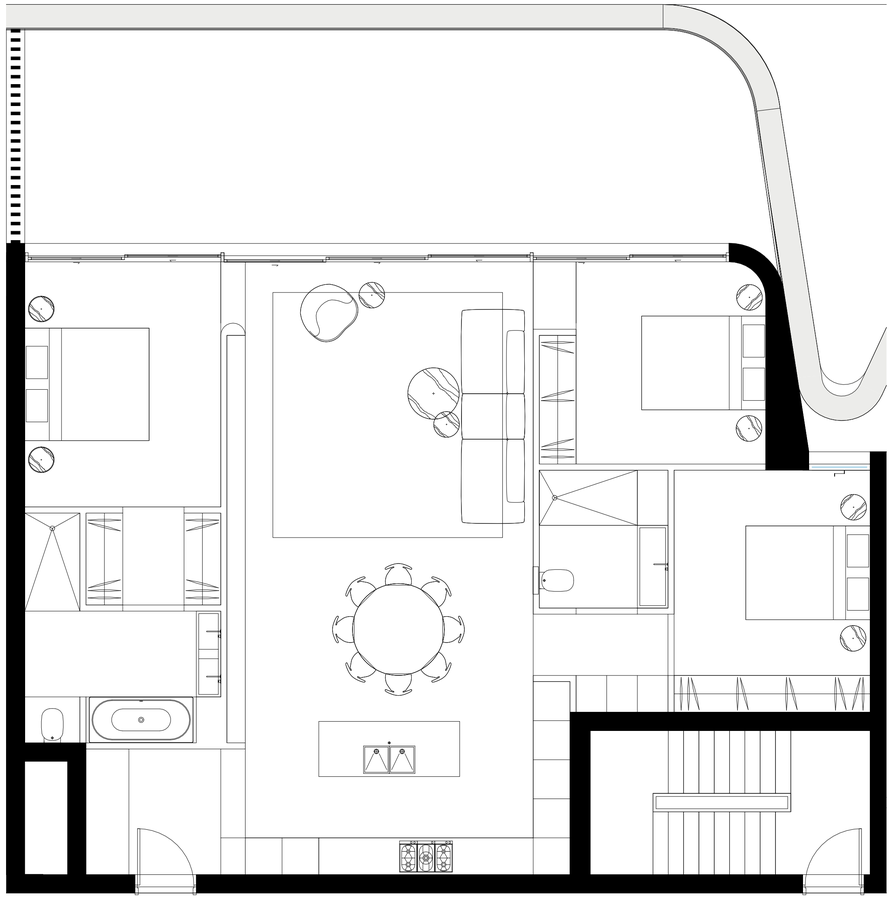
RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

SECTIONS SHEET 2 — 1 : 50 @ A1

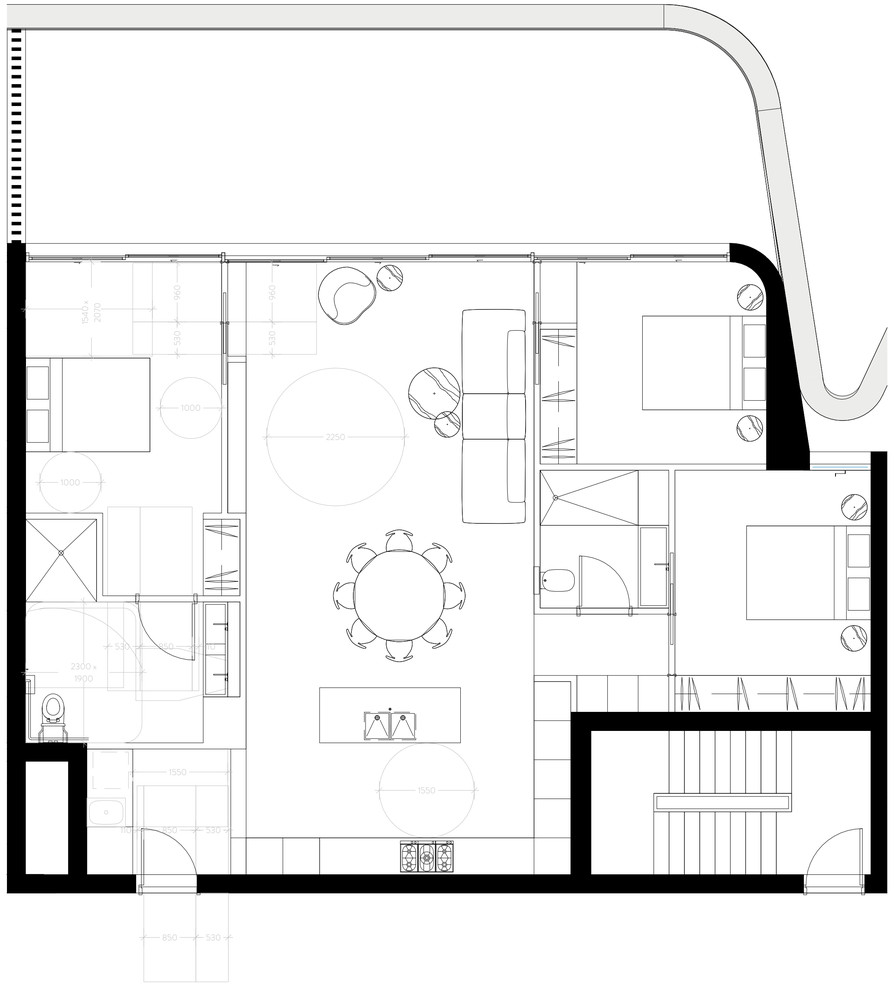
Drawn	JO
Checked	CP
Project No.	23.09

A-0602 [04]

CRAFT



1 **PRE-ADAPTED LAYOUT**
1 : 50



2 **POST-ADAPTED LAYOUT**
1 : 50

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REVISIONS

04	8/12/2023	DA Issue

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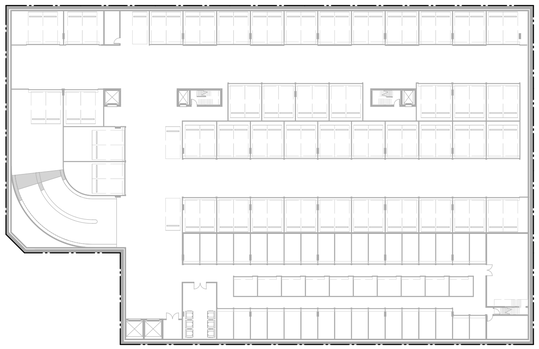
RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

ADAPTABLE APARTMENT PLANS 1 : 50 @ A1

Drawn	MO
Checked	CP
Project No.	23.09

A-0900

CRAFT



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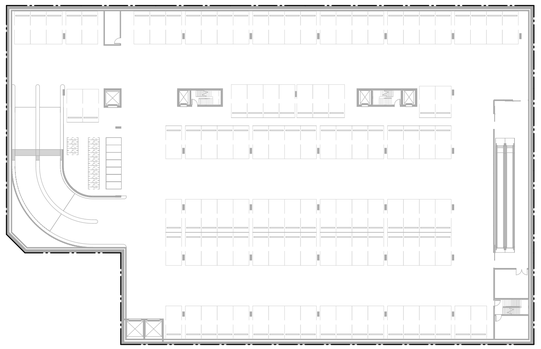
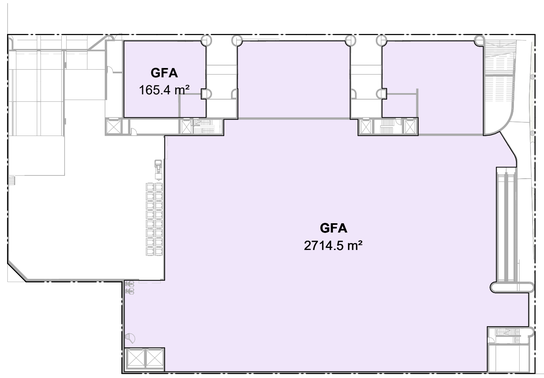
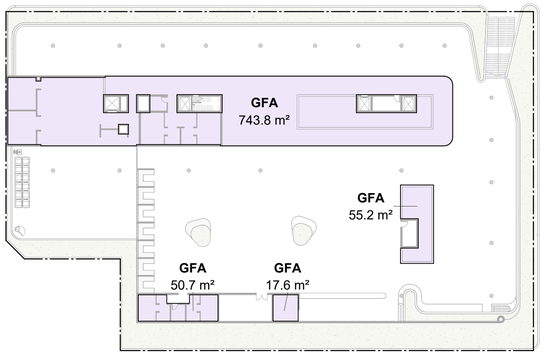


BASEMENT 2

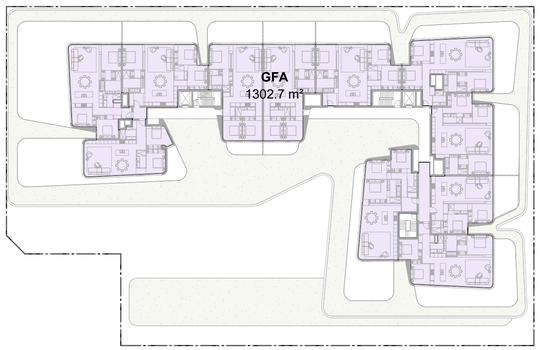
BASEMENT 1



GROUND



L1



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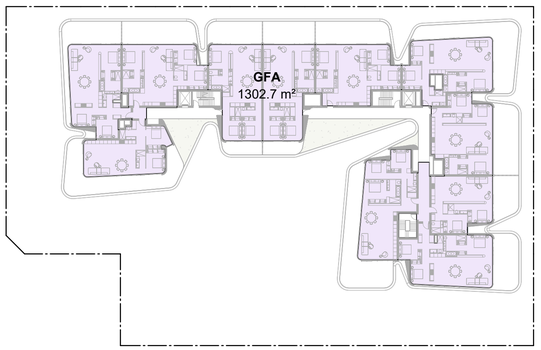

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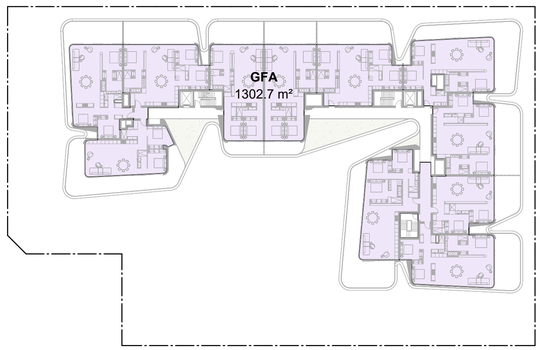

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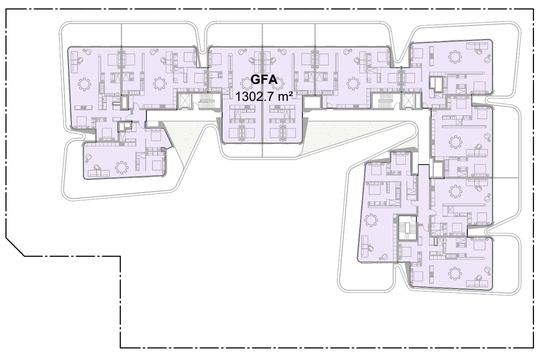
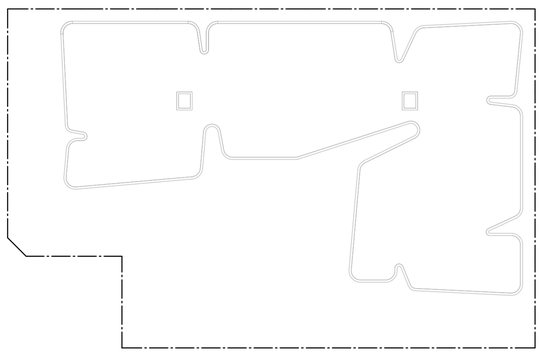


L5



ROOF

GFA SCHEDULE

Level	Area
GROUND	2879.9 m²
L1	867.4 m²
L2	1302.7 m²
L3	1302.7 m²
L4	1302.7 m²
L5	1302.7 m²
TOTAL	8958.1 m²

SITE AREA	4,479 m²
ALLOWABLE GFA	8,958 m²
ALLOWABLE FSR	2:1
PROPOSED GFA	8,958 m²
PROPOSED FSR	2:1
APARTMENTS	44 APARTMENTS

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REVISIONS

01	19/10/2023	Pre-DA Issue
03	1/12/2023	Preliminary DA Issue
04	8/12/2023	DA Issue

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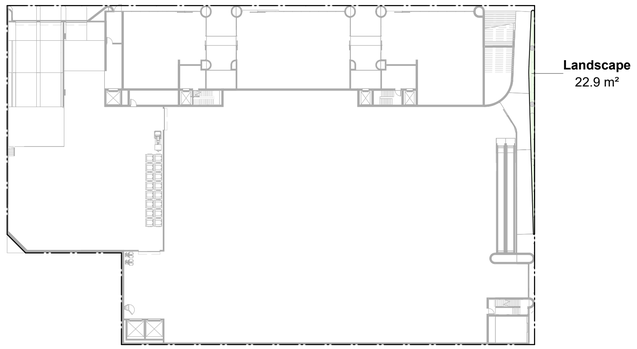
RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

GFA PLANS — 1:500 @ A1

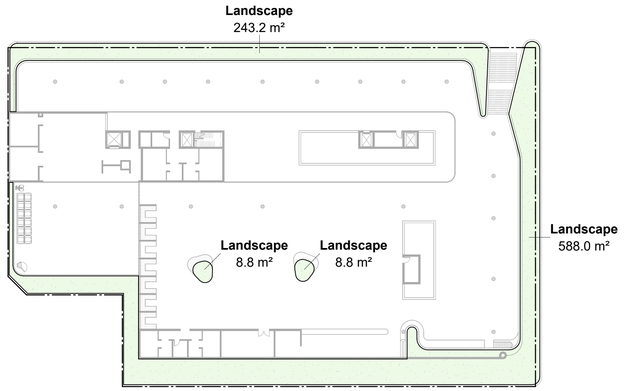
Drawn	JO
Checked	CP
Project No.	23.09

A-3101 [04]

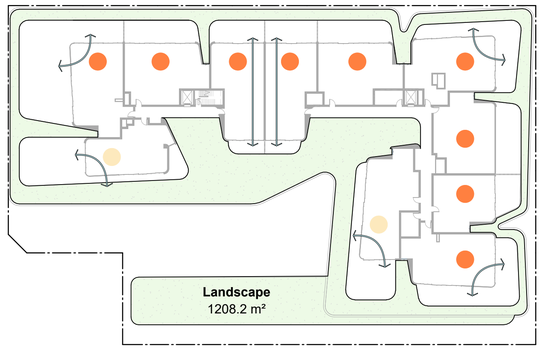
CRAFT



GROUND



L1



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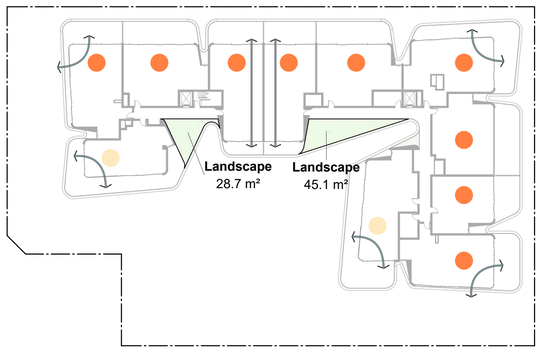
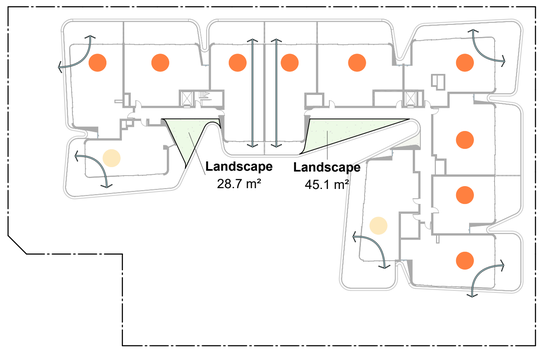


L3



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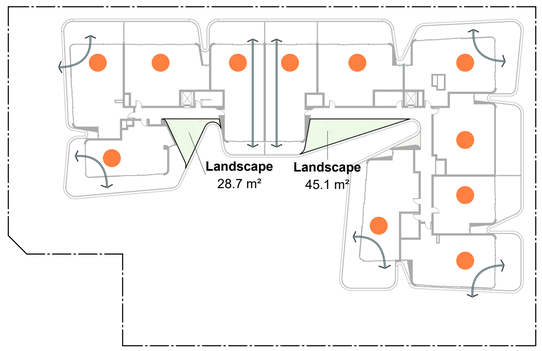

L5

LANDSCAPED AREA

Level	Area
GROUND	22.9 m²
L1	848.9 m²
L2	1208.2 m²
L3	73.8 m²
L4	73.8 m²
L5	73.8 m²
Total	2301.4 m²

SOLAR ACCESS

Direct sunlight to living areas and private open space in mid-winter between 9am and 3pm

3+ hours	38 apartments (86%)
2 hours	6 apartments (14%)

CROSS-VENTILATION

Natural cross-ventilation	28 apartments (64%)

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REVISIONS

04	8/12/2023	DA Issue

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RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

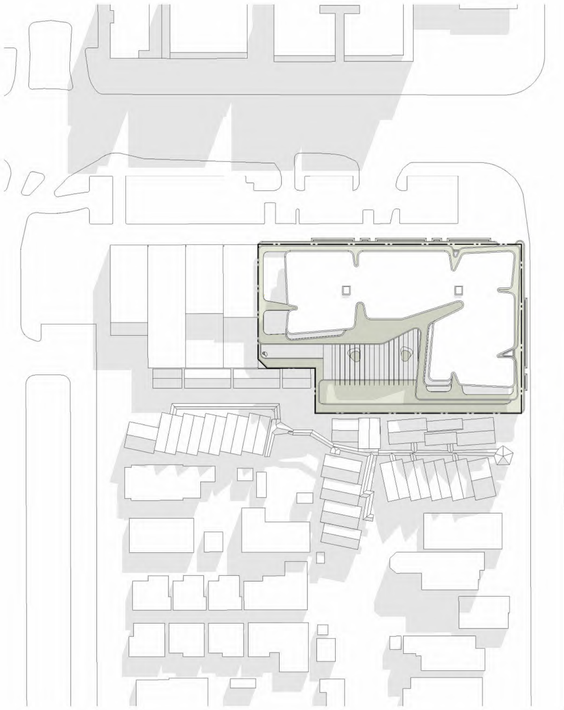
LANDSCAPE, SOLAR, CROSS-FLOW 1 : 500 @ A1

Drawn MO
Checked CP
Project No. 23.09

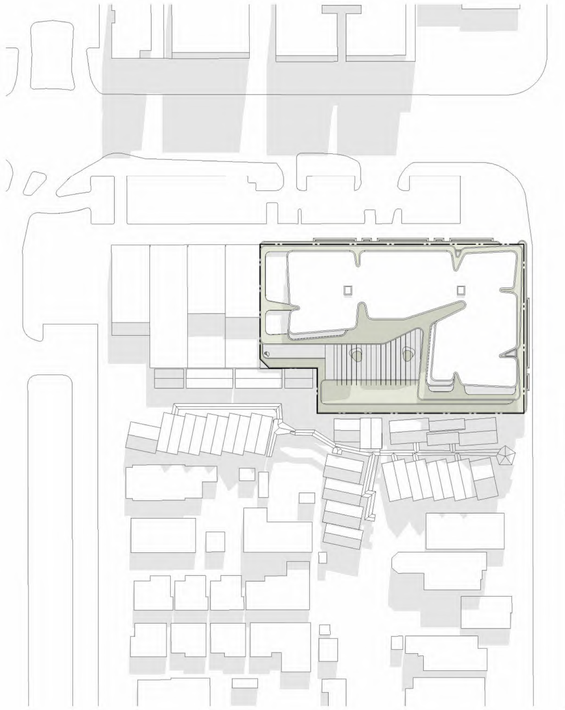
A-3110 [04]

CRAFT

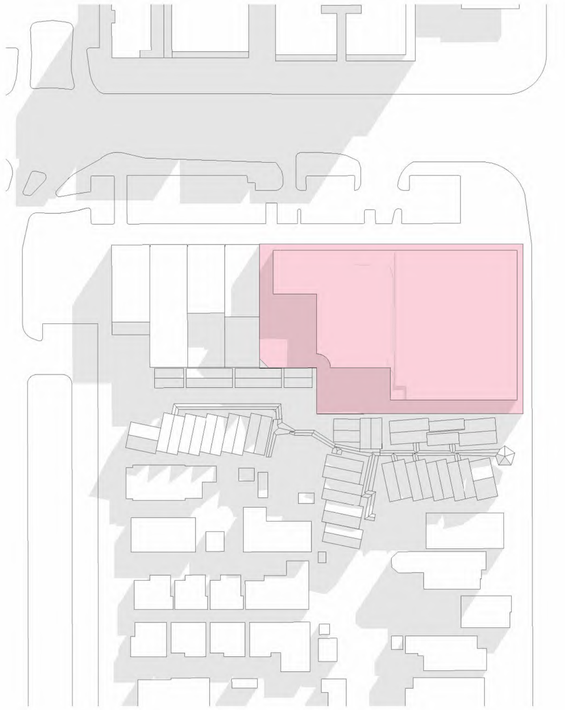
Proposed - 9am



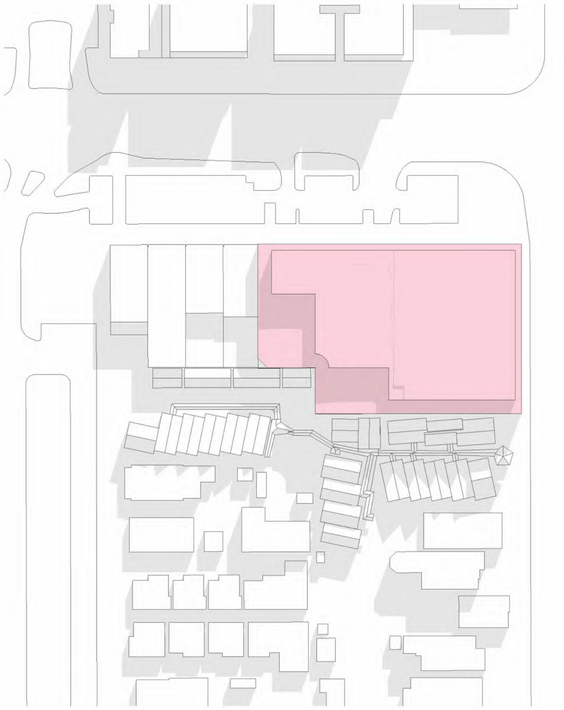
Proposed - 10am



Proposed - 11am



DCP Envelope - 9am



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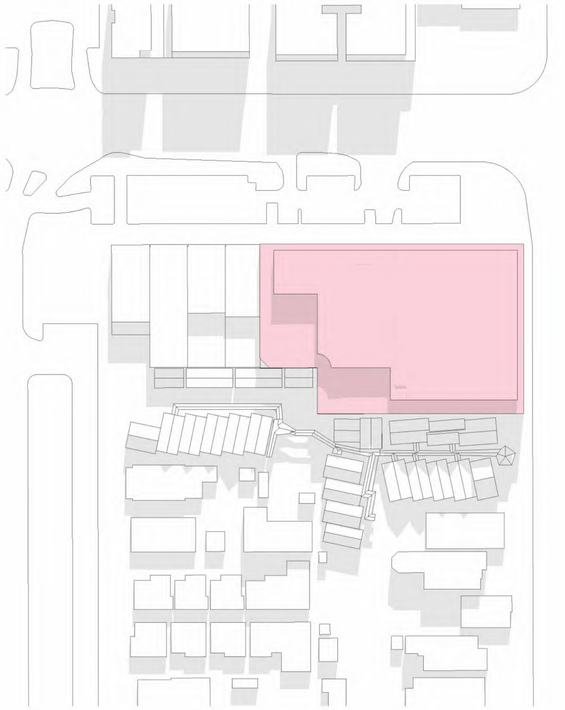

DCP Envelope - 11am

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REVISIONS

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04	8/12/2023	DA Issue

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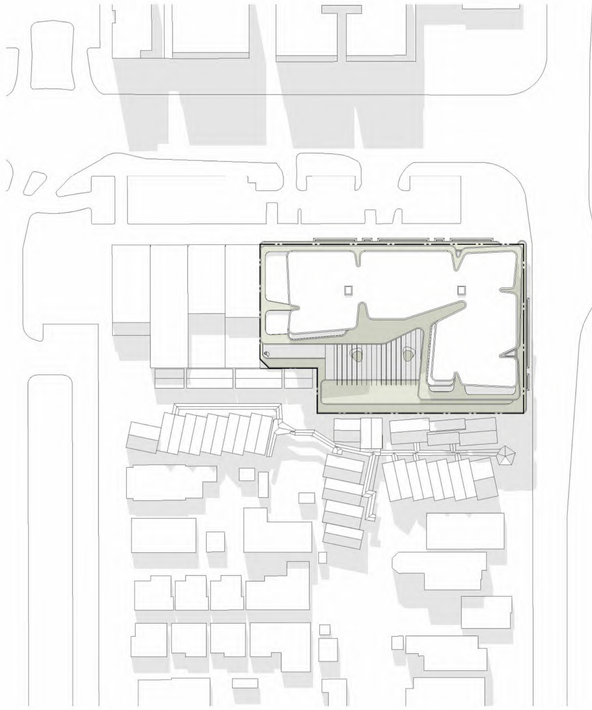
RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

SHADOW DIAGRAMS - SHEET 1 — 1:1000 @ A1

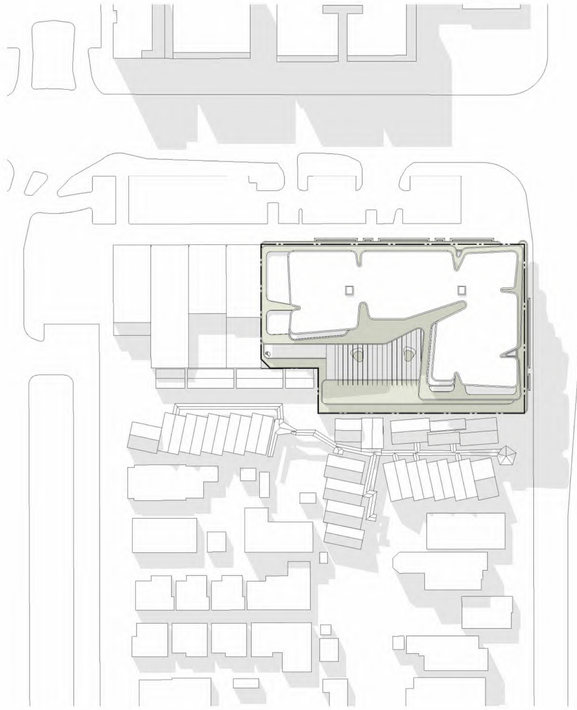
Drawn	JO
Checked	CP
Project No.	23.09

A-3201 [04]

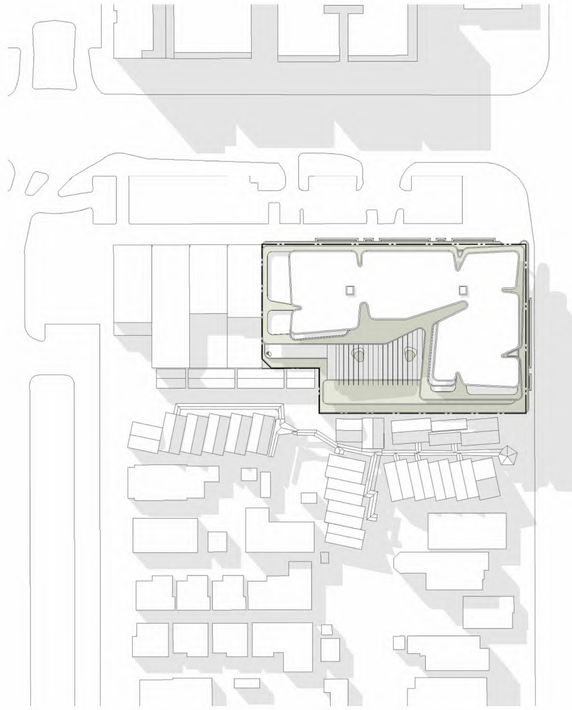
CRAFT



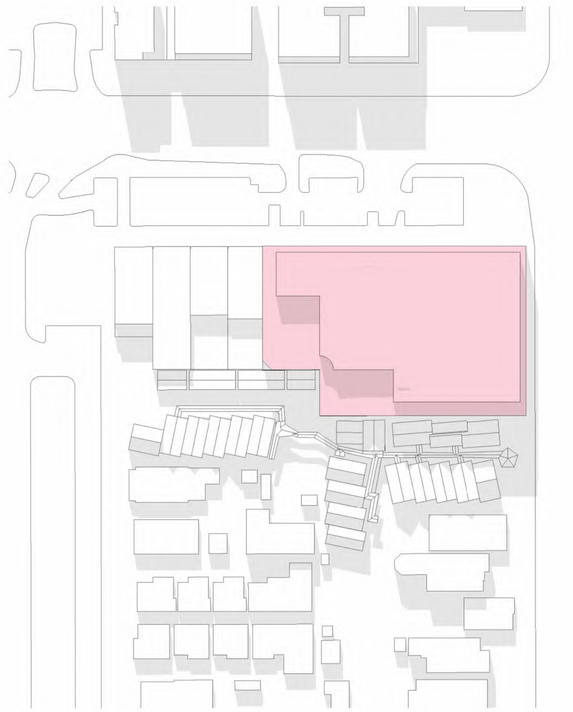
Proposed - 12pm



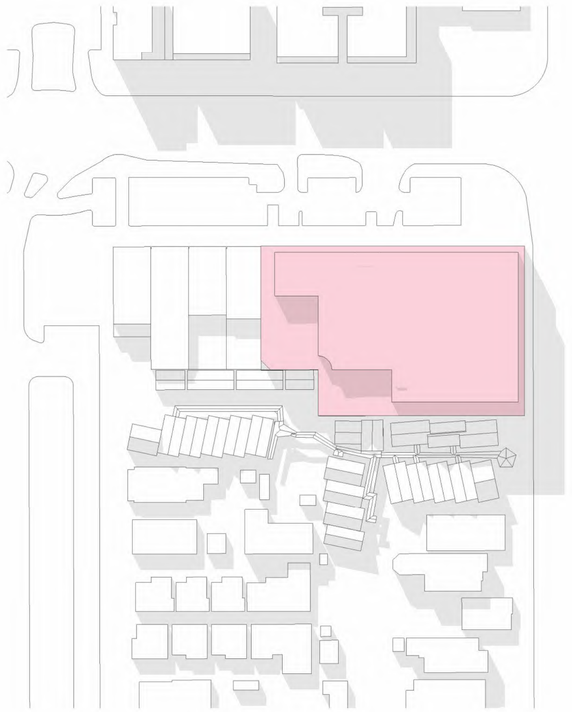
Proposed - 1pm



Proposed - 2pm



DCP Envelope - 12pm



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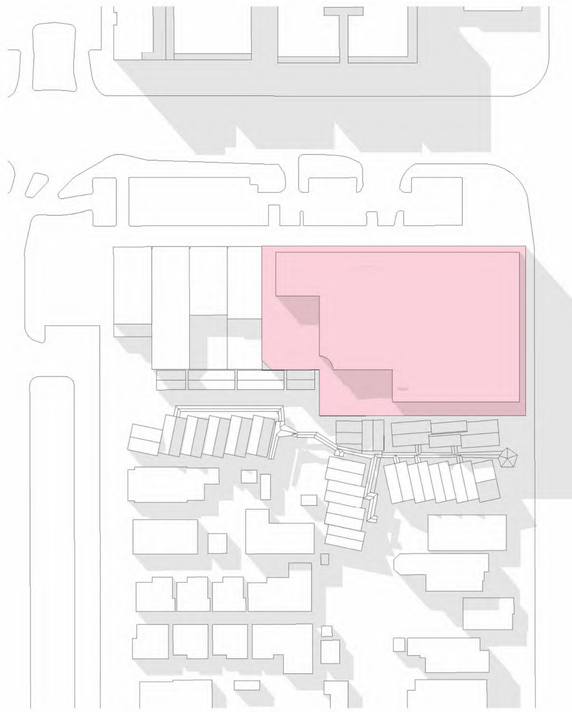

DCP Envelope - 2pm

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REVISIONS

03	1/12/2023	Preliminary DA Issue
04	8/12/2023	DA Issue

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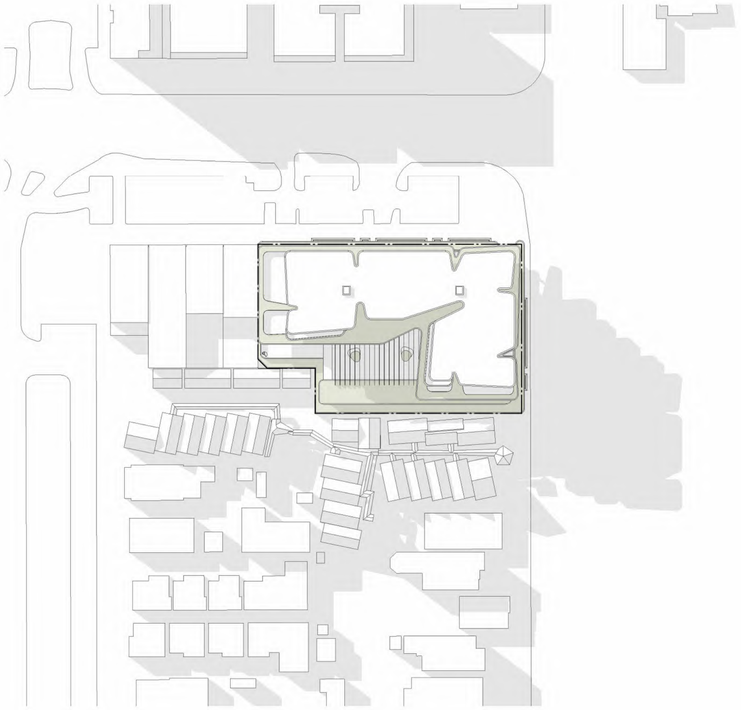
RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

SHADOW DIAGRAMS - SHEET 2 1:1000 @ A1

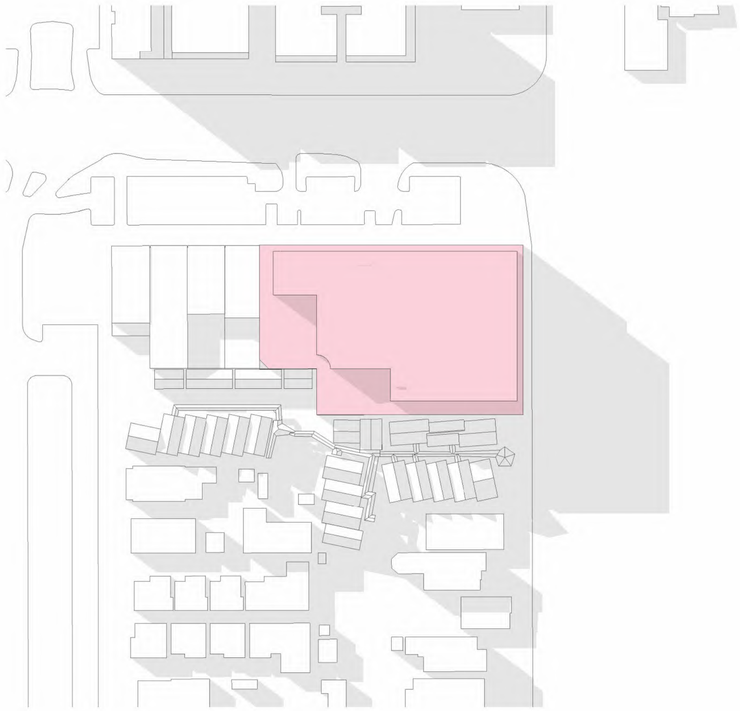
Drawn	JO
Checked	CP
Project No.	23.09

A-3202 [04]

CRAFT



Proposed - 3pm



DCP Envelope - 3pm

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04	8/12/2023	DA Issue

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RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

SHADOW DIAGRAMS - SHEET 3 — 1:1000 @ A1

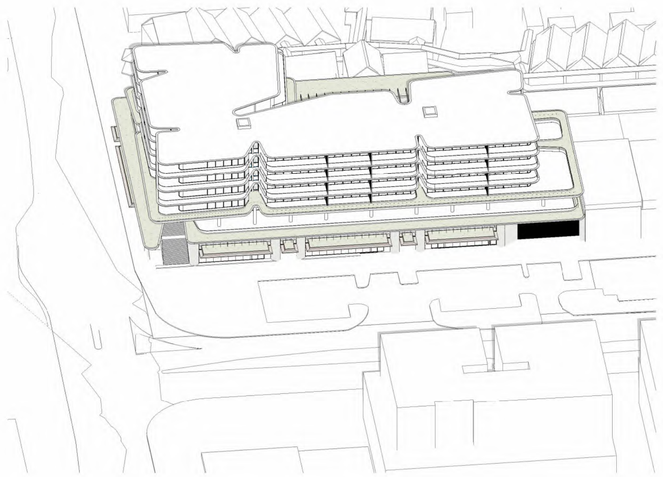
Drawn: JO
Checked: CP
Project No.: 23.09

A-3203 [04]

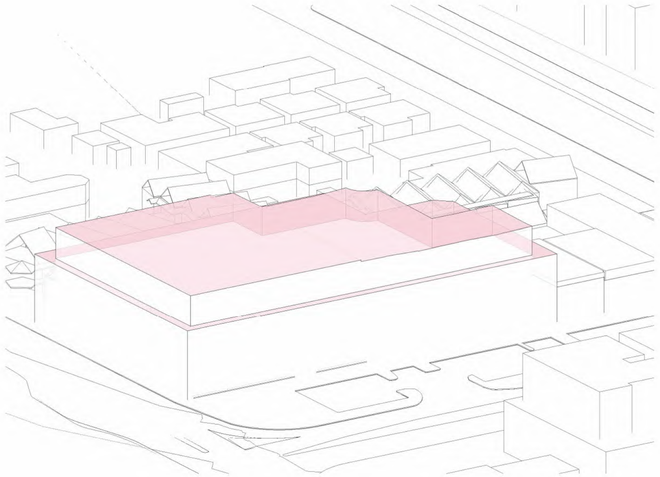
CRAFT

Proposed - June 21, 9am

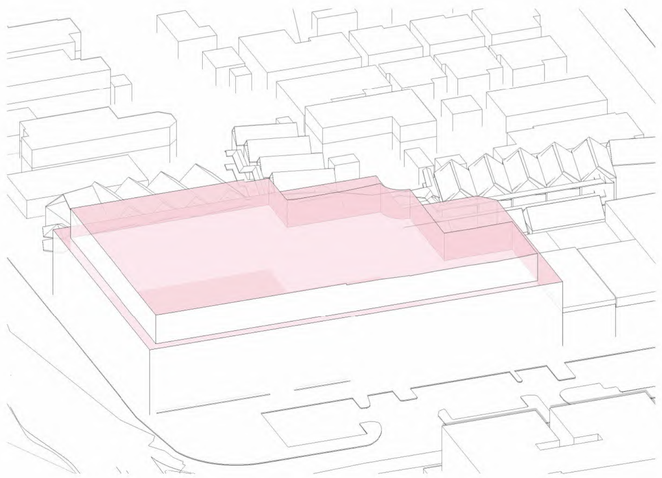
Proposed - June 21, 10am



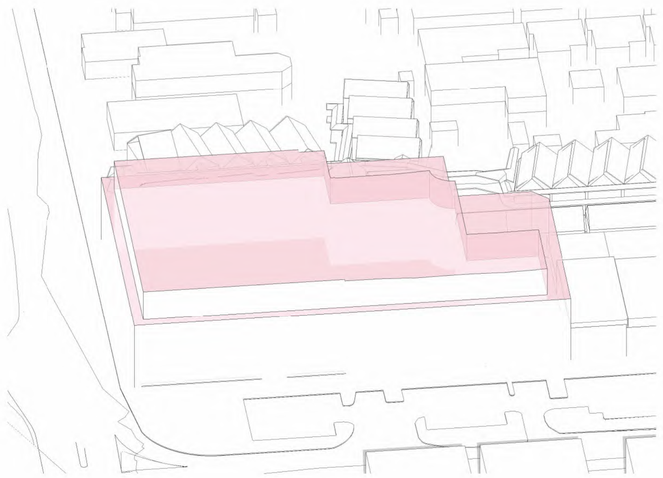
Proposed - June 21, 11am



DCP Envelope - June 21, 9am



DCP Envelope - June 21, 10am



DCP Envelope - June 21, 11am

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REVISIONS

04	8/12/2023	DA Issue

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RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

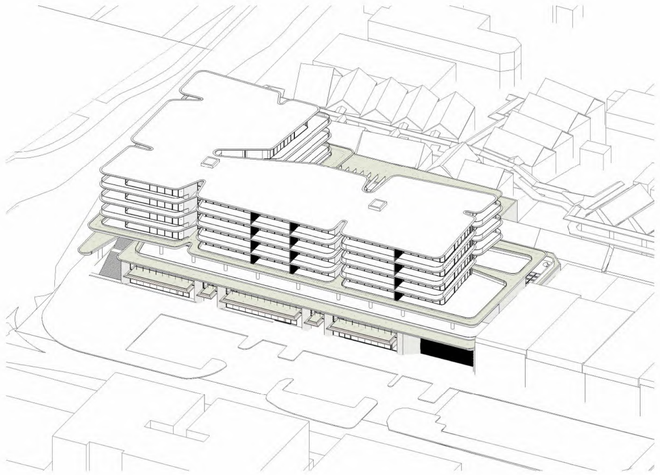
VIEW FROM SUN - SHEET 1 @ A1

Drawn	MO
Checked	CP
Project No.	23.09

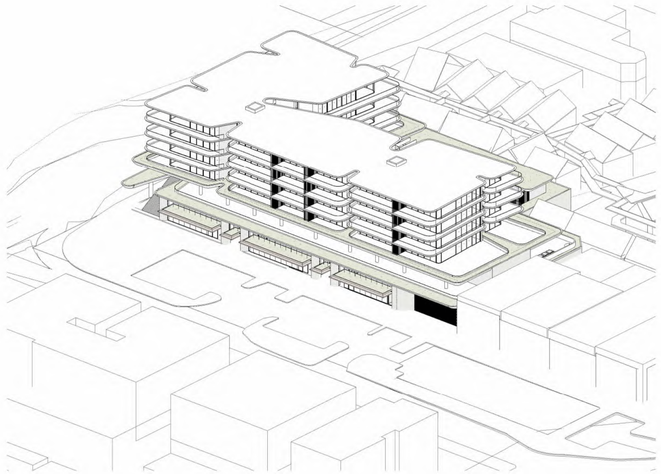
A-3291 [04]

CRAFT

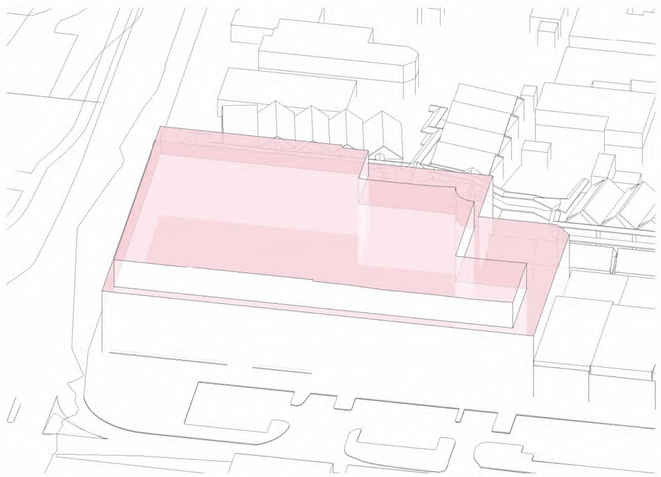
Proposed - June 21, 12pm



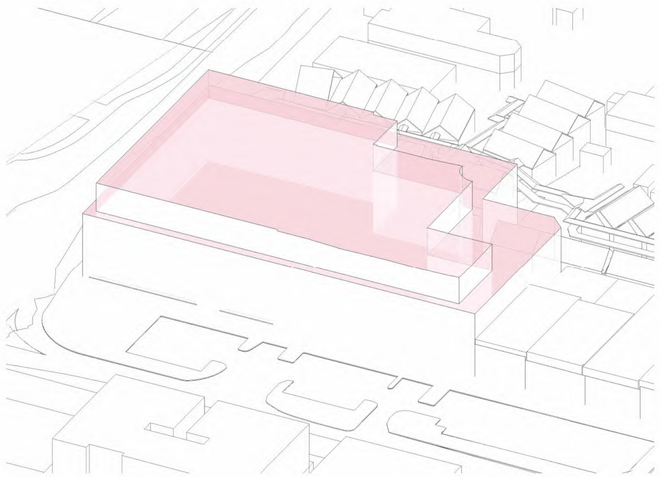
Proposed - June 21, 1pm



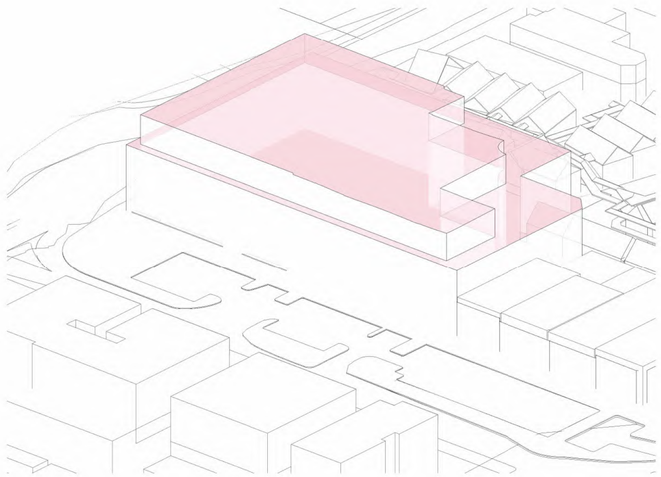
Proposed - June 21, 2pm



DCP Envelope - June 21, 12pm



DCP Envelope - June 21, 1pm



DCP Envelope - June 21, 2pm

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REVISIONS

04	8/12/2023	DA Issue

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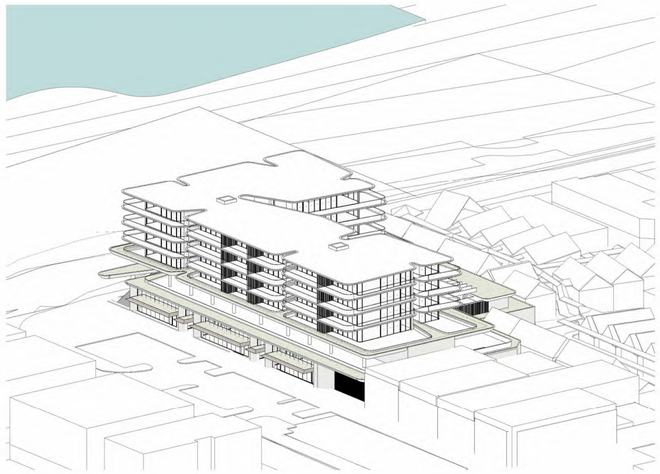
RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

VIEW FROM SUN - SHEET 2 @ A1

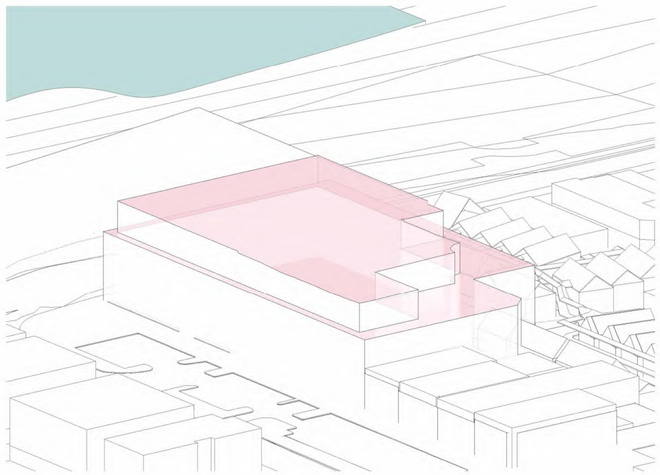
Drawn	MO
Checked	CP
Project No.	23.09

A-3292 [04]

CRAFT



Proposed - June 21, 3pm



Winter Solstice 3pm

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REVISIONS

04	8/12/2023	DA Issue

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RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

VIEW FROM SUN - SHEET 3 @ A1

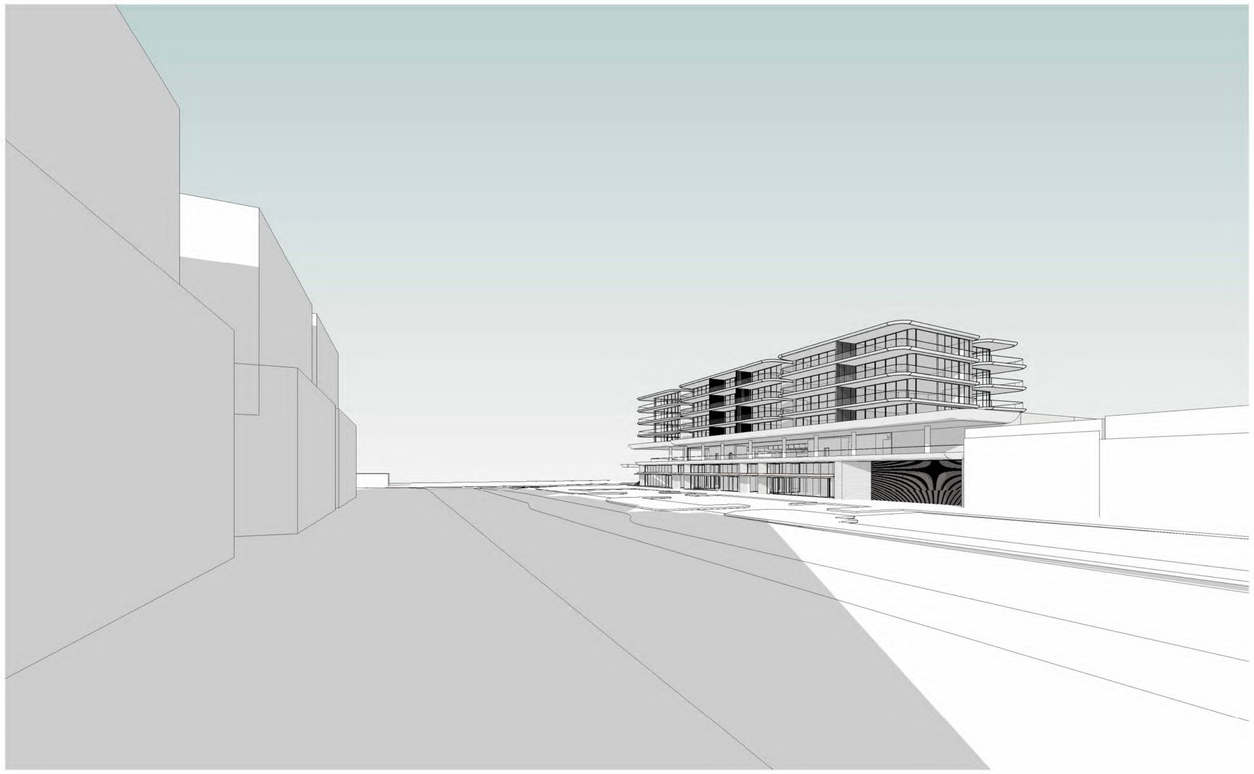
Drawn	MO
Checked	CP
Project No.	23.09

A-3293 [04]

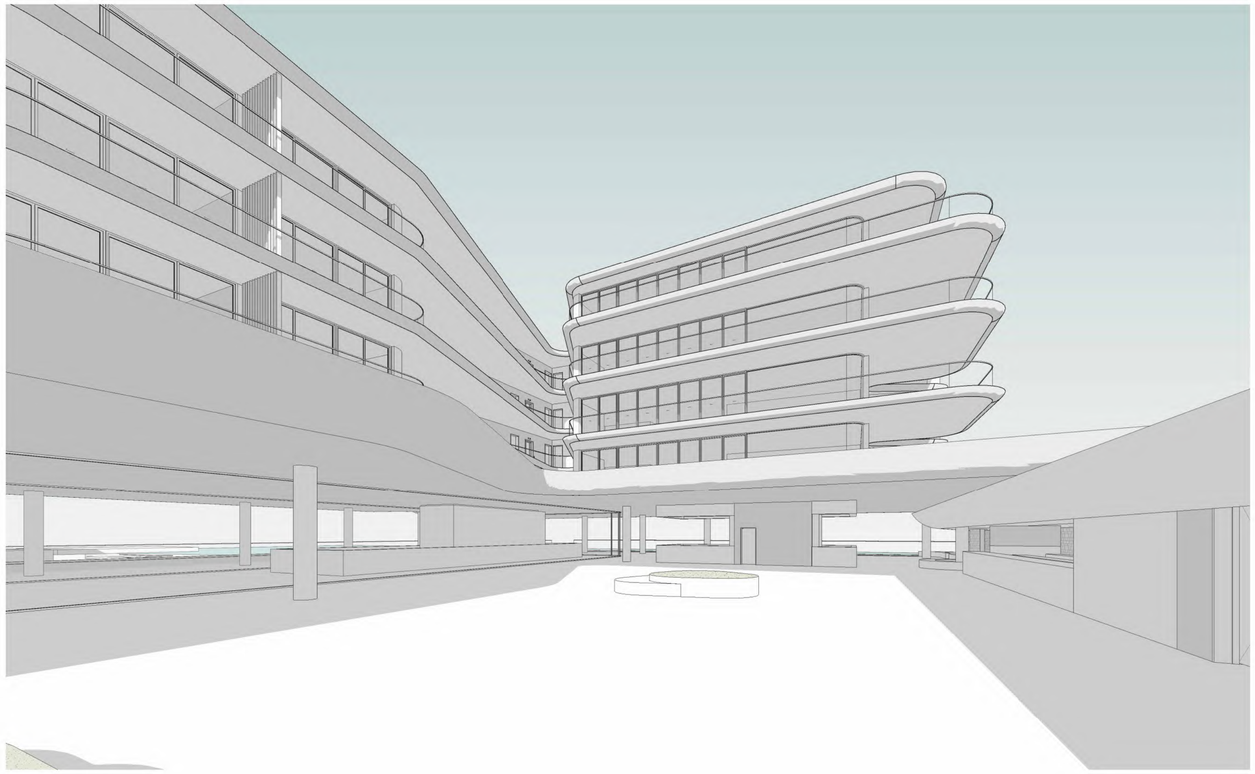
CRAFT

View from Ramsgate Beach Plaza

View from The Grand Parade



View from Ramsgate Road



Level 1 Courtyard

CRAFT ARCHITECTURE SYDNEY
ABN 85134406368
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Nominated Architect: Charles Peters Reg. NSW 8102

REVISIONS

04	8/12/2023	DA Issue

DEVELOPED BY
BRONXX

RAMSGATE BEACH APARTMENTS
277 The Grand Parade, Ramsgate NSW 2217

PERSPECTIVE VIEWS @ A1

Drawn	MO
Checked	CP
Project No.	23.09

A-4001 [04]

CRAFT

Lotsearch Environmental Risk and Planning Report

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Date: 11 Mar 2022 10:27:10

Reference: LS030090 EP

Address: 277 The Grand Parade, Ramsgate, NSW 2217

Dataset Listing

Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Finance, Services & Innovation	04/01/2022	04/01/2022	Quarterly	-	-	-	-
Topographic Data	NSW Department of Finance, Services & Innovation	25/06/2019	25/06/2019	Annually	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	02/03/2022	09/02/2022	Monthly	1000m	0	1	3
Contaminated Land Records of Notice	Environment Protection Authority	03/03/2022	03/03/2022	Monthly	1000m	0	0	1
Former Gasworks	Environment Protection Authority	02/03/2022	14/07/2021	Quarterly	1000m	0	0	0
National Waste Management Facilities Database	Geoscience Australia	12/05/2021	07/03/2017	Annually	1000m	0	0	0
National Liquid Fuel Facilities	Geoscience Australia	15/02/2021	13/07/2012	Annually	1000m	0	1	2
EPA PFAS Investigation Program	Environment Protection Authority	25/02/2022	14/07/2021	Monthly	2000m	0	1	1
Defence PFAS Investigation & Management Program - Investigation Sites	Department of Defence	03/03/2022	03/03/2022	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Department of Defence	03/03/2022	03/03/2022	Monthly	2000m	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	02/03/2022	02/03/2022	Monthly	2000m	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	03/03/2022	03/03/2022	Quarterly	2000m	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	16/02/2022	13/12/2018	Annually	1000m	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	03/03/2022	03/03/2022	Monthly	1000m	0	0	0
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	03/03/2022	03/03/2022	Monthly	1000m	0	0	0
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	03/03/2022	03/03/2022	Monthly	1000m	0	3	4
UBD Business Directories (Premise & Intersection Matches)	Hardie Grant			Not required	150m	2	113	127
UBD Business Directories (Road & Area Matches)	Hardie Grant			Not required	150m	-	6	6
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500m	0	34	60
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500m	-	0	0
Points of Interest	NSW Department of Finance, Services & Innovation	19/08/2021	19/08/2021	Quarterly	1000m	0	2	34
Tanks (Areas)	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	0
Tanks (Points)	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	0
Major Easements	NSW Department of Finance, Services & Innovation	19/08/2021	19/08/2021	Quarterly	1000m	0	0	9
State Forest	Forestry Corporation of NSW	25/02/2021	14/02/2021	Annually	1000m	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	10/02/2022	31/12/2021	Annually	1000m	0	0	0
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000m	1	1	1
Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018	NSW Department of Planning, Industry and Environment	26/10/2020	21/02/2018	Annually	1000m	0	0	0
Groundwater Boreholes	NSW Dept. of Primary Industries - Water NSW; Commonwealth of Australia (Bureau of Meteorology)	24/07/2018	23/07/2018	Annually	2000m	1	16	603

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Geological Units 1:100,000	NSW Department of Planning, Industry and Environment	20/08/2014		Annually	1000m	2	3	6
Geological Structures 1:100,000	NSW Department of Planning, Industry and Environment	20/08/2014		Annually	1000m	0	0	0
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000m	0	0	0
Atlas of Australian Soils	Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES)	19/05/2017	17/02/2011	As required	1000m	1	1	1
Soil Landscapes of Central and Eastern NSW	NSW Department of Planning, Industry and Environment	14/10/2020	27/07/2020	Annually	1000m	2	2	7
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning, Industry and Environment	07/01/2022	17/12/2021	Monthly	500m	1	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000m	1	1	3
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000m	0	0	0
Mining Subsidence Districts	NSW Department of Customer Service - Subsidence Advisory NSW	19/08/2021	05/08/2021	Quarterly	1000m	0	0	0
Current Mining Titles	NSW Department of Industry	11/03/2022	11/03/2022	Monthly	1000m	0	0	0
Mining Title Applications	NSW Department of Industry	11/03/2022	11/03/2022	Monthly	1000m	0	0	0
Historic Mining Titles	NSW Department of Industry	11/03/2022	11/03/2022	Monthly	1000m	12	12	13
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning, Industry and Environment	15/11/2021	07/12/2018	Monthly	1000m	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning, Industry and Environment	15/11/2021	05/11/2021	Monthly	1000m	1	11	47
Commonwealth Heritage List	Australian Government Department of the Agriculture, Water and the Environment	18/05/2021	20/11/2019	Annually	1000m	0	0	0
National Heritage List	Australian Government Department of the Agriculture, Water and the Environment	18/05/2021	20/11/2019	Annually	1000m	0	1	1
State Heritage Register - Curtilages	NSW Department of Planning, Industry and Environment	19/08/2021	25/06/2021	Quarterly	1000m	0	0	0
Environmental Planning Instrument Local Heritage	NSW Department of Planning, Industry and Environment	07/01/2022	17/12/2021	Monthly	1000m	0	2	17
Bush Fire Prone Land	NSW Rural Fire Service	07/03/2022	08/12/2021	Weekly	1000m	0	0	0
Native Vegetation of the Sydney Metropolitan Area	NSW Office of Environment & Heritage	01/03/2017	16/12/2016	As required	1000m	0	2	11
Ramsar Wetlands of Australia	Australian Government Department of Agriculture, Water and the Environment	24/02/2021	19/03/2020	Annually	1000m	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Annually	1000m	0	0	0
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000m	0	0	0
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	08/03/2022	08/03/2022	Weekly	10000m	-	-	-

Site Diagram

277 The Grand Parade, Ramsgate, NSW 2217

Legend

- Site Boundary
- Internal Parcel Boundaries

Total Area: 4471m²

Total Perimeter: 282m

Disclaimers:

Measurements are approximate only and may have been simplified or smaller lengths removed for readability.

Parcels that make up a small percentage of the total site area have not been labelled for increased legibility.

Scale:

0 12.5 25
Meters

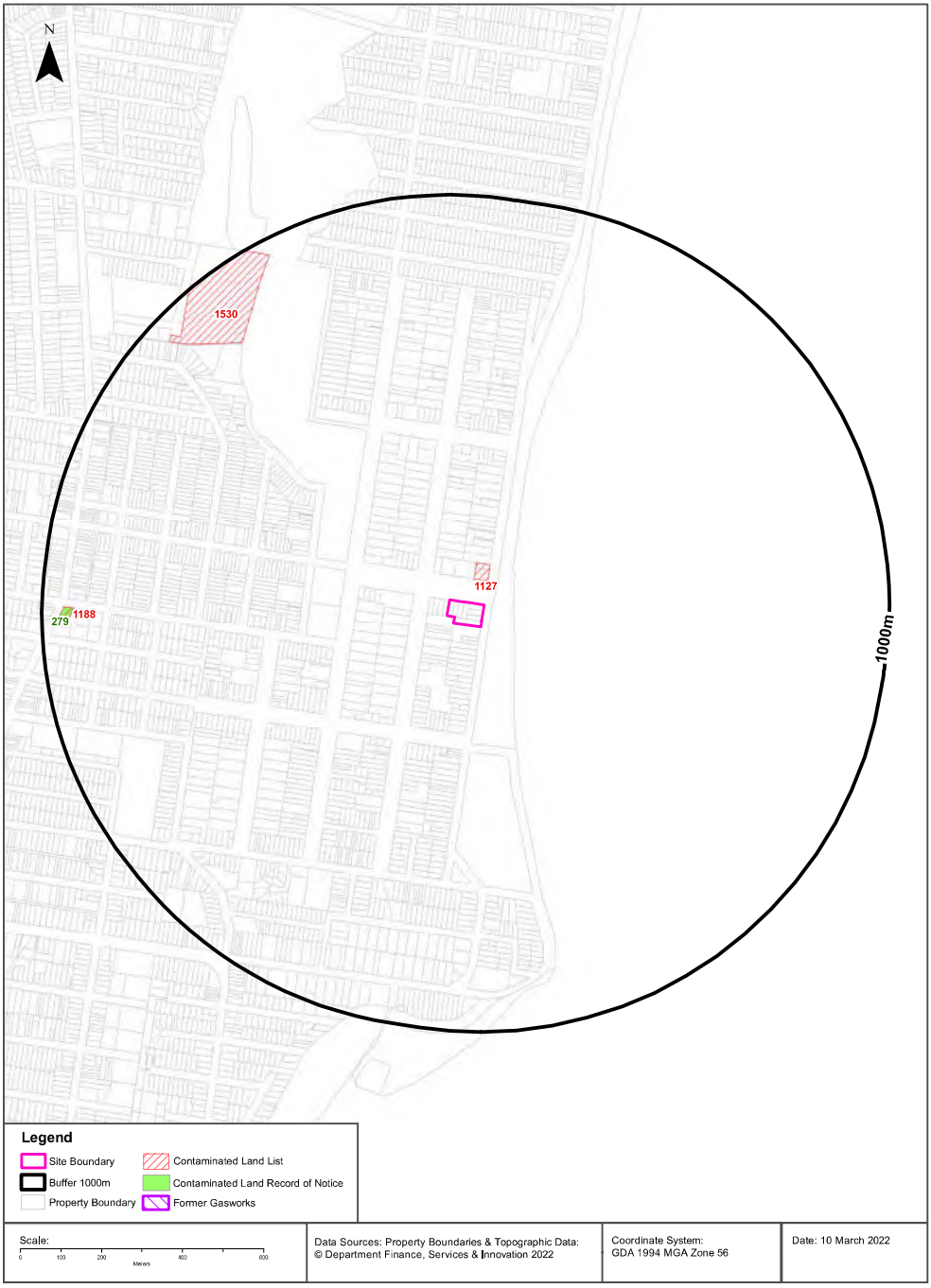
Data Source Aerial Imagery:
© Aerometrex Pty Ltd

Coordinate System:
GDA 1994 MGA Zone 56

Date: 10 March 2022

Contaminated Land

277 The Grand Parade, Ramsgate, NSW 2217



Contaminated Land

277 The Grand Parade, Ramsgate, NSW 2217

List of NSW contaminated sites notified to EPA

Records from the NSW EPA Contaminated Land list within the dataset buffer:

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
1127	Shell Coles Express Service Station	Grand Parade cnr Ramsgate Road	Ramsgate	Service Station	Regulation under CLM Act not required	Current EPA List	Premise Match	60m	North
1530	Scarborough Park South	184R Production AVENUE	Kogarah	Landfill	Regulation being finalised	Current EPA List	Premise Match	815m	North West
1188	Former 7-Eleven Ramsgate	368 Rocky Point ROAD	Sans Souci	Service Station	Contamination formerly regulated under the CLM Act	Current EPA List	Premise Match	920m	West

The values within the EPA site management class in the table above, are given more detailed explanations in the table below:

EPA site management class	Explanation
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record of Notices.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the Protection of the Environment Operations Act 1997 (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record of Notices.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.

NSW EPA Contaminated Land List Data Source: Environment Protection Authority

Contaminated Land

277 The Grand Parade, Ramsgate, NSW 2217

Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
279	Former 7-Eleven Ramsgate	368 Rocky Point Road	Sans Souci	2 former	3328	Premise Match	920m	West

Contaminated Land Records of Notice Data Source: Environment Protection Authority

Former Gasworks

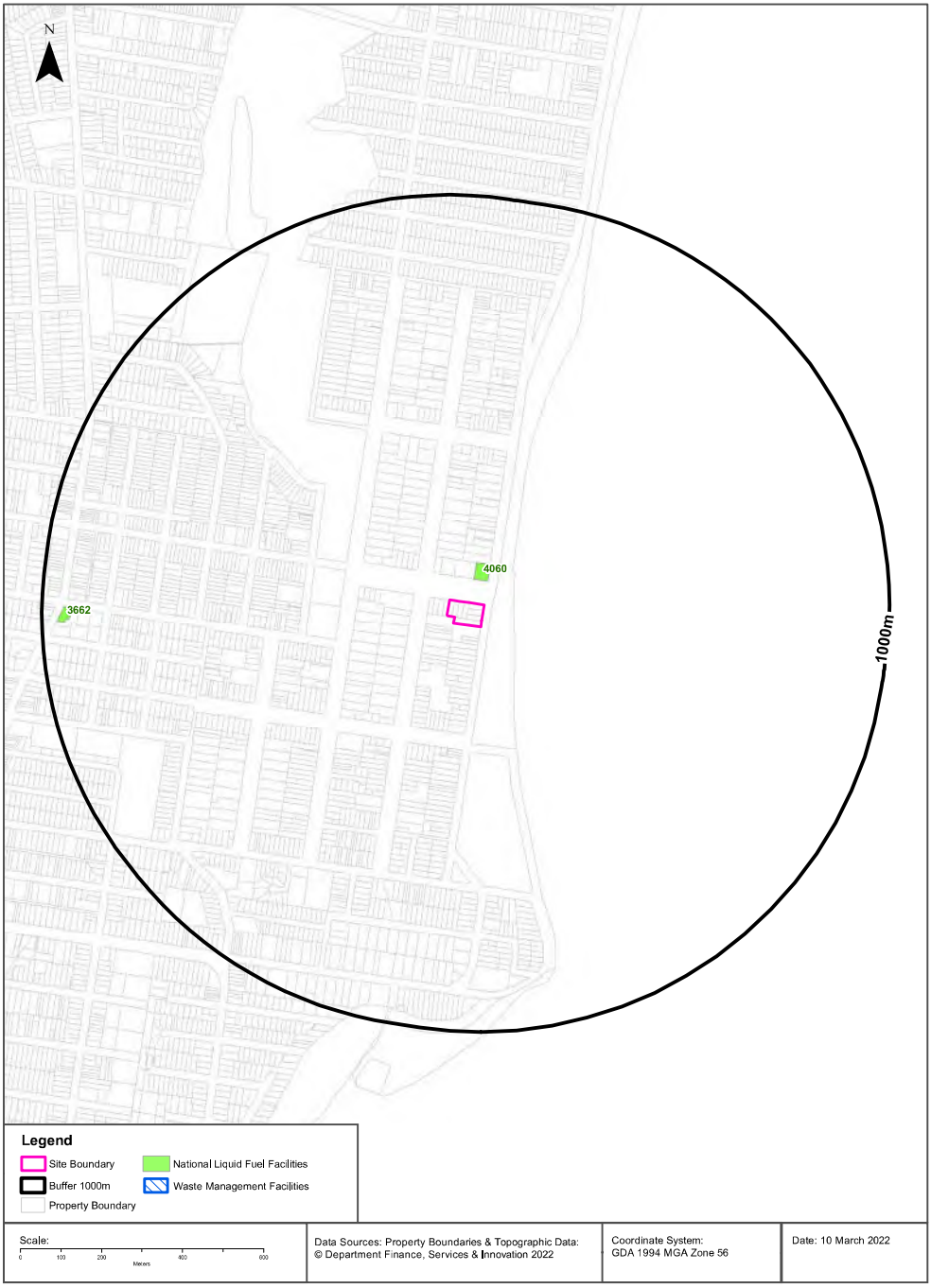
Former Gasworks within the dataset buffer:

Map Id	Location	Council	Further Info	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Environment Protection Authority

Waste Management & Liquid Fuel Facilities

277 The Grand Parade, Ramsgate, NSW 2217



Waste Management & Liquid Fuel Facilities

277 The Grand Parade, Ramsgate, NSW 2217

National Waste Management Site Database

Sites on the National Waste Management Site Database within the dataset buffer:

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist	Direction
N/A	No records in buffer											

Waste Management Facilities Data Source: Geoscience Australia

National Liquid Fuel Facilities

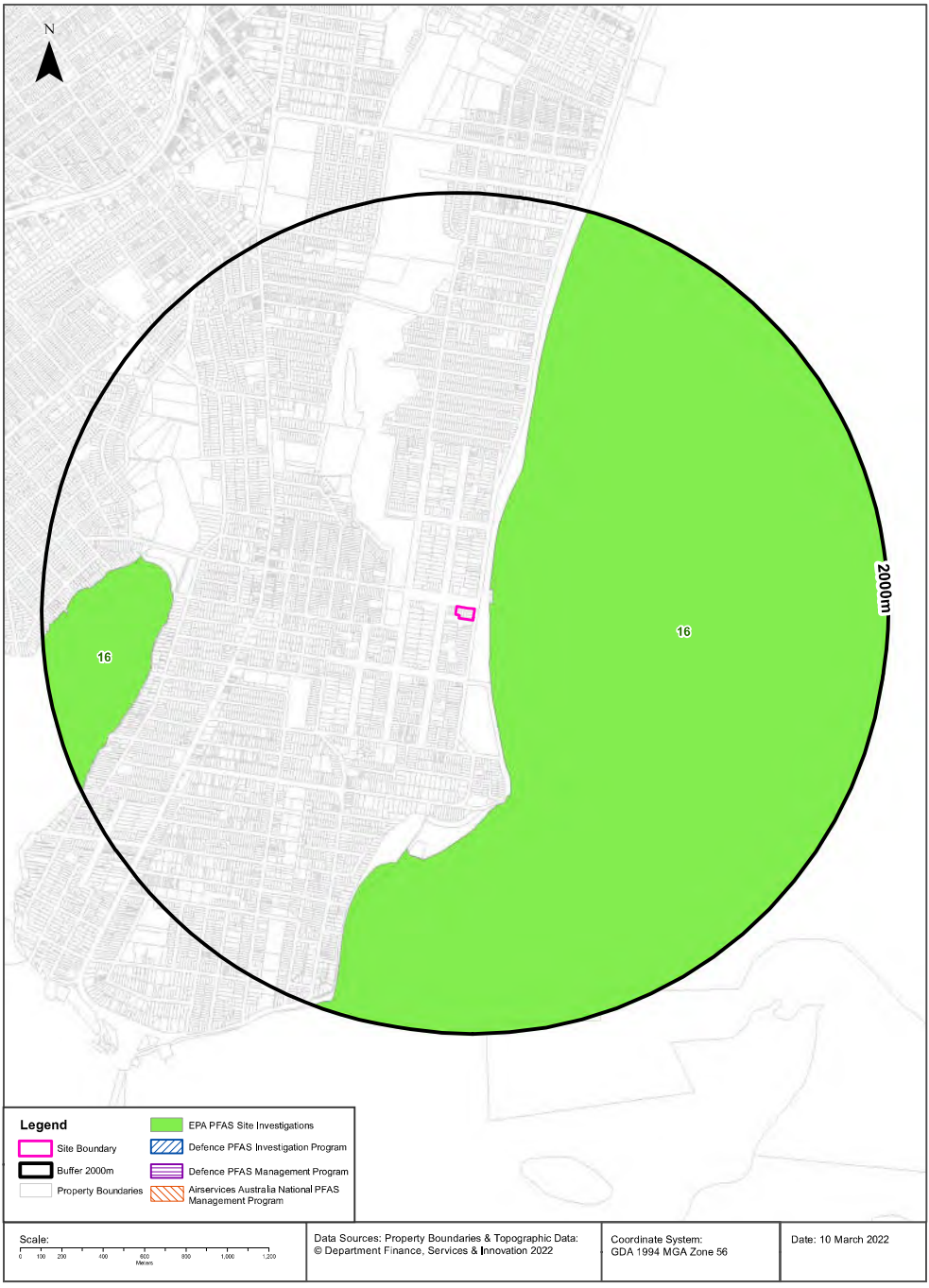
National Liquid Fuel Facilties within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist	Direction
4060	Shell	Coles Express Ramsgate	274-276 The Grand Parade	Ramsgate Beach	Petrol Station	Operational		25/07/2011	Premise Match	60m	North
3662	7-Eleven Pty Ltd	Ramsgate	368 Rocky Point Road	Ramsgate	Petrol Station	Operational		13/07/2012	Premise Match	920m	West

National Liquid Fuel Facilities Data Source: Geoscience Australia

PFAS Investigation & Management Programs

277 The Grand Parade, Ramsgate, NSW 2217



PFAS Investigation & Management Programs

277 The Grand Parade, Ramsgate, NSW 2217

EPA PFAS Investigation Program

Sites that are part of the EPA PFAS investigation program, within the dataset buffer:

Map ID	Site	Address	Loc Conf	Dist	Dir
16	Botany Bay area	Botany Bay area & Georges River	Area Match	73m	East

EPA PFAS Investigation Program: Environment Protection Authority

Defence PFAS Investigation Program

Sites being investigated by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Investigation Program Data Custodian: Department of Defence, Australian Government

Defence PFAS Management Program

Sites being managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Management Program Data Custodian: Department of Defence, Australian Government

Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Loc Conf	Dist	Dir
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence Sites

277 The Grand Parade, Ramsgate, NSW 2217

Defence 3 Year Regional Contamination Investigation Program

Sites which have been assessed as part of the Defence 3 Year Regional Contamination Investigation Program within the dataset buffer:

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
N/A	No records in buffer					

Defence 3 Year Regional Contamination Investigation Program, Data Custodian: Department of Defence, Australian Government

EPA Other Sites with Contamination Issues

277 The Grand Parade, Ramsgate, NSW 2217

EPA Other Sites with Contamination Issues

This dataset contains other sites identified on the EPA website as having contamination issues. This dataset currently includes:

- James Hardie asbestos manufacturing and waste disposal sites
- Radiological investigation sites in Hunter's Hill
- Pasminco Lead Abatement Strategy Area

Sites within the dataset buffer:

Site Id	Site Name	Site Address	Dataset	Comments	Location Confidence	Distance	Direction
N/A	No records in buffer						

EPA Other Sites with Contamination Issues: Environment Protection Authority

EPA Activities

277 The Grand Parade, Ramsgate, NSW 2217

Licensed Activities under the POEO Act 1997

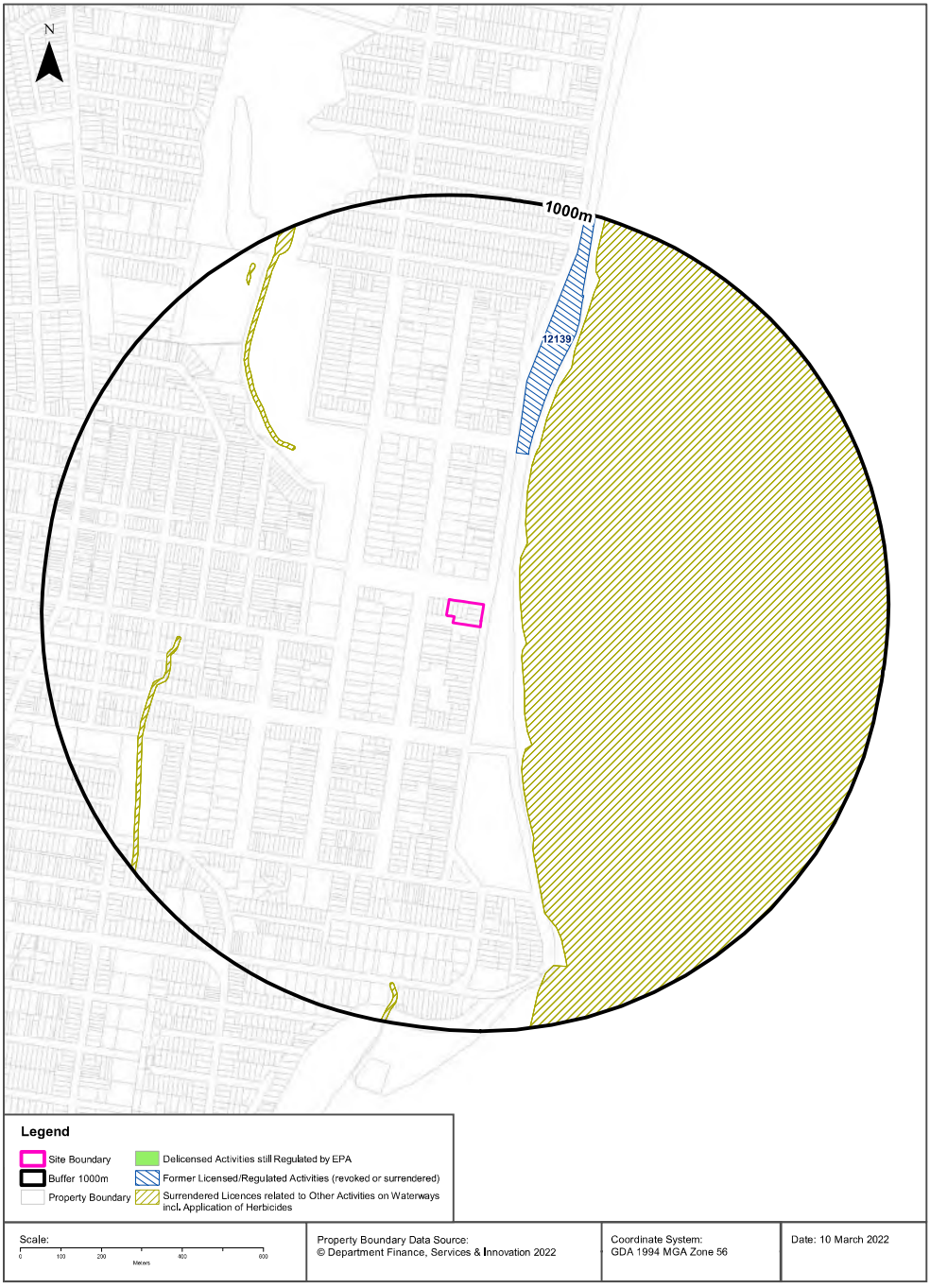
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
N/A	No records in buffer							

POEO Licence Data Source: Environment Protection Authority

Delicensed & Former Licensed EPA Activities

277 The Grand Parade, Ramsgate, NSW 2217



EPA Activities

277 The Grand Parade, Ramsgate, NSW 2217

Delicensed Activities still regulated by the EPA

Delicensed activities still regulated by the EPA, within the dataset buffer:

Licence No	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
N/A	No records in buffer							

Delicensed Activities Data Source: Environment Protection Authority

Former Licensed Activities under the POEO Act 1997, now revoked or surrendered

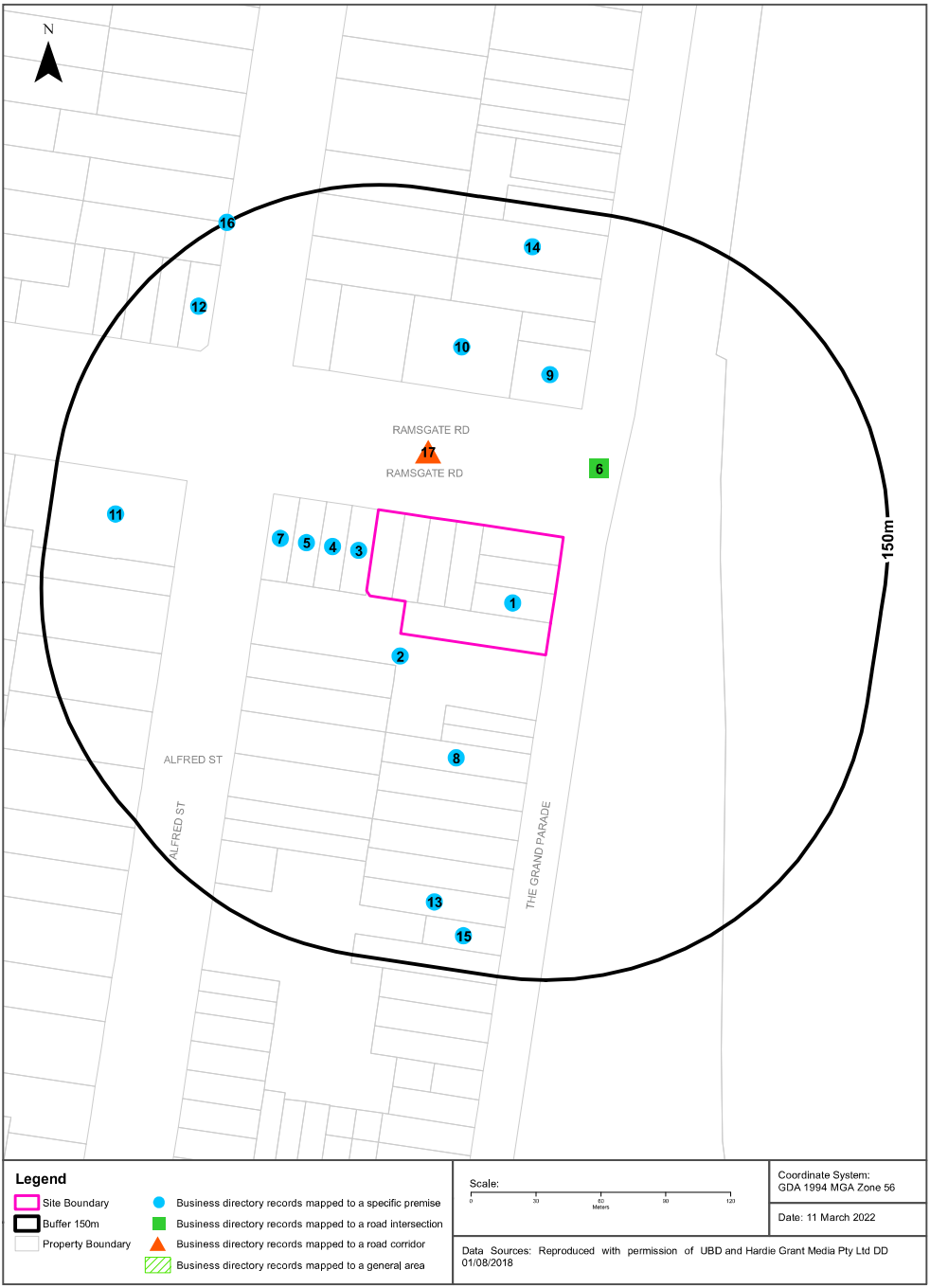
Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	91m	East
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered	07/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	91m	East
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered	09/11/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	91m	East
12139	WARD CIVIL & ENVIRONMENTAL ENGINEERING PTY LTD	Lady Robinsion Beach Restoration, Taylor Bar and Kyeemagh Bar Borrow Pits, DOLLS POINT, NSW 2219	Surrendered	19/05/2004	Water-based extractive activity	Network of Features	384m	North

Former Licensed Activities Data Source: Environment Protection Authority

Historical Business Directories

277 The Grand Parade, Ramsgate, NSW 2217



Historical Business Directories

277 The Grand Parade, Ramsgate, NSW 2217

Business Directory Records 1950-1991
Premise or Road Intersection Matches

Universal Business Directory records from years 1991, 1986, 1982, 1978, 1975, 1970, 1965, 1961 & 1950, mapped to a premise or road intersection within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	GROCERS-RETAIL.	Coles New World, 221 Ramsgate Rd., Ramsgate. 2217	40547	1986	Premise Match	0m	On-site
	GROCERS - RETAIL. (G7850)	Coles New World, 221 Ramsgate Rd., Ramsgate. 2217.	37488	1982	Premise Match	0m	On-site
2	MEDICAL PRACTITIONERS.	Faten, S., 88 Alfred St., Ramsgate. 2217.	54788	1986	Premise Match	0m	South West
	PATTERNMAKERS-ENGINEERING. (P2240)	McIntyre, W. I., 88 Alfred St., Sans Souci. 2219.	63146	1982	Premise Match	0m	South West
	PATTERNMAKERS-ENGINEERING.	McIntyre, W. L., 88 Alfred St., Sans Souci 2219	56232	1978	Premise Match	0m	South West
	SKI-SNOW &/OR WATER-IMPS. &/OR MFRS.	McIntyre, W. L., 88 Alfred St., Sans Souci. 2219	77750	1975	Premise Match	0m	South West
	PATTERNMAKERS-ENGINEERING.	McIntyre, Wallace I., 88 Alfred St., Sans Souci, 2219	66189	1975	Premise Match	0m	South West
	PATTERN MAKERS-ENGINEERING(P198)	McINTYRE WALLACE I., 88 ALFRED St., RAMSGATE	347371	1970	Premise Match	0m	South West
	PATTERN MAKERS-ENGINEERING(P198)	McIntyre, W. I., 88 Alfred St., Ramsgate	347372	1970	Premise Match	0m	South West
	SKI MFRS.-SNOW &/OR WATER(S343)	McIntyre, W. I., 88 Alfred St., Ramsgate	361764	1970	Premise Match	0m	South West
	SPORTS GOODS MFRS. (S440)	McIntyre, W. I., 88 Alfred St., Ramsgate	363323	1970	Premise Match	0m	South West
	ENGINEERS-GENERAL &/OR MFRG.&/OR MECHANICAL (E615)	Simpson, F. A Son Pty. Ltd., 88 Alfred St., Sans Souci	299612	1970	Premise Match	0m	South West
	BRASS FITTINGS & BRASSWARE MANUFACTURERS (B667)	Simpson, Frank & Son Pty. Ltd., 88 Alfred St., Sans Souci	269560	1970	Premise Match	0m	South West
	ENGINEERS-REPETITION (E735)	Simpson, Frank & Son Pty. Ltd., 88 Alfred St., Sans Souci	300888	1970	Premise Match	0m	South West
	Engineers General &/or Mfrg. &/or Mechanical	Simpson, F. & Son Pty. Ltd., 88 Alfred St., Sans Souci	82864	1965	Premise Match	0m	South West
	Brass Fittings & Brassware Mfrs.	Simpson, Frank & Son Pty. Ltd., 88 Alfred St., Sans Souci	54100	1965	Premise Match	0m	South West
	Engineers - Repetition	Simpson, Frank & Son Pty. Ltd., 88 Alfred St., Sans Souci	84099	1965	Premise Match	0m	South West
	ENGINEERS-GENERAL/MFRG./MECHANICAL	Simpson, F. & Son Pty. Ltd., 88 Alfred St., Sans Souci	307024	1961	Premise Match	0m	South West
	BRASS FITTINGS & BRASSWARE MANUFACTURERS	Simpson, Frank & Son Pty. Ltd., 88 Alfred St., Sans Souci	275666	1961	Premise Match	0m	South West
	ENGINEERS-REPETITION	Simpson, Frank & Son Pty. Ltd., 88 Alfred St., Sans Souci	308327	1961	Premise Match	0m	South West
3	WINE &/OR SPIRIT MERCHANTS RETAIL.	La-Nita Liquor Store, 213 Ramsgate Rd., Ramsgate. 2217	99369	1986	Premise Match	0m	West
	WINE &/OR SPIRIT MERCHANTS -. RETAIL. (W5960)	La-Nita Liquor Store, 213 Ramsgate Rd., Ramsgate. 2217.	84819	1982	Premise Match	0m	West
4	CHEMISTS-PHARMACEUTICAL.	Eddies Pharmacy, 211 Ramsgate Rd., Ramsgate. 2217	14185	1986	Premise Match	12m	West
	RESTAURANTS.	Wagon Wheels Restaurants, 211 Ramsgate Rd., Ramsgate. 2217	83113	1986	Premise Match	12m	West

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
4	TAKE-AWAY FOODS.	Wagon Wheels, 211 Ramsgate Rd., Ramsgate. 2217	91931	1986	Premise Match	12m	West
	CHEMISTS - PHARMACEUTICAL.(C4110)	Bens Pharmacy, 211 Ramsgate Rd., Ramsgate. 2217.	14759	1982	Premise Match	12m	West
	MEDICAL PRACTITIONERS. (M2020)	Hourani, M., 211 Ramsgate Rd., Ramsgate. 2217.	48613	1982	Premise Match	12m	West
5	RESTAURANTS.	Ramsgate Chinese, 209 Ramsgate Rd., Ramsgate, 2217	82682	1986	Premise Match	24m	West
	RESTAURANTS. (R5180)	Ramsgate Chinese, 209 Ramsgate Rd., Ramsgate. 2217.	71618	1982	Premise Match	24m	West
6	MILK, FRUIT JUICE BARS/CONFECTIONERS	Ramsgate Public Swimming Baths Refreshment Rooms., Cnr. Ramsgate Rd. & Grand Pde., Ramsgate	331125	1970	Road Intersection	36m	North East
	Milk, Fruit Juice Bars/Confectioners	Ramsgate Public Swimming Baths Refreshment Rooms, Cnr. Ramsgate Rd. & Grand Pde., Ramsgate	115516	1965	Road Intersection	36m	North East
	MILK, FRUIT JUICE BARS/CONFECTIONERS	Ramsgate Public Swimming Baths Refreshment Rooms, Cnr. Ramsgate Rd. & Grand Pde., Ramsgate	339536	1961	Road Intersection	36m	North East
7	HAIRDRESSERS-LADIES &/OR BEAUTY SALONS.	Babs Boutique, 207 Ramsgate Rd., Ramsgate. 2217	41629	1986	Premise Match	37m	West
	DENTISTS.	Dale, J. W., 207 Ramsgate Rd, Ramsgate. 2217	22482	1986	Premise Match	37m	West
	DENTISTS.	Hutchinson, L., 207 Ramsgate Rd., Ramsgate. 2217	22778	1986	Premise Match	37m	West
	DENTISTS.	Stevenson, R. V., 207 Ramsgate Rd., Ramsgate. 2217	23390	1986	Premise Match	37m	West
	DENTISTS.	Sullivan. J. M., 207 Ramsgate Rd., Ramsgate. 2217	23400	1986	Premise Match	37m	West
	MEDICAL PRACTITIONERS.	Sweeney, J. W., 207 Ramsgate Rd., Ramsgate. 2217	57826	1986	Premise Match	37m	West
	MEDICAL PRACTITIONERS.	Sweeney, P. J., 207 Ramsgate Rd., Ramsgate. 2217	57828	1986	Premise Match	37m	West
	BEAUTY SALONS &/OR LADIES HAIRDRESSERS. (B2000)	Babs Boutique, 207 Ramsgate Rd., Ramsgate. 2217.	5240	1982	Premise Match	37m	West
	DENTISTS. (D1800)	Dale, J. W., 203 Ramsgate Rd., Ramsgate. 2217.	20148	1982	Premise Match	37m	West
	DENTISTS. (D1800)	Dale, J. W., 207 Ramsgate Rd., Ramsgate. 2217.	20147	1982	Premise Match	37m	West
	DENTISTS. (D1800)	Hutchinson, L 207 Ramsgate Rd., Ramsgate. 2217.	20385	1982	Premise Match	37m	West
	DENTISTS. (D1800)	Stevenson, R. V., 207 Ramsgate Rd., Ramsgate. 2217.	20889	1982	Premise Match	37m	West
	MEDICAL PRACTITIONERS. (M2020)	Sweeney, J. W 207 Ramsgate Rd., Ramsgate. 2217.	50502	1982	Premise Match	37m	West
	MEDICAL PRACTITIONERS. (M2020)	Sweeney, P. J 205 Ramsgate Rd., Ramsgate. 2217.	50504	1982	Premise Match	37m	West
	MEDICAL PRACTITIONERS. (M2020)	Sweeney. P. J., 207 Ramsgate Rd., Ramsgate. 2217.	50503	1982	Premise Match	37m	West
	BEAUTY SALONS &/OR LADIES HAIRDRESSERS.	Jillian Hairdresser, 207 Ramsgate Rd., Ramsgate. 2217	5154	1978	Premise Match	37m	West
	MEDICAL PRACTITIONERS.	Sweeney, J.W., 207 Ramsgate Rd., Ramsgate. 2217	44426	1978	Premise Match	37m	West
	MEDICAL PRACTITIONERS.	Sweeney. P. J., 207 Ramsgate Rd., Ramsgate. 2217	44429	1978	Premise Match	37m	West
	MEDICAL PRACTITIONERS.	Calderbank, D., 207 Ramsgate Rd., Sans Souci. 2219.	49865	1975	Premise Match	37m	West
	BEAUTY SALONS &/OR LADIES HAIRDRESSERS.	Jillian Hairdresser, 207 Ramsgate Rd., Ramsgate. 2217	5446	1975	Premise Match	37m	West
	MEDICAL PRACTITIONERS.	Sweeney, J. W., 207 Ramsgate Rd., Sans Souci. 2219	51679	1975	Premise Match	37m	West
	MEDICAL PRACTITIONERS.	Sweeney. P. J, 207 Ramsgate Rd., Sans Souci. 2219	51682	1975	Premise Match	37m	West
	MEDICAL PRACTITIONERS (M216)	Calderbank, Dorothea., 207 Ramsgate Rd., Sans Souci	326370	1970	Premise Match	37m	West

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
7	DENTISTS (D140)	Cohen, D. J. & Mathews, T. B., 203 Ramsgate Rd., Sans Souci	288467	1970	Premise Match	37m	West
	BEAUTY SALONS &/OR LADIES' HAIRDRESSERS (B260)	Jillian Hairdresser., 207 Ramsgate Rd., Ramsgate	266066	1970	Premise Match	37m	West
	MEDICAL PRACTITIONERS (M216)	Maitland, H. L. C., 207 Ramsgate Rd., Ramsgate	327554	1970	Premise Match	37m	West
	MEDICAL PRACTITIONERS (M216)	Sweeney, P. J., 207 Ramsgate Rd., Sans Souci	328365	1970	Premise Match	37m	West
	DENTISTS	Cohen, D. J. & Mathews, T. B., 203 Ramsgate Rd., Sans Souci	73225	1965	Premise Match	37m	West
	Medical Practitioners	Maitland, H. L. C., 207 Ramsgate Rd., Ramsgate	112133	1965	Premise Match	37m	West
8	CONFECTIONERS-RETAIL	Lillies Corner (J. Lillie), 283 Grand Pde., Ramsgate	28726	1950	Premise Match	46m	South
	MIXED BUSINESSES & GENERAL STORES	Lillies Corner (J. Lillie), 283 Grand Pde., Ramsgate	80410	1950	Premise Match	46m	South
9	Motor Garages & Service Stations	Grand Parade Auto Port, 274 The Grand Pde., Ramsgate 2217	53744	1991	Premise Match	60m	North
	MOTOR GARAGES & SERVICE STATIONS.	Grand Parade Auto Port, 274 The Grand Pde., Ramsgate. 2217	64808	1986	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS. (M6860)	Grand Parade Auto Port, 274 The Grand Pde., Ramsgate. 2217.	56894	1982	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Grand Parade Auto Port, 274 The Grand Pde., Ramsgate. 2217	50187	1978	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS.	Grand Parade Auto Port., 274 The Grand Pde., Ramsgate. 2217	58984	1975	Premise Match	60m	North
	MOTOR GARAGES & ENGINEERS(M6S6)	Grand Parade Auto Port., 274-276 The Grand Pde., RAMSGATE	337924	1970	Premise Match	60m	North
	Motor Service Stations - Petrol, Oil, Etc.	Grand Parade Auto Port, 274-276 The Grand Pde. Ramsgate	126078	1965	Premise Match	60m	North
	MOTOR SERVICE STATIONS—PETROL, OIL, Etc.	Bindley, J., 278 Grand Pde. SANS SOUCI	350373	1961	Premise Match	60m	North
	MOTOR SERVICE STATIONS-PETROL, Etc.	Bindlev, J., 278 Grand Pde., Sans Souci	85796	1950	Premise Match	60m	North
	MILK BARS & CONFECTIONERS	Bindley, J., 278 Grand Pde., Sans Souci	76362	1950	Premise Match	60m	North
10	WELDERS-ELECTRIC &/OR OXY	Morgan, W. J., 160 Ramsgate Rd., Kogarah	112957	1950	Premise Match	60m	North
11	Bakers	Robbies, 14A, Ramsgate Plaza, Ramsgate Rd, Ramsgate 2217	35347	1991	Premise Match	89m	West
	Building Societies	St. George Building Society., 13, Ramsgate Plaza, Ramsgate Rd., Ramsgate 2217	37399	1991	Premise Match	89m	West
	Wallpaper &/or Wallcoverings Merchants	Wallpaper Centre, Ramsgate Plaza Ramsgate Rd Ramsgate 2217	65844	1991	Premise Match	89m	West
	RESTAURANTS.	Beachcomber, Shop 11 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217	81075	1986	Premise Match	89m	West
	CLOTHING-RETAIL-LADIES &/OR GIRLS WEAR.	Casual Aire, Shop 10 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217	16930	1986	Premise Match	89m	West
	DENTISTS.	Foar, A. K., Suite 6, Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217	22587	1986	Premise Match	89m	West
	OPTOMETRISTS &/OR OPTICIANS.	Fortescue, R. J., Shop 8, Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217	70844	1986	Premise Match	89m	West
	GROCERS-RETAIL.	Franklins, Shop 1 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217	40733	1986	Premise Match	89m	West
	HAIRDRESSERS-LADIES &/OR BEAUTY SALONS.	Hairlights Unisex, Shop 9 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217	42319	1986	Premise Match	89m	West
	DRESS FABRIC RETAILERS.	Kays Fashion Fabrics, Shop 2 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217	25044	1986	Premise Match	89m	West

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
11	CLOTHING-RETAIL-LADIES &/OR GIRLS WEAR.	Martha's Boutique, Shop 6 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217	17541	1986	Premise Match	89m	West
	CHIROPRACTORS.	Petinos, A., Suite 11, Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217	15271	1986	Premise Match	89m	West
	VIDEO RECORDER &/OR CASSETTE SALES &/OR HIRE &/OR SERVICE.	Plaza Video, Ramsgate Plaza, Ramsgate Rd. Ramsgate. 2217	97701	1986	Premise Match	89m	West
	BAKERS-BREAD.	Robbies, 14A Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217	5145	1986	Premise Match	89m	West
	FISH MERCHANTS-RETAIL.	Seafood Spot, The, 191 Ramsgate Rd., Ramsgate. 2217	33261	1986	Premise Match	89m	West
	BUILDING SOCIETIES.	St. George Building Society, 13 Ramsgate Plaza, Ramsgate Rd., Ramsgate.2217	8980	1986	Premise Match	89m	West
	TRAVEL AGENCIES &/OR BOOKING OFFICES.	St. George Travel, Shop 7 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217	95597	1986	Premise Match	89m	West
	BUTCHERS-RETAIL.	V. & T. Meats, Shop 4 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217	10763	1986	Premise Match	89m	West
	WALLPAPER MERCHANTS.	Wallpaper Centre, Ramsgate Plaza, Ramsgate Rd. Ramsgate. 2217	98171	1986	Premise Match	89m	West
	MEDICAL PRACTITIONERS.	Yenson, N., Suite 10, Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217	58384	1986	Premise Match	89m	West
	RESTAURANTS. (R5180)	Beachcomber, Shop 11 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	70449	1982	Premise Match	89m	West
	JEWELLERS &/OR WATCHMAKERS RETAIL. (J0550)	Eisenberg, G., Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	43529	1982	Premise Match	89m	West
	DENTISTS. (D1800)	Foar, A. K., Suite 6, Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	20228	1982	Premise Match	89m	West
	OPTOMETRISTS &/OR OPTICIANS.(O3600)	Fortescue, Shop 8, Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	61823	1982	Premise Match	89m	West
	GROCERS - RETAIL. (G7850)	Franklins, Shop 1 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	37630	1982	Premise Match	89m	West
	GIFT SHOPS. (G3350)	Kitchen World, Shop 14, Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	36368	1982	Premise Match	89m	West
	BUTCHERS - RETAIL. (B8040)	La Bourcherie, Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	11104	1982	Premise Match	89m	West
	DRESS SHOPS & ACCESSORIES.(D7450)	Martha's Boutique, Shop 6 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	23150	1982	Premise Match	89m	West
	BEAUTY SALONS &/OR LADIES HAIRDRESSERS. (B2000)	Nancy's Place, Shop 9 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	6247	1982	Premise Match	89m	West
	CHIROPRACTORS. (C4365)	Petinos, A., Suite 11, Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	16105	1982	Premise Match	89m	West
	FISH MERCHANTS - RETAIL (F2825)	Seafood Spot, The, 191 Ramsgate Rd., Ramsgate. 2217.	31047	1982	Premise Match	89m	West
	BUTCHERS - RETAIL. (B8040)	V. & T Meats, Shop 8 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	11748	1982	Premise Match	89m	West
	WALLPAPER MERCHANTS. (W0600)	Wallpaper Centre, Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	83719	1982	Premise Match	89m	West
	MEDICAL PRACTITIONERS. (M2020)	Yenson, N., Suite 10, Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	50922	1982	Premise Match	89m	West
	MIXED BUSINESSES (M408)	Schneider, N. Mrs., 197 Ramsgate Rd., Sans Souci	333786	1970	Premise Match	89m	West
	Drapers - Retail	Ramsgate Beach Store (The), 193 Ramsgate Rd., Ramsgate	75258	1965	Premise Match	89m	West
	DENTISTS	Cohen, Donald L., 191 Ramsgate Rd., Ramsgate	295789	1961	Premise Match	89m	West

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
11	DRAPERS-RETAIL	Ramsgate Beach Store (The), 193 Ramsgate Rd., Ramsgate	298094	1961	Premise Match	89m	West
	RADIO &/OR TELEVISION SALES & SERVICEMEN	Ramsgate Beach Television & Radio, 193 Ramsgate Rd. RAMSGATE	364438	1961	Premise Match	89m	West
12	Medical Practitioners	Goodman, Ben, 150 Ramsgate Rd., Ramsgate	111491	1965	Premise Match	109m	North West
	MEDICAL PRACTITIONERS	Goodman, Ben, 150 Ramsgate Rd., Ramsgate	335241	1961	Premise Match	109m	North West
13	SQUASH COURTS (S475)	Ramsgate Beach Squash Court, 288 Grand Pde., Ramsgate	363967	1970	Premise Match	113m	South
	SQUASH COURTS	Ramsgate Beach Squash Court, 288 Grand Pde., Ramsgate	146938	1965	Premise Match	113m	South
	SQUASH COURTS	Ramsgate Beach Squash Court, 288 Grand Pde., Ramsgate	252563	1961	Premise Match	113m	South
14	MILK BARS & CONFECTIONERS	Doherty, L. M., 272 Grand Pde., Ramsgate	76616	1950	Premise Match	120m	North
15	MILK, FRUIT JUICE BARS &/OR CONFECTIONERS.	Doherty, B. G., 289 Grand Parade., Ramsgate. 2217	53368	1975	Premise Match	127m	South
	MILK, FRUIT JUICE BARS/CONFECTIONERS	Doherty, B. G., 289 Grand Pde., Ramsgate	330562	1970	Premise Match	127m	South
	Milk, Fruit Juice Bars/Confectioners	Doherty, L. M., 289 Grand Pde., Ramsgate	115005	1965	Premise Match	127m	South
	Camping Grounds & Caravan Parks	Ramsgate Beach Caravan Park Pty. Ltd., 289 The Grand Pde., Ramsgate	61773	1965	Premise Match	127m	South
	MILK, FRUIT JUICE BARS/CONFECTIONERS	Doherty, L. M., 289 Grand Pde., Ramsgate	339036	1961	Premise Match	127m	South
	CAMPING GROUNDS & CARAVAN PARKS	Ramsgate Beach Caravan Park Pty. Ltd., 289 Grand Pde., Ramsgate	283492	1961	Premise Match	127m	South
16	Mixed Businesses	Carter & Button, 93 Alfred St., Ramsgate	116867	1965	Premise Match	150m	North West
	MIXED BUSINESS	Carter & Button, 93 Alfred St., Ramsgate	340481	1961	Premise Match	150m	North West

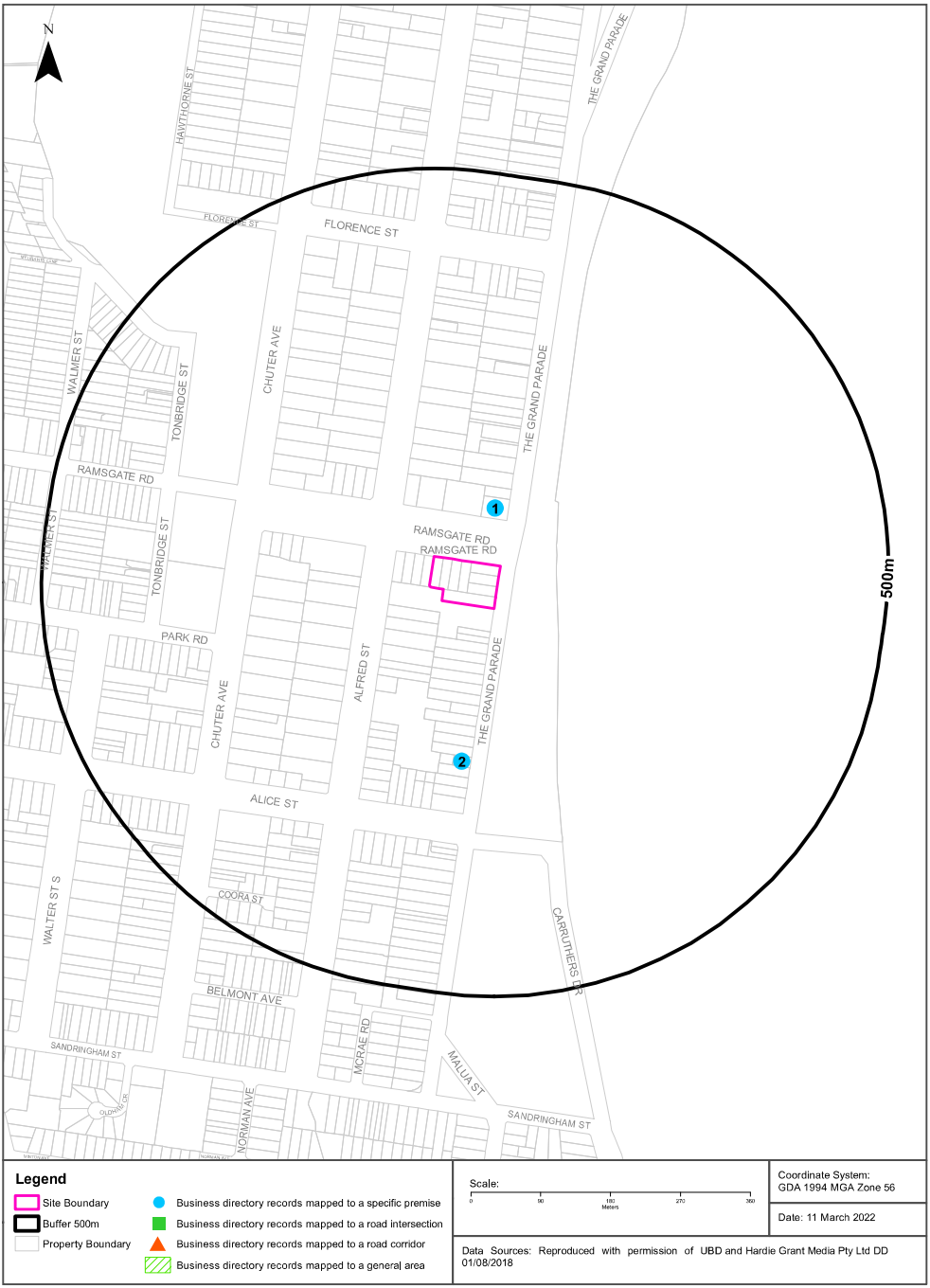
Business Directory Records 1950-1991
Road or Area Matches

Universal Business Directory records from years 1991, 1986, 1982, 1978, 1975, 1970, 1965, 1961 & 1950, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
17	DRESS SHOPS & ACCESSORIES.(D7450)	Casual Aire, Shop 10 Ramsgate Plaza, Ramsgate Rd., Ramsgate. 2217.	22600	1982	Road Match	0m
	FRUITERERS &/OR GREENGROCERS.	Fruft & Vegetable Market & Delicatessen, Ramsgate Rd., Ramsgate. 2217	35240	1975	Road Match	0m
	DELICATESSENS	Fruit & Vegetable Market & Delicatessen, Ramsgate Rd., Ramsgate. 2217	20159	1975	Road Match	0m
	CLUBS & SPORTING BODIES (C487)	Ramsgate R. S. L Memorial Club., Ramsgate Rd., Sans Souci	284583	1970	Road Match	0m
	Clubs & Sporting Bodies	Ramsgate R.S.L., Ramsgate Rd., Ramsgate	69241	1965	Road Match	0m
	CLUBS & SPORTS BODIES	Ramsgate R.S.L., Ramsgate Rd., Ramsgate	291743	1961	Road Match	0m

Dry Cleaners, Motor Garages & Service Stations

277 The Grand Parade, Ramsgate, NSW 2217



Legend

- Site Boundary
- Buffer 500m
- Property Boundary
- Business directory records mapped to a specific premise
- Business directory records mapped to a road intersection
- Business directory records mapped to a road corridor
- Business directory records mapped to a general area

Scale: 0 90 180 270 360 Meters

Coordinate System: GDA 1994 MGA Zone 56

Date: 11 March 2022

Data Sources: Reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018

Historical Business Directories

277 The Grand Parade, Ramsgate, NSW 2217

Dry Cleaners, Motor Garages & Service Stations 1948-1993 Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	MOTOR GARAGES & SERVICE STATIONS.	Grand Parade Auto Port, 274 The Grand Pde., Ramsgate. 2217	18989	1993	Premise Match	60m	North
	Motor Garages & Service Stations	Grand Parade Auto Port, 274 The Grand Pde., Ramsgate 2217	53744	1991	Premise Match	60m	North
	MOTOR GARAGES & SERVICE STATIONS.	Grand Parade Auto Port, 274 The Grand Pde., Ramsgate. 2217	11658	1990	Premise Match	60m	North
	MOTOR GARAGE & SERVICE STATIONS.	Grand Parade Auto Port, 274 The Grand Pde, Ramsgate. 2217	65139	1989	Premise Match	60m	North
	MOTOR GARAGES & SERVICE STATIONS.	Grand Parade Auto Port, 274 The Grand Pde., Ramsgate. 2217	59378	1988	Premise Match	60m	North
	MOTOR GARAGES & SERVICE STATIONS.	Grand Parade Auto Port, 274 The Grand Pde., Ramsgate. 2217	64808	1986	Premise Match	60m	North
	MOTOR GARAGES & SERVICE STATIONS.	Grand Parade Auto Port, 274 The Grand Pde., Ramsgate. 2217	44904	1985	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Grand Parade Auto Port, 274 The Grand Pde., Ramsgate. 2217	28407	1984	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Grand Parade Auto Port., 274 The Grand Pde., Ramsgate. 2217	14830	1983	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS. (M6860)	Grand Parade Auto Port, 274 The Grand Pde., Ramsgate. 2217.	56894	1982	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Grand Parade Auto Port., 274 The Grand Pde., Ramsgate 2217	3454	1981	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Grand Parade Auto Port., 274 The Grand Pde., Ramsgate. 2217	58185	1980	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Grand Parade Auto Port., 274 The Grand Pde., Ramsgate. 2217.	41647	1979	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Grand Parade Auto Port, 274 The Grand Pde., Ramsgate. 2217	50187	1978	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Grand Parade Auto Port., 274 The Grand Pde., Ramsgate 2217	30185	1976	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS.	Grand Parade Auto Port., 274 The Grand Pde., Ramsgate. 2217	58984	1975	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS.	Grand Parade Auto Port., 274-276 The Grand Pde Ramsgate	12906	1972	Premise Match	60m	North
	MOTOR GARAGES &/OR ENGINEERS.	Grand Parade Auto Port., 274-276 The Grand Pde Ramsgate	62566	1971	Premise Match	60m	North

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	MOTOR GARAGES & ENGINEERS(M6S6)	Grand Parade Auto Port., 274-276 The Grand Pde., RAMSGATE	337924	1970	Premise Match	60m	North
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Grand Parade Auto Port., 274-276 The Grand Pde Ramsgate	50663	1969	Premise Match	60m	North
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Grand Parade Auto Port., 274-276 The Grand Pde Ramsgate	36750	1968	Premise Match	60m	North
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Grand Parade Auto Port., 274-276 The Grand Pde Ramsgate	16153	1967	Premise Match	60m	North
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Grand Parade Auto Port., 274-276 The Grand Pde Ramsgate	1727	1966	Premise Match	60m	North
	Motor Service Stations - Petrol, Oil, Etc.	Grand Parade Auto Port, 274-276 The Grand Pde. Ramsgate	126078	1965	Premise Match	60m	North
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Grand Parade Auto Port., 274-276 The Grand Pde Ramsgate	52333	1964	Premise Match	60m	North
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Bindley J., 278 Grand Pde Sans Souci	38701	1962	Premise Match	60m	North
	MOTOR SERVICE STATIONS—PETROL, OIL, Etc.	Bindley, J., 278 Grand Pde. SANS SOUCI	350373	1961	Premise Match	60m	North
	MOTOR SERVICE STATIONS-PETROL,. OIL, ETC.	Bindley J., 278 Grand Pde Sans Souci	24569	1959	Premise Match	60m	North
	MOTOR SERVICE STATIONS-PETROL, ETC.	Bindley J., 278 Grand Pde Sans Souci	9402	1958	Premise Match	60m	North
	MOTOR SERVICE STATIONS-PETROL, ETC.	Bindley J., 278 Grand Pde., Sans Souci	61802	1956	Premise Match	60m	North
	MOTOR SERVICE STATIONS-PETROL, ETC.	Bindlev J., 278 Grand Pde., Sans Souci	54397	1954	Premise Match	60m	North
	MOTOR SERVICE STATIONS–PETROL, ETC.	Bindlev J., 278 Grand Pde Sans Souci	44012	1953	Premise Match	60m	North
	MOTOR SERVICE STATIONS–PETROL, ETC.	Bindlev J., 278 Grand Pde Sans Souci	35779	1952	Premise Match	60m	North
	MOTOR SERVICE STATIONS-PETROL, Etc.	Bindlev, J., 278 Grand Pde., Sans Souci	85796	1950	Premise Match	60m	North
2	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	BP Ramsgate Beach Service Station., 295 The Grand Pde., Ramsgate. 2217	63966	1981	Premise Match	194m	South
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	BP Ramsgate Beach Service Station., 295 The Grand Pde., Ramsgate. 2217	51468	1980	Premise Match	194m	South
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	BP Ramsgate Beach Service Station., 295 The Grand Pde., Ramsgate 2217.	41065	1979	Premise Match	194m	South
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	BP Ramsgate Beach Service Station, 295 The Grand Pde., Ramsgate. 2217	49603	1978	Premise Match	194m	South
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	BP Ramsgate Beach Service Station., 295 The Grand Pde., Ramsgate 2217	25317	1976	Premise Match	194m	South
	MOTOR GARAGES &/OR ENGINEERS.	BP Ramsgate Beach Service Station., 295 The Grand Pde., Ramsgate. 2217	58549	1975	Premise Match	194m	South
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	BP Service Station., 294 Grand Pde Ramsgate	18075	1972	Premise Match	194m	South

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
2	MOTOR GARAGES &/OR ENGINEERS.	BP Ramsgate Beach Service Station., 295 The Grand Pde Ramsgate	62564	1971	Premise Match	194m	South
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	BP Service Station., 294 Grand Pde Ramsgate	2514	1971	Premise Match	194m	South
	MOTOR GARAGES & ENGINEERS(M6S6)	BP Ramsgate Beach Service Station., 295 The Grand Pde., RAMSGATE	337398	1970	Premise Match	194m	South
	MOTOR SERVICE STATIONS-PETROL,OIL,Etc.	BP Service Station., 294 Grand Pde., RAMSGATE	340890	1970	Premise Match	194m	South
	MOTOR GARAGES & ENGINEERS.	BP Ramsgate Beach Service Station., 295 The Grand Pde Ramsgate	46999	1969	Premise Match	194m	South
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	BP Service Station., 294 Grand Pde Ramsgate	50660	1969	Premise Match	194m	South
	MOTOR GARAGES & ENGINEERS	BP Ramsgate Beach Service Station., 295 The Grand Pde Ramsgate	26390	1968	Premise Match	194m	South
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	BP Service Station., 294 Grand Pde Ramsgate	36747	1968	Premise Match	194m	South
	MOTOR GARAGES & ENGINEERS.	BP Ramsgate Beach Service Station., 295 The Grand Pde Ramsgate	10882	1967	Premise Match	194m	South
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	BP Service Station., 294 Grand Pde Ramsgate	16150	1967	Premise Match	194m	South
	MOTOR GARAGES & ENGINEERS.	BP Ramsgate Beach Service Station., 295 The Grand Pde Ramsgate	60615	1966	Premise Match	194m	South
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	BP Service Station., 294 Grand Pde Ramsgate	1724	1966	Premise Match	194m	South
	Motor Garages & Engineers	BP Ramsgate Beach Service Station, 295 The Grand Pde Ramsgate	123252	1965	Premise Match	194m	South
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Joe's Grand Parade Service Station., 294 Grand Pde Ramsgate	38599	1962	Premise Match	194m	South
	MOTOR SERVICE STATIONS—PETROL, OIL, Etc.	Joe's Grand Parade Service Station, 294 Grand Pde., RAMSGATE	350733	1961	Premise Match	194m	South
	MOTOR SERVICE STATIONS-PETROL,. OIL, ETC.	Joe's Service Station., 295 Grand Pde Ramsgate	24493	1959	Premise Match	194m	South
	MOTOR SERVICE STATIONS-PETROL, ETC.	Joe's Service Station., 295 Grand Pde Ramsgate	9610	1958	Premise Match	194m	South
	MOTOR SERVICE STATIONS-PETROL, ETC.	Joe's Service Station., 295 Grand Pde Ramsgate	61968	1956	Premise Match	194m	South
	MOTOR SERVICE STATIONS-PETROL, ETC.	Joe's Service Station., 295 Grand Pde Ramsgate	54525	1954	Premise Match	194m	South

Dry Cleaners, Motor Garages & Service Stations 1948-1993 Road or Area Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer					

Aerial Imagery 2022

277 The Grand Parade, Ramsgate, NSW 2217

Aerial Imagery 2016

277 The Grand Parade, Ramsgate, NSW 2217

Aerial Imagery 2011

277 The Grand Parade, Ramsgate, NSW 2217

Aerial Imagery 2005

277 The Grand Parade, Ramsgate, NSW 2217

Aerial Imagery 2000

277 The Grand Parade, Ramsgate, NSW 2217

Aerial Imagery 1994

277 The Grand Parade, Ramsgate, NSW 2217

Aerial Imagery 1991

277 The Grand Parade, Ramsgate, NSW 2217

Aerial Imagery 1986

277 The Grand Parade, Ramsgate, NSW 2217

Aerial Imagery 1982

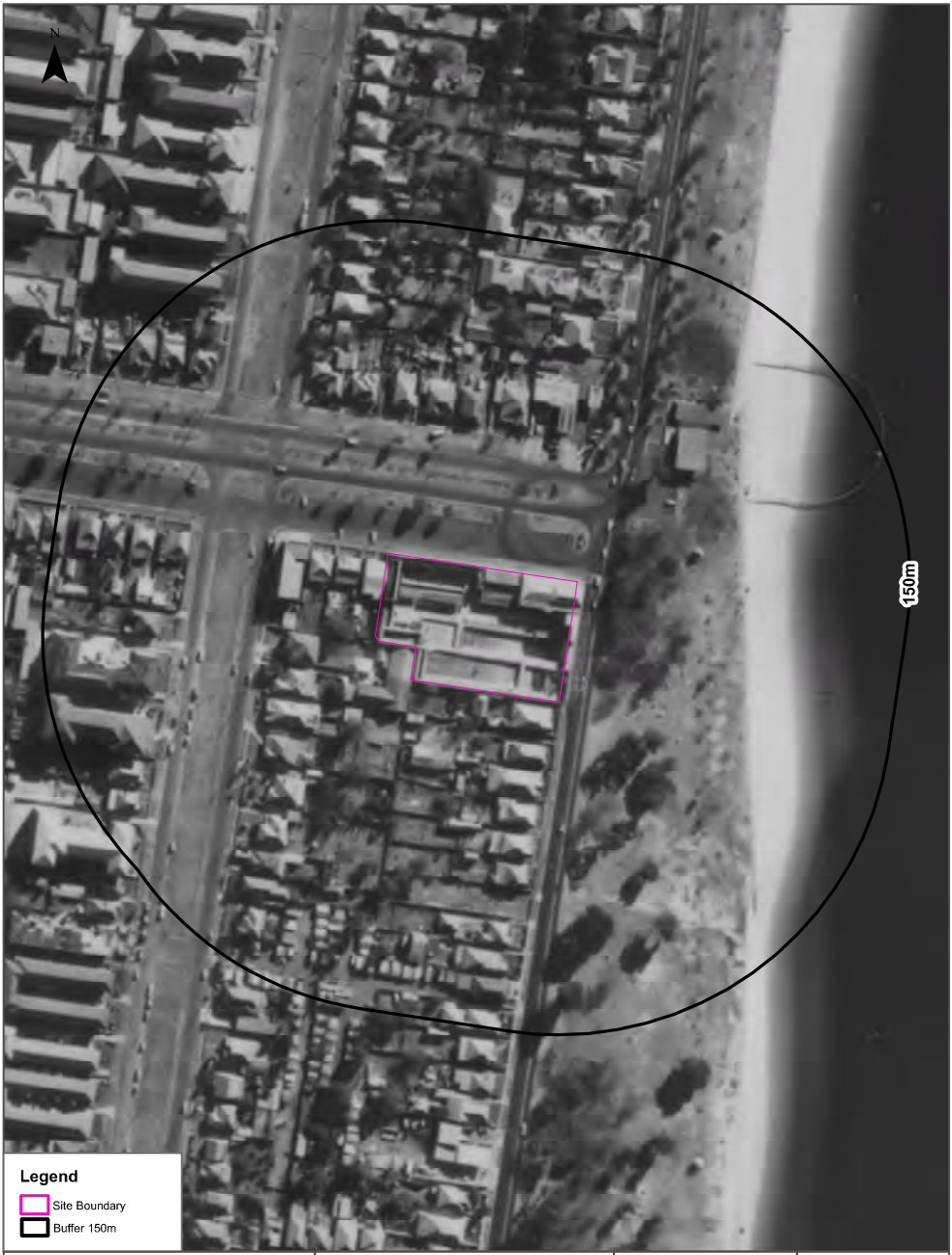
277 The Grand Parade, Ramsgate, NSW 2217

Aerial Imagery 1978

277 The Grand Parade, Ramsgate, NSW 2217

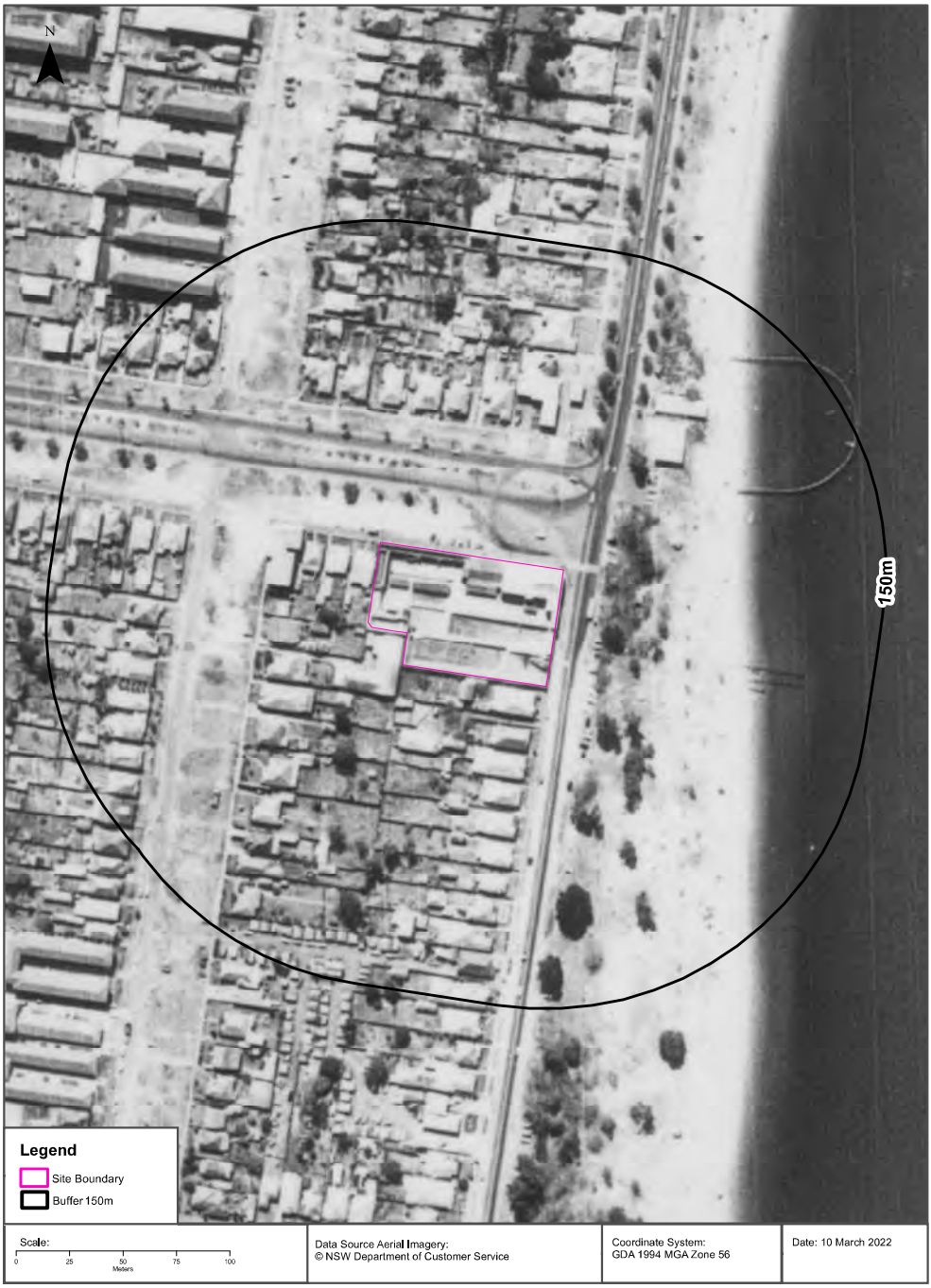
Aerial Imagery 1970

277 The Grand Parade, Ramsgate, NSW 2217



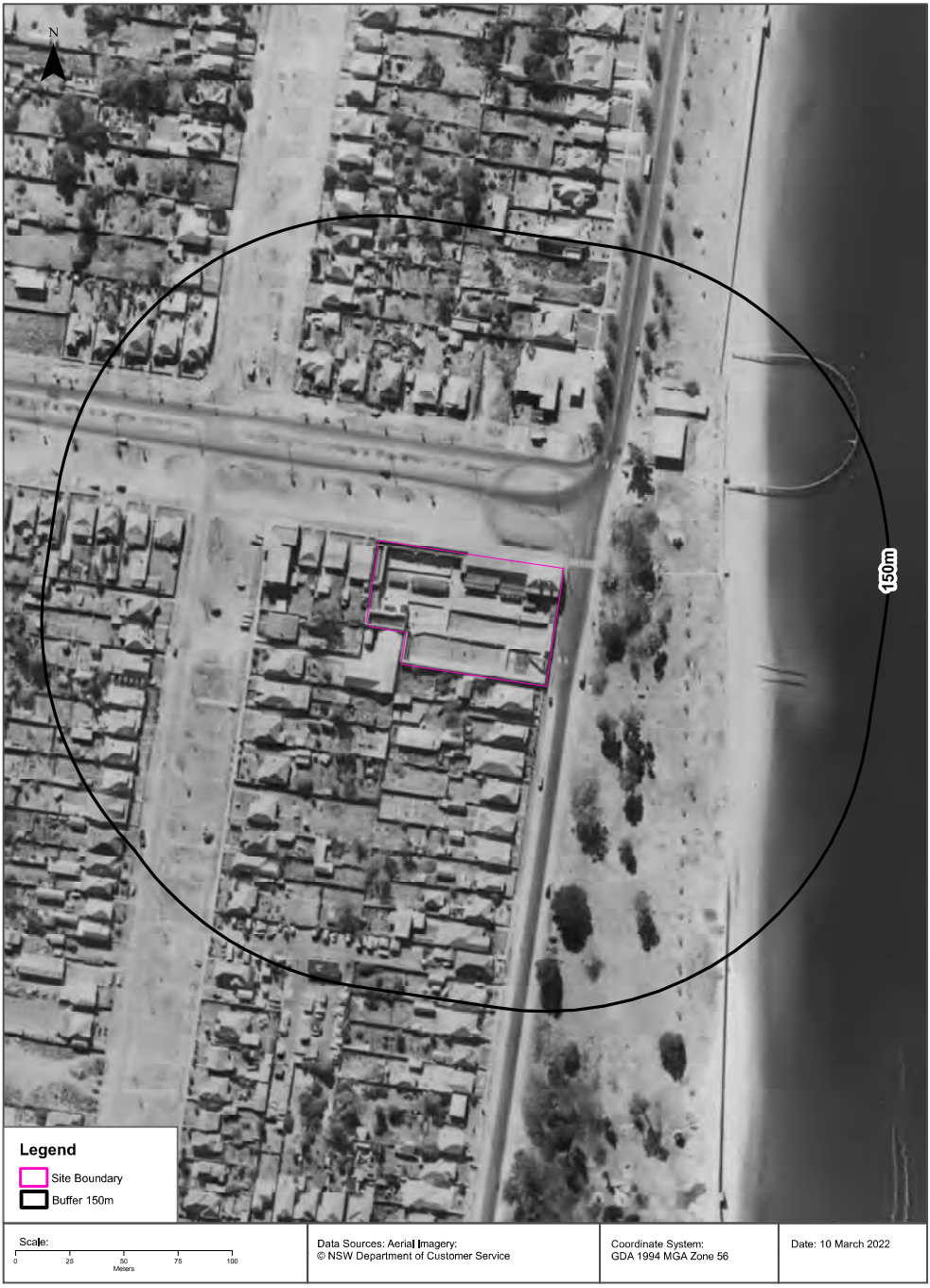
Aerial Imagery 1965

277 The Grand Parade, Ramsgate, NSW 2217



Aerial Imagery 1961

277 The Grand Parade, Ramsgate, NSW 2217

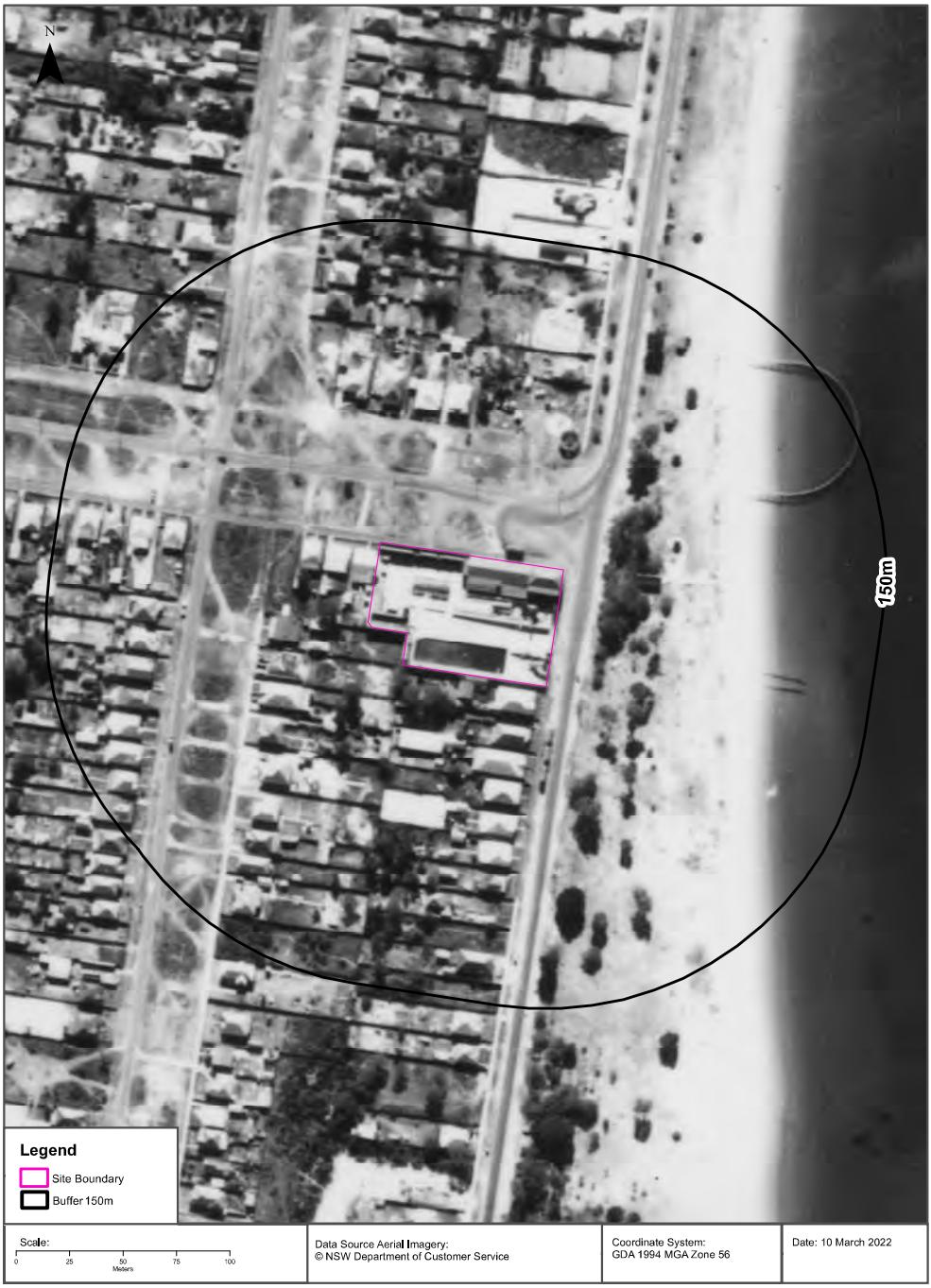


Aerial Imagery 1955, 1956

277 The Grand Parade, Ramsgate, NSW 2217

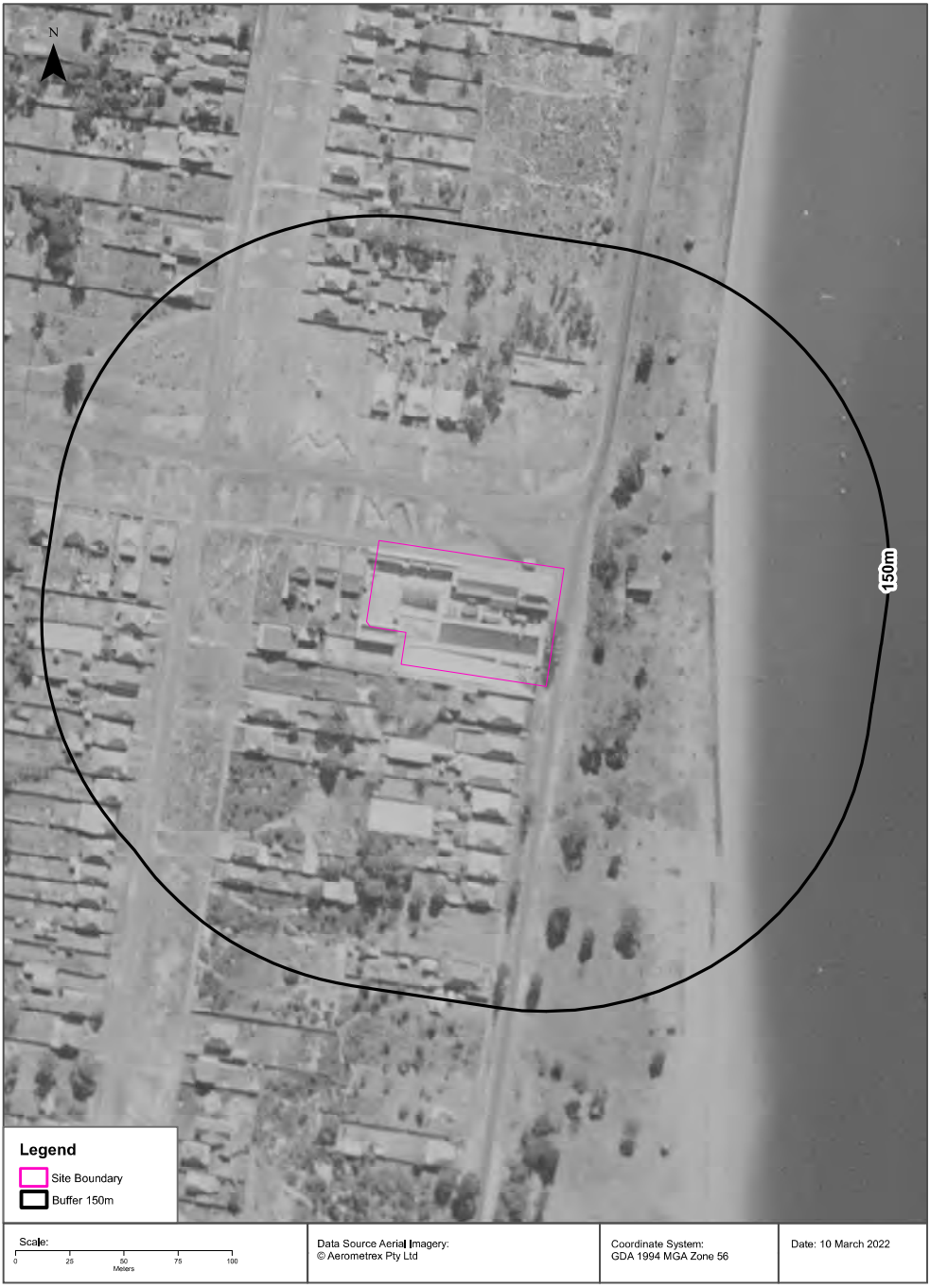
Aerial Imagery 1951

277 The Grand Parade, Ramsgate, NSW 2217



Aerial Imagery 1943

277 The Grand Parade, Ramsgate, NSW 2217

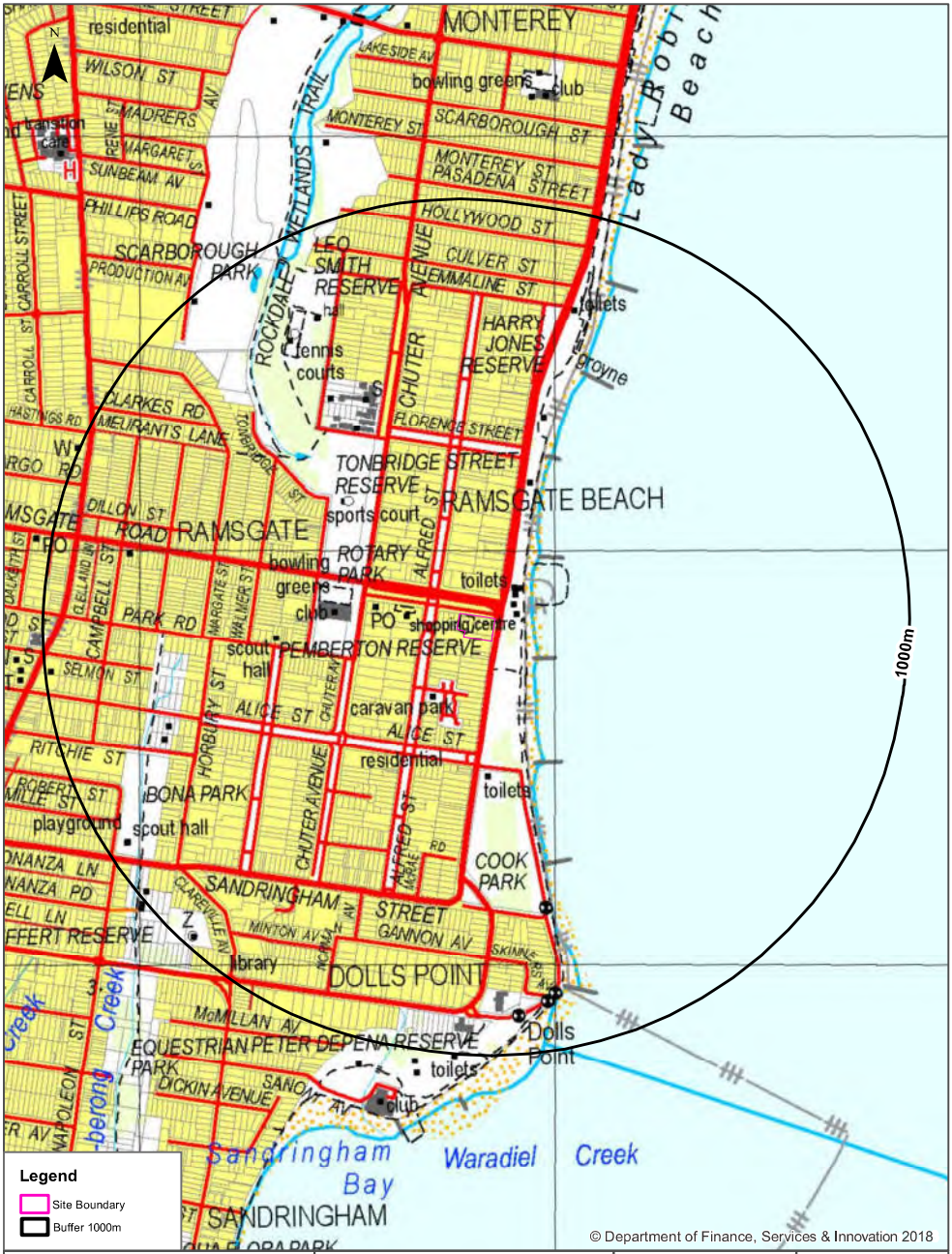


Aerial Imagery 1930

277 The Grand Parade, Ramsgate, NSW 2217

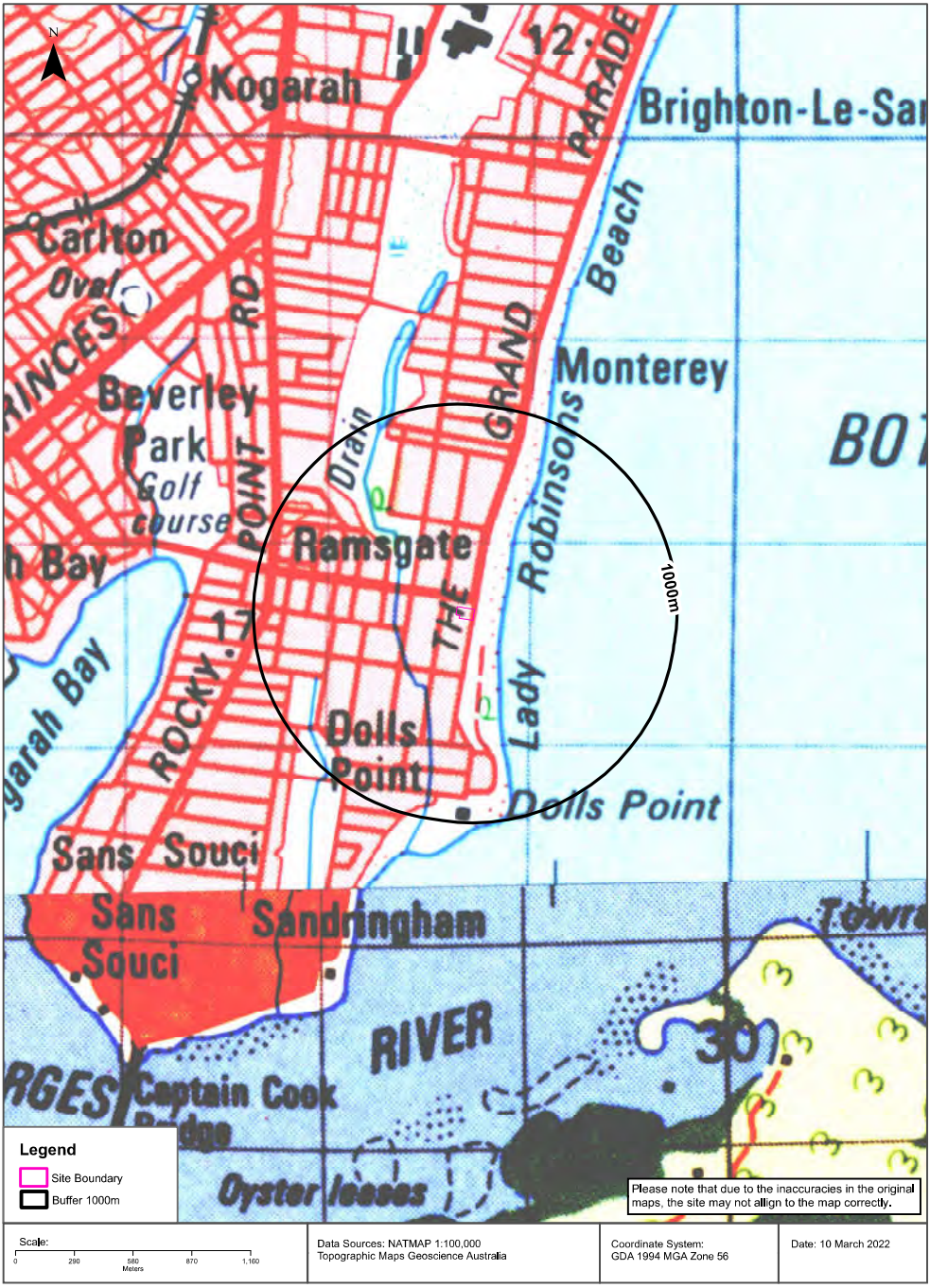
Topographic Map 2015

277 The Grand Parade, Ramsgate, NSW 2217



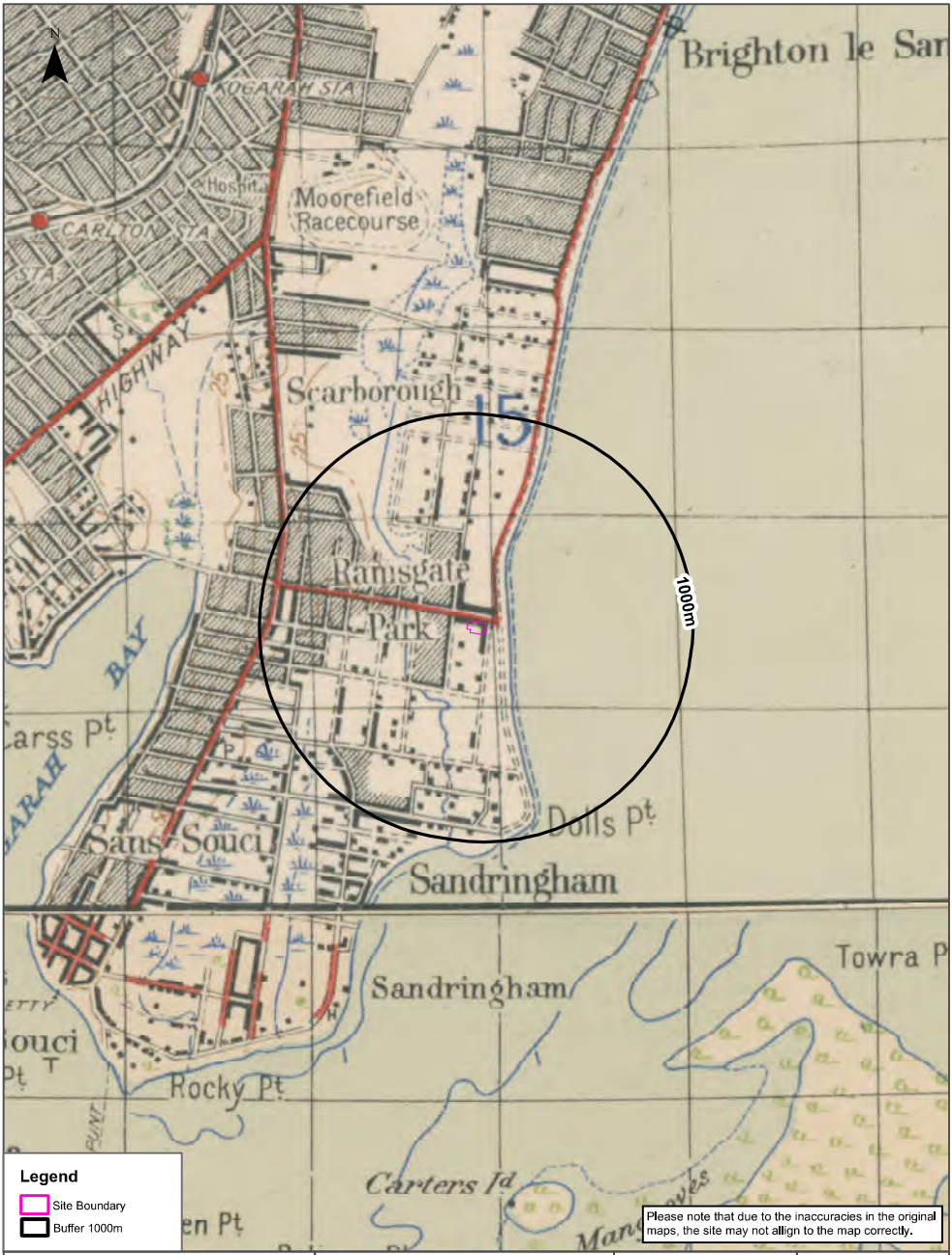
Historical Map 1975 - 1976

277 The Grand Parade, Ramsgate, NSW 2217



Historical Map 1935 - 1936

277 The Grand Parade, Ramsgate, NSW 2217



Scale: 0 290 580 870 1,160 Meters

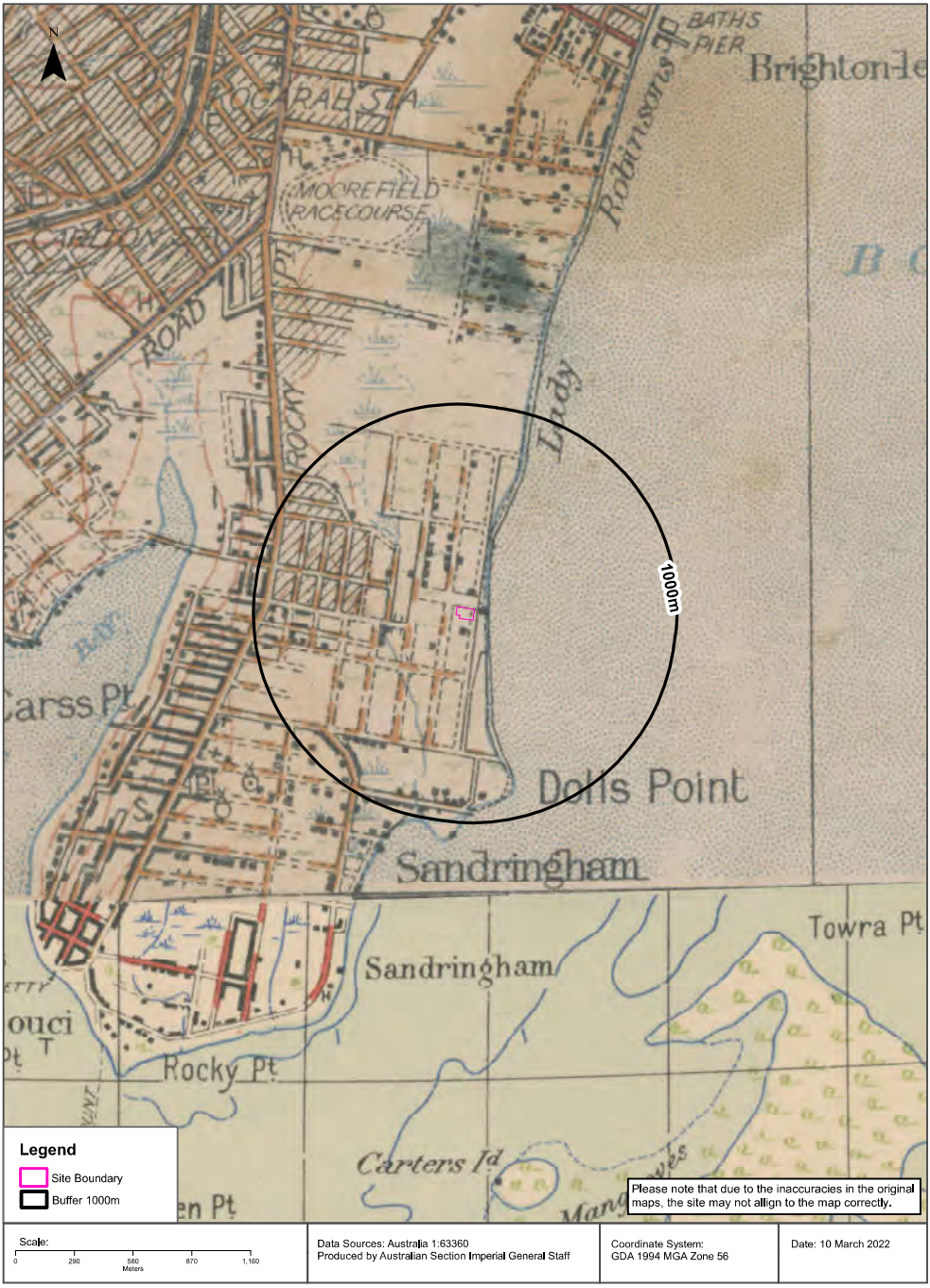
Data Sources: Australia 1:63360
Produced by Australian Section Imperial General Staff

Coordinate System:
GDA 1994 MGA Zone 56

Date: 10 March 2022

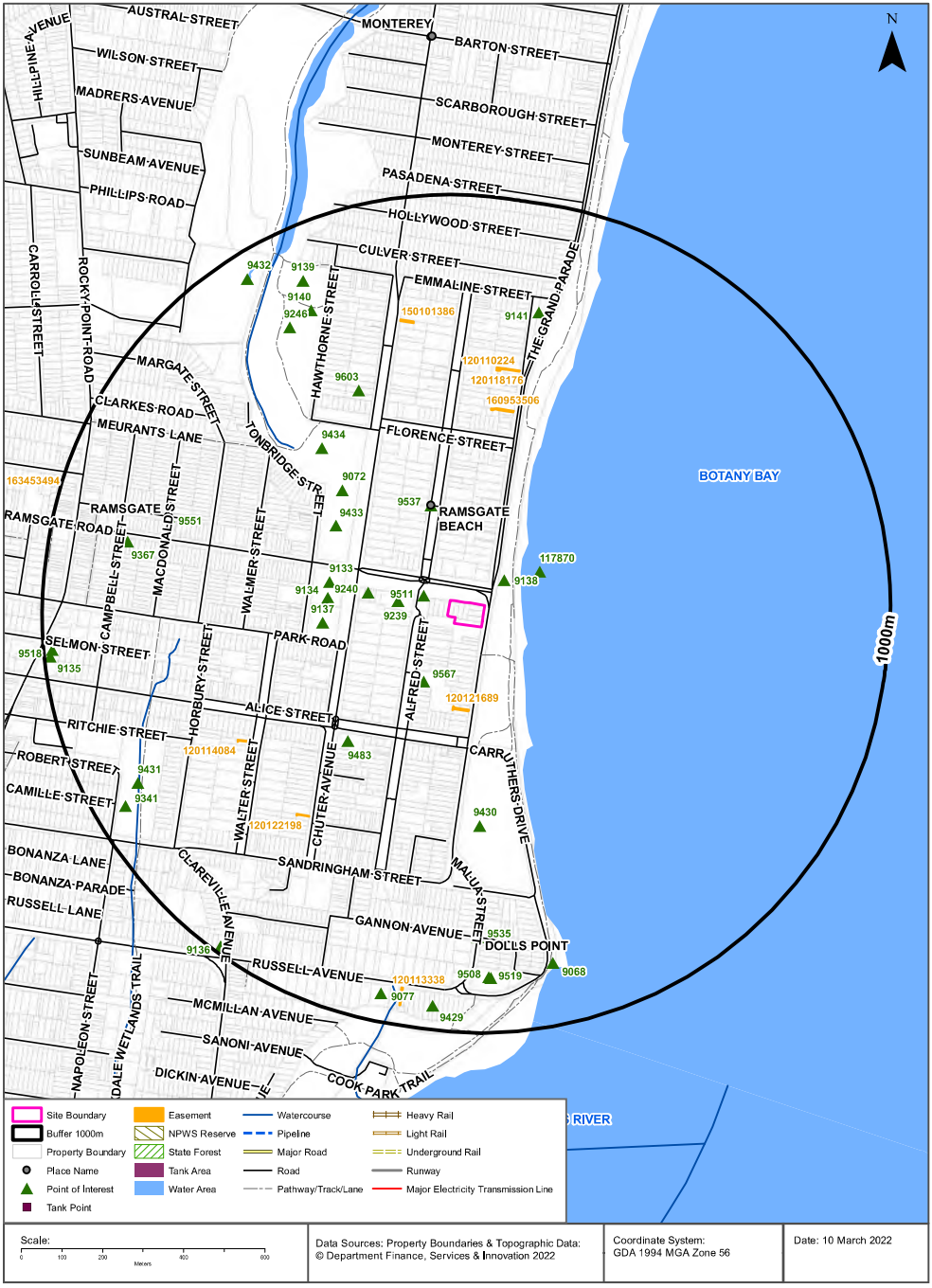
Historical Map 1917 - 1935

277 The Grand Parade, Ramsgate, NSW 2217



Topographic Features

277 The Grand Parade, Ramsgate, NSW 2217



Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2022

Coordinate System: GDA 1994 MGA Zone 56

Date: 10 March 2022

Topographic Features

277 The Grand Parade, Ramsgate, NSW 2217

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
9511	Park	BILL BATLEY SQUARE	66m	North West
9138	Community Facility	RAMSGATE SLSC	78m	North East
9239	Shopping Centre	RAMSGATE PLAZA	126m	West
117870	Swimming Pool	Swimming Pool	159m	North East
9567	Tourist Park / Home Village	THE GRAND PINES TOURIST PARK	162m	South West
9240	Post Office	RAMSGATE BEACH POST OFFICE	203m	West
9537	Suburb	RAMSGATE BEACH	238m	North
9134	Club	RAMSGATE RSL MEMORIAL CLUB	298m	West
9133	Sports Field	BOWLING GREENS	301m	West
9137	Park	PEMBERTON RESERVE	309m	West
9433	Park	ROTARY PARK	336m	North West
9072	Sports Court	Sports Court	379m	North West
9483	Community Home	THOMAS HOLT SANS SOUCI GARDENS	391m	South West
9430	Park	COOK PARK	490m	South
9434	Park	TONBRIDGE STREET RESERVE	491m	North West
9603	Primary School	RAMSGATE PUBLIC SCHOOL	564m	North West
9551	Suburb	RAMSGATE	724m	West
9141	Park	HARRY JONES RESERVE	735m	North
9535	Suburb	DOLLS POINT	764m	South
9246	Sports Court	TENNIS COURTS	780m	North West
9140	Community Facility	SYD FROST MEMORIAL HALL	792m	North West
9367	Community Facility	LITERARY INSTITUTE	808m	West
9068	Headland	DOLLS POINT	847m	South
9519	Community Medical Centre	PRIMROSE HOUSE DOLLS POINT	863m	South
9508	Primary School	THE SCOTS COLLEGE BRIGHTON PREPARATORY SCHOOL	864m	South
9139	Park	LEO SMITH RESERVE	867m	North West
9431	Park	BONA PARK	868m	South West
9341	Park	PLAYGROUND	923m	South West
9077	Retirement Village	KENT HOUSE AND PRINCESS ALEXANDRA HOUSE	931m	South
9432	Park	SCARBOROUGH PARK	936m	North West
9429	Park	PETER DEPENA RESERVE	941m	South

Map Id	Feature Type	Label	Distance	Direction
9518	Community Medical Centre	RAMSGATE EARLY CHILDHOOD CENTRE	979m	West
9136	Library	SANS SOUCI LIBRARY	984m	South West
9135	Community Facility	RAMSGATE SENIOR CITIZENS CENTRE	985m	West

Topographic Features

277 The Grand Parade, Ramsgate, NSW 2217

Tanks (Areas)

What are the Tank Areas located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
N/A	No records in buffer					

Tanks (Points)

What are the Tank Points located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
N/A	No records in buffer					

Major Easements

What Major Easements exist within the dataset buffer?
Note. Easements provided by LPI are not at the detail of local governments. They are limited to major easements such as Right of Carriageway, Electrical Lines (66kVa etc.), Easement to drain water & Significant subterranean pipelines (gas, water etc.).

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
120121689	Primary	Undefined		202m	South
160953506	Primary	Right of way		478m	North
120118176	Primary	Undefined		577m	North
120114084	Primary	Undefined		581m	South West
120110224	Primary	Undefined		582m	North
120122198	Primary	Undefined		594m	South West
150101386	Primary	Right of way		689m	North
120113338	Primary	Undefined		908m	South
163453494	Primary	Right of way	5m	998m	West

Topographic Features

277 The Grand Parade, Ramsgate, NSW 2217

State Forest

What State Forest exist within the dataset buffer?

State Forest Number	State Forest Name	Distance	Direction
N/A	No records in buffer		

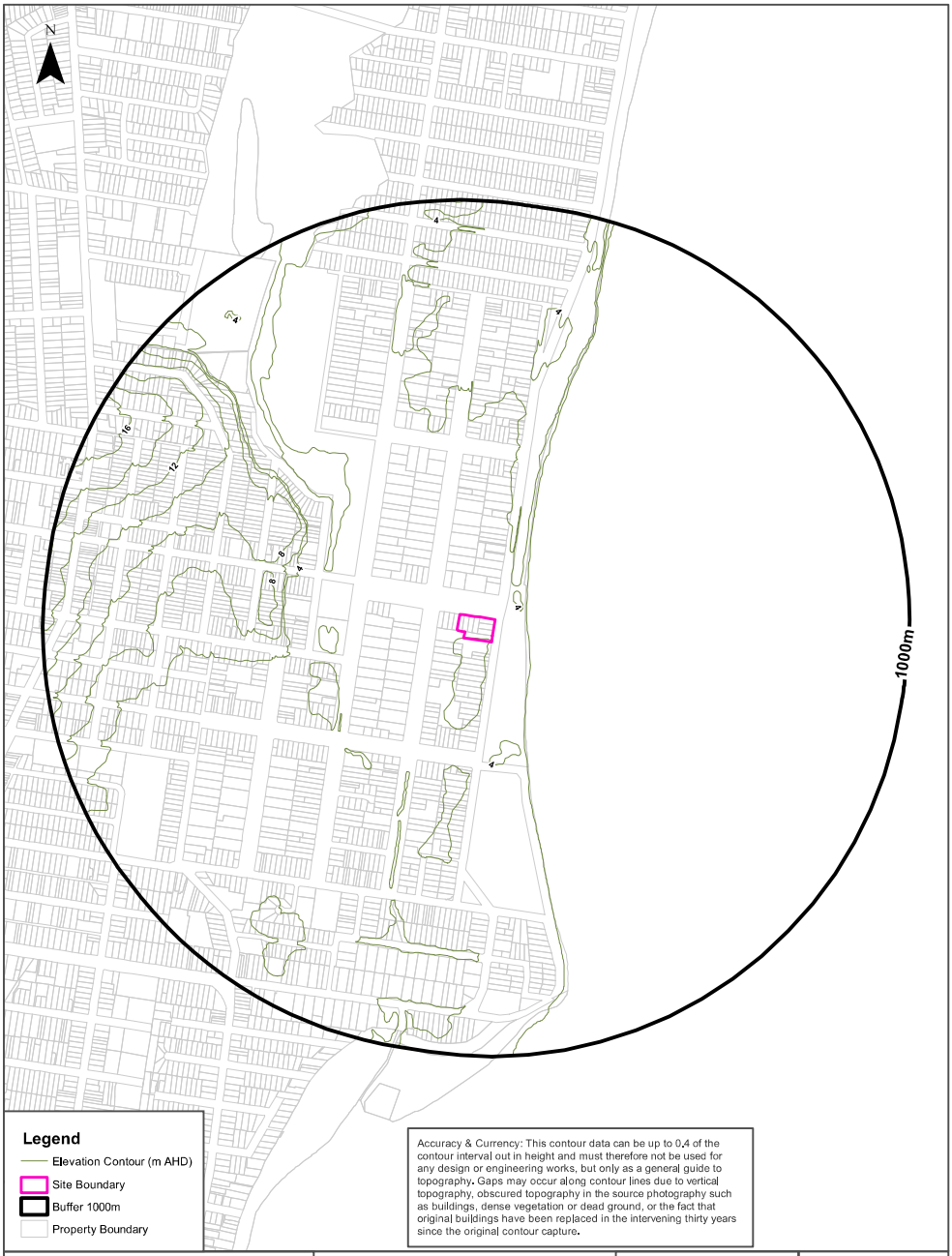
National Parks and Wildlife Service Reserves

What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N/A	No records in buffer				

Elevation Contours (m AHD)

277 The Grand Parade, Ramsgate, NSW 2217



Hydrogeology & Groundwater

277 The Grand Parade, Ramsgate, NSW 2217

Hydrogeology

Description of aquifers within the dataset buffer:

Description	Distance	Direction
Porous, extensive aquifers of low to moderate productivity	0m	On-site

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018

Temporary water restrictions relating to the Botany Sands aquifer within the dataset buffer:

Prohibition Area No.	Prohibition	Distance	Direction
N/A	No records in buffer		

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018 Data Source : NSW Department of Primary Industries

Groundwater Boreholes

277 The Grand Parade, Ramsgate, NSW 2217

Hydrogeology & Groundwater

277 The Grand Parade, Ramsgate, NSW 2217

Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW017 349	10BL008 507, 10WA11 2794	Spear	Private	Domestic	General Use			7.60	7.60					0m	On-site
GW106 324	10BL163 440, 10WA11 3580	Spear	Private	Domestic	Domestic		16/07/2004	5.00	5.00	Good		0.500		5m	South West
GW028 205	10BL020 778, 10WA11 4765	Spear	Local Govt	Recreation (groundwater)	Irrigation		01/04/1966	6.00	6.10	Good				23m	North West
GW109 160	10BL163 601, 10WA11 3628	Spear	Private	Domestic	Domestic		05/08/2008	5.49			5.49	1.000		26m	South West
GW033 181	10BL025 998, 10WA11 3001	Spear	Private	Domestic	General Use		01/12/1970	5.40						29m	West
GW111 186	10BL602 071	Bore	Private	Monitoring Bore	Monitoring Bore		18/04/2007	6.00	6.00					29m	East
GW106 419	10BL163 584, 10WA11 3619	Spear	Private	Domestic	Domestic		07/08/2004	4.00	4.00	Good	2.00	0.500		39m	South West
GW106 113	10BL162 845, 10WA11 3496	Spear	Private	Domestic	Domestic		30/03/2004	5.18	5.19		1.83	1.000		44m	South West
GW111 185	10BL602 071	Bore	Private	Monitoring Bore	Monitoring Bore		18/04/2007	6.00	6.00					48m	North East
GW017 480	10BL008 917, 10WA11 2799	(Unknown)	Private	Domestic	General Use			7.60	7.60					52m	South
GW111 187	10BL602 071	Bore	Private	Monitoring Bore	Monitoring Bore		30/04/2007	5.30	6.00					52m	North East
GW111 184	10BL602 071	Bore	Private	Monitoring Bore	Monitoring Bore		18/04/2007	6.00	6.00					78m	North East
GW028 207	10BL020 776, 10WA11 4757	Bore	Local Govt	Recreation (groundwater)	Irrigation		01/01/1966	18.20	18.30	Poor				79m	North East
GW106 238	10BL163 616, 10WA11 3632	Spear	Private	Domestic	Domestic		19/07/2004	5.00	5.00	Good	2.00	0.500		85m	South
GW107 637	10BL165 593, 10WA11 4000	Spear	Private	Domestic	Domestic		25/10/2005	4.00	4.00	Good	2.00	0.500		89m	North
GW111 188	10BL602 071	Bore	Private	Monitoring Bore	Monitoring Bore		30/04/2007	6.00	6.00					93m	North
GW108 560	10BL601 264, 10WA11 4311	Spear	Private	Domestic	Domestic		15/02/2007	4.00	4.00	Good	2.00	0.500		108m	South West
GW111 183	10BL602 071	Bore	Private	Monitoring Bore	Monitoring Bore		18/04/2007	6.00	6.00					111m	North East

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW023601	10BL017290, 10WA112885	Spear	Private	Domestic	General Use		01/02/1966	4.80	4.90	Good				113m	South West
GW108174	10BL600484, 10WA114156	Spear	Private	Domestic	Domestic		22/08/2006	4.00	4.00		2.00	0.500		125m	North
GW108299	10BL600643, 10WA114186	Spear	Private	Domestic	Domestic		03/11/2006	4.00	4.00		2.00	0.500		131m	West
GW023603	10BL017289, 10WA112884	Spear	Private	Domestic	General Use		01/02/1966	4.50	4.60	Good				136m	North
GW017476	10BL008826, 10WA112798	Spear	Private	Domestic	General Use			7.60	7.60					178m	South
GW071885	10BL154111, 10WA114651	Spear	Private	Industrial	Industrial		14/12/1992	6.00	6.00	Good	3.00	0.900	10.00	195m	South
GW108812	10BL601640, 10WA114395	Bore	Private	Domestic	Domestic		02/05/2007	4.00	4.00	Good	2.00	0.500		200m	South West
GW109145	10BL600747, 10WA114211	Spear	Private	Domestic	Domestic		04/08/2008	4.00		Good	4.00	0.500		243m	South
GW108591	10BL601232, 10WA114304	Spear	Private	Domestic	Domestic		05/02/2007	6.10	6.10	Good	2.44	1.000		246m	South
GW101761	10BL157338, 10WA113144	Bore		Domestic	Domestic		30/11/1995	5.50	5.50					247m	North West
GW105133	10BL157057, 10WA113106	Bore		Domestic	Domestic		01/10/1998	6.00						250m	West
GW107341	10BL165344, 10WA113964	Spear	Private	Domestic	Domestic		15/07/2009	6.00	6.00	Good	3.00	0.500		253m	North
GW031679	10BL024630, 10WA114769	Spear	Local Govt	Recreation (groundwater)	Irrigation		01/10/1969	6.40	6.40	Good				275m	South West
GW108718	10BL601595, 10WA114384	Spear	Private	Domestic	Domestic		16/05/2007	4.00	4.00	Good	2.00	0.500		286m	North
GW024059	10BL017416, 10WA112894	Spear	Private	Domestic	General Use			3.60						308m	South
GW105767	10BL162456, 10WA113430	Spear	Private	Domestic	Domestic		20/01/2004	5.00	5.00	Good	3.00	0.500		318m	North
GW106325	10BL163441, 10WA113581	Spear	Private	Domestic	Domestic		14/07/2004	5.00	5.00	Good	3.00	0.500		323m	North
GW108701	10BL601657, 10WA114399	Spear	Private	Domestic	Domestic		12/06/2007	6.10	6.10	Good	3.15	1.000		327m	North
GW102629	10BL159237, 10WA113282	Bore		Domestic	Domestic		19/06/1999	8.00	8.00					331m	South

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW110 657	10BL601 148, 10WA11 4290	Spear	Private	Domestic	Domestic		18/02/2007	5.49	5.49	Good	1.52	1.000		360m	South
GW108 598	10BL601 372, 10WA11 4329	Spear	Private	Domestic	Domestic		24/03/2007	5.18	5.19	Good	1.52	1.000		364m	South West
GW107 724	10BL165 965, 10WA11 4069	Spear	Private	Domestic	Domestic		10/01/2006	4.00	4.00	Good	2.00	0.500		371m	South
GW111 282	10BL604 299, 10WA11 4609	Spear	Private	Domestic	Domestic		17/11/2010	6.00	6.00		4.00			371m	South West
GW106 115	10BL162 852, 10WA11 3497	Spear	Private	Domestic			03/05/2004	4.00	4.00					381m	West
GW108 627	10BL164 200, 10WA11 3754	Spear	Private	Domestic	Domestic		22/12/2006	6.00	6.00	Good	3.00	0.500		385m	South
GW108 490	10BL600 542, 10BL602 309, 10WA11 4747	Bore	Private	Recreation (groundwater), Test Bore	Recreation (groundwater)		14/01/2008	12.50	12.50	Good				388m	North West
GW106 849	10BL164 443, 10WA11 3792	Spear	Private	Domestic	Domestic		29/12/2004	4.27	4.27		1.83	1.000		398m	West
GW023 457	10BL017 014, 10WA11 2857	Spear	Private	Domestic	General Use		01/01/1966	3.60		Good				410m	South West
GW024 174	10BL018 343, 10WA11 4759	Bore	Local Govt	Recreation (groundwater)	Irrigation		01/09/1966	4.20	4.30					412m	North
GW107 149	10BL164 991, 10WA11 3899	Spear		Domestic	Domestic		06/04/2005	6.00	6.00					413m	West
GW107 077	10BL165 042, 10WA11 3907	Spear	Private	Domestic	Domestic		11/05/2005	4.00	4.00	Good	2.00	0.500		415m	South West
GW111 766	10BL165 193, 10WA11 3934	Bore	Private	Domestic	Domestic		25/07/2005	4.00	4.00	good	2.00	0.500		425m	South West
GW111 376	10BL601 505, 10WA11 4364	Spear	Private	Domestic	Domestic		31/05/2007	7.00	7.00					444m	North
GW109 643	10BL602 355, 10WA11 4495	Spear	Private	Domestic	Domestic		29/04/2008	6.71	6.71	Good	3.05	1.000		455m	North
GW110 777	10BL601 259, 10WA11 4310	Spear	Private	Domestic	Domestic		22/04/2010	4.00						461m	South West
GW107 183	10BL164 140, 10WA11 3735	Spear	Private	Domestic	Domestic		24/10/2004	5.50	5.50					462m	South West
GW106 331	10BL164 117, 10WA11 3728	Spear	Private	Domestic	Domestic		30/09/2004	5.00	5.00	Good	1.50	0.500		463m	West

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW109642	10BL602354, 10WA114494	Spear	Private	Domestic	Domestic		29/04/2008	6.71	6.71		3.05	1.000		465m	North
GW109939	10BL602759, 10WA114532	Spear	Private	Domestic	Domestic		26/11/2008	6.10	6.10	Good	3.10	1.000		469m	North
GW075063		Bore	NSW Office of Water		Monitoring Bore	BOTANY BORE AT TONBRIDGE RESERVE	28/05/2001		3.40				13.25	471m	North West
GW031678	10BL024631, 10WA113000	Spear	Local Govt	Domestic	Irrigation		01/09/1969	6.40	6.40	Good				478m	North
GW108292	10BL600584, 10WA114171	Spear	Private	Domestic	Domestic		27/10/2006	4.00	4.00		2.00	0.500		483m	South
GW106732	10BL164239, 10WA113761	Spear	Private	Domestic	Domestic		07/01/2005	6.00	6.00					484m	South West
GW114835	10WA119164	Spear	Private	Domestic	Domestic		24/03/2015	6.00	6.00		2.00	0.500		488m	South West
GW109641	10BL602353, 10WA114493	Spear	Private	Domestic	Domestic		29/04/2008	6.71	6.71	Good	3.05	1.000		490m	North
GW109318	10BL602591, 10WA114524	Bore	Private	Domestic	Domestic		10/09/2008	6.10		Good	2.74	1.000		491m	North West
GW106172	10BL163701, 10WA113654	Bore		Domestic			01/07/2005							494m	West
GW107157	10BL165278, 10WA113945	Bore		Domestic	Domestic		01/01/2003	6.00						502m	South
GW109947	10BL602292, 10WA114480	Spear	Private	Domestic	Domestic		25/01/2009	7.00	7.00	Good	4.00	0.500		508m	North
GW108644	10BL601348, 10WA114324	Spear	Private	Domestic	Domestic		23/02/2007	4.00	4.00	Good	2.00	0.500		510m	South West
GW106153	10BL163333, 10WA113561	Spear		Domestic	Domestic		28/06/2005	6.00						511m	North
GW106152	10BL163332, 10WA113560	Spear	Private	Domestic	Domestic		08/11/2005	6.00	6.00	Good	3.00	0.500		514m	North
GW108658	10BL164758, 10WA113854	Spear	Private	Domestic	Domestic		10/01/2007	4.00	4.00		2.00	0.500		514m	South West
GW106420	10BL163583, 10WA113618	Bore		Domestic			01/09/2005							518m	South West
GW106482	10BL164183, 10WA113749	Spear	Private	Domestic	Domestic		12/10/2004	4.00	4.00	Good	2.00	0.500		518m	West
GW106399	10BL163465, 10WA113586	Spear	Private	Domestic	Domestic		20/07/2004	6.00	6.00		3.00	0.500		519m	North

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW108 531	10BL600 902, 10WA11 4241	Spear	Private	Domestic	Domestic		28/12/2006	4.00	4.00	Good	2.00	0.500		519m	South West
GW108 173	10BL600 457, 10WA11 4149	Spear	Private	Domestic	Domestic		19/08/2006	5.00	5.00		3.00	0.500		520m	North
GW106 262	10BL163 173, 10WA11 3535	Spear	Private	Domestic	Domestic		02/08/2004	6.00	6.00		3.00	0.500		521m	North
GW108 763	10BL601 218, 10WA11 4303	Spear	Private	Domestic	Domestic		22/05/2007	6.00	6.00	Good	3.00	0.500		524m	North
GW109 236	10BL602 145, 10WA11 4450	Spear	Private	Domestic	Domestic		19/08/2008	5.18		Good	1.83	1.000		524m	South West
GW106 234	10BL163 560, 10WA11 3611	Spear	Private	Domestic	Domestic		14/08/2004	5.00	5.00					525m	South West
GW106 222	10BL163 640, 10WA11 3639	Spear	Private	Domestic	Domestic		20/07/2004	4.00	4.00	Good	2.00	0.500		542m	South West
GW108 311	10BL600 525, 10WA11 4160	Spear		Domestic	Domestic		01/01/1999	4.00						543m	North
GW106 840	10BL162 630, 10WA11 3461	Spear	Private	Domestic	Domestic		23/02/2005	4.00	4.00	Good	2.00	0.500		545m	South West
GW105 753	10BL162 248, 10WA11 3379	Spear	Private	Domestic	Domestic		06/01/2004	4.00	4.00		1.50	0.500		546m	South
GW106 544	10BL162 236, 10WA11 3372	Spear	Private	Domestic	Domestic		12/11/2004	4.00	4.00	Good	2.00	0.500		546m	South West
GW105 119	10BL157 196, 10WA11 3123	Bore	Private	Domestic	Domestic		10/10/1995	6.10	6.10	Good	1.22	1.000		553m	South West
GW106 809	10BL164 060, 10WA11 3722	Spear	Private	Domestic	Domestic		07/01/2005	6.00	6.00					561m	South West
GW108 554	10BL601 242, 10WA11 4307	Spear	Private	Domestic	Domestic		20/02/2007	4.00	4.00	Good	2.00	0.500		562m	West
GW105 772	10BL162 338, 10WA11 3408	Spear	Private	Domestic	Domestic		05/01/2004	4.00	4.00		2.00	0.500		566m	West
GW108 810	10BL601 693, 10WA11 4406	Spear	Private	Domestic	Domestic		10/05/2007	6.00	6.00	Good	3.00	0.500		566m	North
GW105 616	10BL161 663, 10WA11 3340	Spear	Private	Domestic	Domestic		30/10/2003	4.50	4.50	Good	2.00	0.500		567m	South West
GW106 920	10BL164 646, 10WA11 3827	Spear	Private	Domestic	Domestic		30/01/2005	6.10	6.10	Good	2.13	1.000		575m	North
GW109 227	10BL163 528, 10WA11 3601	Spear	Private	Domestic	Domestic		18/08/2008	8.00			2.00	2.500		576m	North

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW024 591	10BL018 811, 10WA11 2968	Spear	Private	Domestic	General Use		01/11/1965	4.80	4.90	Good				579m	South West
GW105 249	10BL162 369, 10WA11 3416	Bore		Domestic	Domestic		05/01/2003	4.00	4.00	Good	2.00	0.500		581m	West
GW105 250	10BL162 370, 10WA11 3417	Bore		Domestic	Domestic		05/01/2004	4.00	4.00	Good	2.00	0.500		592m	West
GW111 475	10BL604 410, 10WA11 4615	Spear	Private	Domestic	Domestic		13/05/2011	4.00	4.00		2.00	0.500		599m	South West
GW109 031	10BL601 563, 10WA11 4375	Spear	Private	Domestic	Domestic		14/07/2008	4.00		Good	2.00	0.500		601m	South
GW108 697	10BL601 578, 10WA11 4380	Spear	Private	Domestic	Domestic		16/04/2007	4.00	4.00	Good	2.00	0.500		604m	South West
GW108 745	10BL601 460, 10WA11 4356	Spear	Private	Domestic	Domestic		26/03/2007	7.01	7.02	Good	3.40	1.000		604m	North
GW106 564	10BL164 169, 10WA11 3746	Spear	Private	Domestic	Domestic		16/11/2004	3.05	3.50	Good	1.22	1.000		606m	West
GW107 667	10BL162 204, 10WA11 3364	Spear	Private	Domestic	Domestic		28/11/2005	7.00	7.00	Good	2.00	0.500		608m	South West
GW115 126	10WA11 7736			Domestic	Domestic		01/01/2012	5.50			9.00			608m	South
GW023 984	10BL017 318, 10WA11 2892	Spear	Private	Domestic	General Use		01/01/1966	6.70	6.70	Good				618m	North
GW107 878	10BL165 959, 10WA11 4067	Spear	Private	Domestic	Domestic		22/02/2006	4.00	4.00		2.00	0.500		623m	South West
GW072 484	10BL156 296, 10WA11 3031	Bore		Domestic	Domestic		13/10/1997	5.00				0.375		624m	South
GW101 763	10BL157 358, 10BL162 636, 10BL603 089, 10WA11 4569	Bore		Domestic, Recreation (groundwater)	Domestic		01/10/1994	6.00	6.00					629m	North West
GW106 411	10BL163 313, 10WA11 3557	Spear	Private	Domestic	Domestic		22/09/2004	4.00	4.00		2.00	0.500		630m	West
GW028 209	10BL020 777, 10WA11 4763	Spear	Local Govt	Recreation (groundwater)	Irrigation		01/02/1966	4.50	4.60	Good				632m	South
GW106 896	10BL164 366, 10WA11 3783	Spear	Private	Domestic	Domestic		26/11/2004	6.00	6.00	Good	3.00	0.500		632m	North
GW107 426	10BL163 203, 10WA11 3538	Spear	Private	Domestic	Domestic		21/10/2005	4.00	4.00	Good	2.00	0.500		635m	South West

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW108268	10BL165903, 10WA114058	Spear	Private	Domestic	Domestic		03/11/2006	4.00	4.00		2.00	0.500		638m	North West
GW102137	10BL159050, 10WA113270	Bore	Private	Domestic	Domestic		19/02/1999	5.00	5.00		3.00	0.500		639m	North
GW105952	10BL163368, 10WA113566	Bore		Domestic			23/05/2005							640m	South West
GW107428	10BL165397, 10WA113972	Spear	Private	Domestic	Domestic		18/10/2005	4.00	4.00		2.00	0.500		641m	South West
GW024376	10BL018575, 10WA112955	Spear	Private	Domestic	General Use		01/01/1966	4.80	4.90	Good				643m	South West
GW107375	10BL163458, 10WA113584	Spear	Private	Domestic	Domestic		26/09/2005	4.00	4.00	Good	2.00	0.500		645m	South West
GW106384	10BL163606, 10WA113630	Spear	Private	Domestic	Domestic		14/09/2004	6.10	6.10		3.05	1.000		654m	North West
GW023508	10BL017065, 10WA112862	Spear	Private	Domestic	General Use		01/08/1965	5.40	5.50	Good				655m	South West
GW106848	10BL164447, 10WA113793	Spear	Private	Domestic	Domestic		06/12/2004	4.00	4.00	Good	2.00	0.500		662m	South West
GW106434	10BL163963, 10WA113709	Spear	Private	Domestic	Domestic		11/10/2004	6.00	6.00	Good	3.00	0.500		674m	North
GW103228	10BL157324, 10WA113142	Bore		Domestic	Domestic		24/11/1995	6.00	6.00					675m	North
GW107953	10BL600086, 10WA114097	Spear		Domestic	Domestic		01/01/1985	4.00			2.00	0.500		680m	South West
GW108493	10BL600740, 10WA114208	Spear	Private	Domestic	Domestic		27/12/2006	6.00	6.00		3.00	0.500		680m	North
GW108947	10BL601977, 10WA114426	Spear	Private	Domestic	Domestic		19/06/2008	7.00						681m	North
GW108522	10BL600827, 10WA114231	Spear	Private	Domestic	Domestic		27/12/2006	3.00	3.00	Good	1.00	0.500		684m	West
GW106703	10BL164283, 10WA113770	Spear	Private	Domestic	Domestic		03/12/2004	4.00	4.00		2.00	0.500		685m	South
GW109113	10BL602302, 10WA114482	Spear	Private	Domestic	Domestic		25/07/2008	4.00		Good	2.00	0.500		686m	West
GW023986	10BL017640, 10WA112921	Spear	Private	Domestic	General Use		01/02/1966	2.40	2.40	Brackish				689m	South West
GW106578	10BL163908, 10WA113705	Spear	Private	Domestic	Domestic		16/09/2004	4.00	4.00	Good	2.00	0.500		689m	South West

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GW023966	10BL016398, 10WA112809	Spear	Private	Domestic	General Use		01/09/1965	7.30	7.30	Good				690m	South
GW110876	10BL601606, 10WA114387	Spear	Private	Domestic	Domestic		01/01/2007	6.00			2.00	2.500		690m	South West
GW114902	10WA119176	Spear	Private	Domestic	Domestic		08/04/2015	5.00	5.00		1.50	0.500		690m	South West
GW107479	10BL164158, 10WA113743	Spear	Private	Domestic	Domestic		20/01/2005	6.00	6.00	Good	2.00	0.500		692m	South
GW106804	10BL163994, 10WA113716	Spear	Private	Domestic	Domestic		03/12/2004	4.00	4.00	Good	2.00	0.500		696m	South
GW106805	10BL163993, 10WA113715	Spear	Private	Domestic	Domestic		03/12/2004	4.00	4.00	Good	2.00	0.500		696m	South
GW105773	10BL162608, 10WA113458	Spear	Private	Domestic	Domestic		25/02/2004	4.00	4.00		1.50	0.500		701m	South
GW024375	10BL018433, 10WA112946	Spear	Private	Domestic	Domestic		01/01/1966	3.60	3.70	Fair				706m	North West
GW107065	10BL164704, 10WA113836	Spear	Private	Domestic	Domestic		26/04/2005	6.00	6.00		2.00	0.500		706m	South
GW101154	10BL157029, 10WA113098	Spear	Private	Domestic	Domestic		05/09/1995	4.88	4.88	Good	1.83	0.800		708m	South West
GW109053	10BL602166, 10WA114457	Spear	Private	Domestic	Domestic		15/07/2008	5.80		Good	3.36	1.000		711m	South
GW107599	10BL165628, 10WA114006	Spear	Private	Domestic	Domestic		30/10/2005	6.00	6.00					721m	North West
GW025681	10BL018848, 10WA112971	Spear	Private	Domestic	General Use		01/09/1966	6.00	6.10	Good				722m	South
GW105310	10BL163296, 10WA113554	Bore		Domestic	Domestic		07/07/2004	4.00	4.00	Good	2.00	0.500		723m	North
GW104637	10BL161203, 10WA113330	Bore	Private	Domestic	Domestic		12/12/2002	7.32	7.32		4.22	1.000		724m	North
GW111562	10BL600950	Spear	Private	Domestic	Domestic		20/01/2007	6.00	6.00					725m	South West
GW107974	10BL165026, 10WA113906	Spear		Domestic	Domestic		10/12/2005	3.00	3.00					726m	South
GW111467	10BL604409, 10WA114614	Spear	Private	Domestic	Domestic		22/12/2010	6.00	6.00		2.00	0.500		730m	North West
GW110867	10BL603605, 10WA114591	Spear	Private	Domestic	Domestic		12/04/2010	6.00	6.00	Good	4.00	0.150		731m	North

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GW112351	10BL602183, 10WA114461	Spear	Private	Domestic	Domestic		08/11/2007	5.80	5.80		1.22	1.000		732m	South
GW101889	10BL158950, 10WA113267	Bore		Domestic	Domestic		24/11/1998	5.19	5.19	Good	1.83	1.000		734m	South
GW028206	10BL020775	Spear	Local Govt	Recreation (groundwater)	Irrigation		01/02/1966	5.40	5.50	Good				742m	North
GW107208	10BL164628, 10WA113822	Spear	Private	Domestic	Domestic		19/07/2005	4.00	4.00		1.00	0.500		744m	South
GW024371	10BL018577, 10WA112957	Spear	Private	Domestic	General Use		01/08/1966	4.20	4.30	Good				752m	North
GW025714	10BL016399, 10WA112810	Bore	Private	Domestic	General Use		01/11/1965	3.00	3.00	Good				760m	South
GW028208	10BL020774, 10WA114761	Spear	Local Govt	Recreation (groundwater)	Irrigation		01/04/1966	6.00	6.10	Good				765m	North
GW112490	10WA118670	Spear	Private	Domestic	Domestic		27/05/2013	7.00	7.00		4.00	0.500		779m	North
GW107215	10BL164992, 10WA113900	Spear	Private	Domestic	Domestic		14/06/2005	4.00	4.00		2.00	0.500		785m	South West
GW107845	10BL164775, 10WA113857	Spear	Private	Domestic	Domestic		12/07/2005	5.00	5.00	Good	2.00	0.500		787m	South
GW024071	10BL017280, 10WA112879	Spear	Private	Domestic	General Use		01/11/1965	4.80						788m	South West
GW111613	10BL163692, 10WA113652	Spear	Private	Domestic	Domestic		06/10/2004	6.00	6.00	good	3.00	0.500		789m	North
GW107729	10BL164521, 10WA113806	Spear	Private	Domestic	Domestic		10/01/2006	5.00	5.00					797m	South
GW108925	10BL601994, 10WA114428	Spear	Private	Domestic	Domestic		18/06/2008	6.00						801m	South West
GW107861	10BL600064, 10WA114089	Spear	Private	Domestic	Domestic		21/03/2006	6.00	6.00					802m	North
GW106837	10BL162689, 10WA113473	Spear	Private	Domestic	Domestic		15/03/2005	3.00						803m	South West
GW024117	10BL018508, 10WA112953	Spear	Private	Domestic	General Use		01/11/1965	5.40	5.50	Good				804m	North
GW106729	10BL164276, 10WA113769	Spear	Private	Domestic	Domestic		29/11/2004	4.00	4.00	Good		0.500		807m	South
GW025721	10BL016431, 10WA112818	Spear	Private	Domestic	General Use		01/11/1965	3.00						815m	South West

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GW107170	10BL165257, 10WA113942	Spear	Private	Domestic	Domestic		18/07/2005	4.00	4.00	Good	1.00	0.500		815m	South West
GW106458	10BL162134, 10WA113353	Spear	Private	Domestic	Domestic		15/11/2004	4.00	4.00	Good	2.00	0.500		818m	South West
GW072912		Spear	Private		Domestic		12/12/1994	6.00	6.00	Good				819m	South West
GW108274	10BL600238, 10WA114127	Spear	Private	Domestic	Domestic		13/11/2006	4.88	4.88		1.88	1.000		821m	South West
GW105752	10BL162364, 10WA113414	Spear	Private	Domestic	Domestic		05/01/2004	7.32	7.32		3.72	1.000		823m	South West
GW106263	10BL162837, 10WA113494	Spear	Private	Domestic	Domestic		17/08/2004	6.00	6.00	Good	2.00	0.500		825m	South
GW109064	10BL602157, 10WA114456	Spear	Private	Domestic	Domestic		16/07/2008	4.00		Good	2.00	0.500		827m	South
GW024669	10BL018797, 10WA112966	Spear	Private	Domestic	General Use		01/04/1966	4.50	4.60					828m	North
GW025559	10BL016387, 10WA112808	Spear	Private	Domestic	General Use		01/11/1965	3.00	3.00	Good				830m	South West
GW107156	10BL164854, 10WA113873	Bore		Domestic			30/05/2006							831m	North
GW023136	10BL016582, 10WA112826	Spear	Private	Domestic	General Use		01/01/1965	3.20	3.20	Good				832m	North
GW023185	10BL016549, 10WA112824	Spear	Private	Domestic, General Use	General Use		01/10/1965	4.20	4.30	Good				833m	North
GW107118	10BL164853, 10WA113872	Spear	Private	Domestic	Domestic		28/05/2005	6.00	6.00					834m	North
GW108977	10BL602111, 10WA114442	Spear	Private	Domestic	Domestic		27/06/2008	4.00		Good	2.00	0.500		837m	South
GW111123	10BL601549, 10WA114371	Spear	Private	Domestic	Domestic		01/01/2007	8.00	8.00		2.00	2.500		837m	North
GW023125	10BL016583, 10WA112827	Spear	Private	Domestic	General Use		01/11/1965	5.10	5.20	Good				839m	North
GW101586	10BL158899, 10WA113264	Bore		Domestic	Domestic		31/10/1998	5.80	5.80	Good		1.000		841m	South
GW023573	10BL017669, 10WA112927	Spear	Private	Domestic	General Use		01/03/1966	4.80	4.90	Good				842m	North
GW106136	10BL162163, 10WA113358	Spear	Private	Domestic	Domestic		07/06/2004	4.00	4.00	Good	2.00	0.500		845m	South

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW111442	10BL600911, 10WA114242	Spear	Private	Domestic	Domestic		26/02/2007	4.25	4.27	good	2.13	1.000		845m	South West
GW025703	10BL016459, 10WA112821	Spear	Private	Domestic	Domestic		01/11/1957	6.00	6.10					847m	North
GW106092	10BL162895, 10WA113506	Spear	Private	Domestic	Domestic		05/04/2004	4.58	4.58		2.13	1.000		849m	North
GW106251	10BL163420, 10WA113579	Bore		Domestic	Domestic		19/07/2005	7.00						849m	North
GW106382	10BL163631, 10WA113637	Spear	Private	Domestic	Domestic		15/09/2004	6.00	6.00		3.00	0.500		849m	North
GW108266	10BL600706, 10WA114201	Spear	Private	Domestic	Domestic		08/11/2006	6.00	6.00		3.00	0.500		850m	North
GW106957	10BL164731, 10WA113845	Spear	Private	Domestic	Domestic		06/04/2005	7.32	7.32		2.44	1.000		855m	North
GW027339	10BL019944, 10WA112995	Spear	Private	Domestic	General Use		01/04/1967	3.00	3.00					857m	South
GW106038	10BL163062, 10WA113523	Spear	Private	Domestic	Domestic		10/06/2004	7.00	7.00					858m	South
GW101474	10BL158447, 10WA113239	Spear	Private	Domestic	Domestic		16/02/1998	4.27	4.27	Good	2.13	0.100		859m	South
GW108290	10BL600568, 10WA114170	Spear	Private	Domestic	Domestic		30/01/2006	6.00	6.00		3.00	0.500		865m	North
GW023547	10BL017161, 10WA112869	Spear	Private	Domestic	General Use		01/03/1966	3.30	3.40					866m	South West
GW108529	10BL600891, 10WA114239	Spear	Private	Domestic	Domestic		15/01/2007	6.00	6.00	Good	4.00	0.500		866m	North
GW105715	10BL162355, 10WA113412	Bore	Private	Domestic	Domestic		05/01/2004	4.00	4.00	Good	2.00	0.500		877m	South
GW109134	10BL602100, 10WA114441	Spear	Private	Domestic	Domestic		31/07/2008	4.00		Good	2.00	0.500		879m	South
GW111440	10BL600921, 10WA114244	Spear	Private	Domestic	Domestic		12/02/2007	5.18	5.19	good	1.83	1.000		882m	South West
GW108733	10BL601453, 10WA114354	Spear	Private	Domestic	Domestic		20/04/2007	6.00	6.00	Good	4.00	0.500		884m	North
GW106963	10BL164629, 10WA113823	Spear	Private	Domestic	Domestic		01/02/2003	6.00	6.00					885m	North
GW026865	10BL016986, 10WA112856	Spear	Private	Domestic	General Use		01/01/1966	2.40	2.40					889m	South

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW106280	10BL163338, 10WA113562	Spear	Private	Domestic	Domestic		19/06/2004	6.41	6.41		3.36	1.000		890m	North
GW113044	10BL602243, 10WA114471	Spear	Private	Domestic	Domestic		02/08/2007	7.32	7.32	Good	2.74	1.000		891m	North
GW105680	10BL162605, 10WA113457	Spear	Private	Domestic	Domestic		25/01/2004	6.41	6.41		3.36	1.000		892m	North
GW106377	10BL163863, 10WA113696	Spear	Private	Domestic	Domestic		08/09/2004	4.00	4.00		2.00	0.500		892m	South West
GW107920	10BL163968, 10WA113710	Spear	Private	Domestic	Domestic		10/02/2006	6.00	6.00					893m	North
GW109106	10BL602392, 10WA114503	Spear	Private	Domestic	Domestic		23/07/2008	6.71		Good	3.35	1.000		897m	North
GW111226	10BL604267, 10WA114607	Spear	Private	Domestic	Domestic		02/11/2010	5.49	5.49	good	1.52			899m	South West
GW105741	10BL162442, 10WA113428	Bore	Private	Domestic	Domestic		13/02/2004	4.00	4.00	Good	2.00	0.500		907m	South West
GW115044	10WA119107	Spear	Private	Domestic	Domestic	Di Sisto	16/02/2015	6.00	6.00		3.00	0.500		910m	North
GW106317	10BL163377, 10WA113568	Bore		Domestic			15/08/2005							915m	West
GW101678	10BL158815, 10WA113263	Bore		Domestic	Domestic		29/09/1998	6.00	6.00					918m	South West
GW114841	10WA119048	Spear	Private	Domestic	Domestic		02/10/2014	7.00	7.00		1.50	0.500		918m	South West
GW024245	10BL018846, 10WA112969	Spear	Private	Domestic	General Use		01/11/1965	5.40	5.50	Good				924m	South
GW106561	10BL164085, 10WA113724	Spear	Private	Domestic	Domestic		15/11/2004	4.00	4.00	Good	2.00	0.500		927m	South
GW106879	10BL164726, 10WA113843	Spear	Private	Domestic	Domestic		31/01/2005	5.49	5.49	Good	2.44	1.000		935m	South West
GW106204	10BL163535, 10WA113603	Spear	Private	Domestic	Domestic		10/08/2004	6.00	6.00		2.00	0.500		943m	South West
GW114806	10BL604240	Bore	Private	Monitoring Bore	Monitoring Bore		01/01/2010	10.90	10.90					943m	West
GW111003	10BL604001, 10WA114601	Spear	Private	Domestic	Domestic		11/06/2010	4.00	4.00	good	2.00	0.500		946m	South
GW106961	10BL164641, 10WA113825	Spear	Private	Domestic	Domestic		04/03/2005	7.00	7.00	Good	5.00	0.500		947m	North
GW114808	10BL604240	Bore	Private	Monitoring Bore	Monitoring Bore		01/01/2010	8.00	8.00					949m	West

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW106104	10BL162597, 10WA113456	Bore	Private	Domestic	Domestic		05/01/2004	7.00	7.00					953m	North
GW108533	10BL600959, 10WA114250	Spear	Private	Domestic	Domestic		17/01/2007	6.00	6.00		4.00	0.500		958m	North
GW109942	10BL601034, 10WA114268	Spear	Private	Domestic	Domestic		31/01/2009	6.71	6.71	Good	3.50	1.000		958m	North
GW114807	10BL604240	Bore	Private	Monitoring Bore	Monitoring Bore		01/01/2010	9.00	9.00					958m	West
GW103229	10BL157357, 10WA113149	Bore		Domestic	Domestic		09/08/1995	6.00	6.00					960m	North
GW108948	10BL601480, 10WA114360	Spear	Private	Domestic	Domestic		19/06/2008	4.00		Good	2.00	0.500		964m	South West
GW107177	10BL163057, 10WA113522	Spear	Private	Domestic	Domestic		24/06/2004	7.63	7.63		4.58	1.000		968m	North
GW107505	10BL165443, 10WA113979	Spear	Private	Domestic	Domestic		03/10/2005	5.00	5.00	Good	3.00	0.500		970m	North
GW024366	10BL018712, 10WA112965	Spear	Private	Domestic	General Use		01/01/1966	4.50	4.60	Good				976m	North
GW108696	10BL601482, 10WA114361	Spear	Private	Domestic	Domestic		11/05/2007	7.00	7.00	Good	5.00	0.500		981m	North
GW107019	10BL164940, 10WA113896	Spear	Private	Domestic	Domestic		19/04/2005	7.00	7.00	Good	5.00	0.500		982m	North
GW112400	10BL163672, 10WA113646	Spear	Private	Domestic	Domestic		01/01/2004	6.00	6.00		5.00	0.500		983m	South West
GW111315	10BL600492, 10WA114158	Spear	Private	Domestic	Domestic		03/08/2006	4.00	4.00	good	2.00	0.500		984m	South
GW106415	10BL163168, 10WA113534	Spear	Private	Domestic	Domestic		28/08/2004	6.10	6.10		3.50	1.000		986m	North
GW100440	10BL157889, 10WA113185	Bore		Domestic			01/01/1995	6.30	6.30		4.50	0.670		988m	North
GW103780	10BL156560, 10WA113070	Bore		Domestic	Domestic		20/03/1995	7.62	7.62	Good				989m	North
GW107051	10BL164886, 10WA113879	Spear	Private	Domestic	Domestic		25/03/2005	7.00	7.00	Good	3.00	0.500		989m	North
GW106371	10BL163791, 10WA113683	Spear	Private	Domestic	Domestic		14/09/2004	5.00	5.00		2.00	0.500		991m	North
GW106053	10BL162467, 10WA113433	Spear	Private	Domestic	Domestic		07/06/2004	6.10	6.10		3.09	1.000		993m	North

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW108536	10BL601013, 10WA114264	Spear	Private	Domestic	Domestic		25/01/2007	4.00	4.00	Good	2.00	0.500		997m	South West
GW111420	10BL601660, 10WA114401	Spear	Private	Domestic	Domestic		15/05/2007	9.15	9.15	good	5.18	1.000		997m	North
GW023475		Spear	Private		General Use		01/02/1966	4.50	4.60					999m	South West
GW106054	10BL162544, 10WA113444	Spear	Private	Domestic	Domestic		10/03/2004	6.10	6.10		1.52	1.000		999m	North
GW111237	10BL604283, 10WA114608	Spear	Private	Domestic	Domestic		01/01/1995	6.00	6.00	good	3.00	0.500		1002m	North
GW107891	10BL600003, 10WA114078	Spear	Private	Domestic	Domestic		08/02/2006	7.00	7.00		5.00	0.500		1003m	North
GW107836	10BL165861, 10WA114050	Spear	Private	Domestic	Domestic		21/01/2006	5.00	5.00	Good	2.00	1.000		1006m	South West
GW110228	10BL600354, 10WA114139	Spear	Private	Domestic	Domestic		14/05/2006	8.85	8.85	Good	2.13	1.000		1007m	North
GW024069	10BL017471, 10WA112899	Spear	Private	Domestic	General Use		01/02/1966	4.50						1011m	South West
GW107880	10BL600102, 10WA114100	Spear	Private	Domestic	Domestic		20/02/2006	4.00	4.00		2.00	0.500		1011m	South
GW100664	10BL157648, 10WA113171	Spear	Private	Domestic	Domestic		20/05/1996	5.80	5.80	Good	2.29	1.000		1014m	North
GW110842	10BL164519, 10WA113805	Spear	Private	Domestic	Domestic		24/02/2005	8.54	8.54	Good	2.13	1.000		1017m	North
GW023458	10BL016718, 10WA112839	Spear	Private	Domestic	General Use		01/11/1965	4.80	4.90	Good				1027m	South West
GW106422	10BL163475, 10WA113588	Bore		Domestic			01/09/2005							1037m	North
GW107273	10BL163538, 10WA113604	Bore	Private	Domestic	Domestic		10/08/2005	4.00	4.00		1.60	0.250		1037m	South West
GW106413	10BL163252, 10WA113546	Spear	Private	Domestic	Domestic		28/08/2004	6.10	6.10		3.50	1.000		1038m	North
GW110566	10BL603431, 10WA114582	Spear	Private	Domestic	Domestic		10/11/2009	4.00	4.00	Good	2.00	0.500		1045m	South West
GW111020	10BL601211, 10WA114302	Spear	Private	Domestic	Domestic		01/01/2007	4.00	4.00					1048m	North
GW106619	10BL162268, 10WA113385	Spear	Private	Domestic	Domestic		11/11/2004	4.00	4.00		2.00	0.500		1049m	South West

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GW111 439	10BL600 922, 10WA11 4245	Spear	Private	Domestic	Domestic		06/02/2007	7.32	7.32	good	4.58	1.000		1054m	North
GW107 824	10BL600 124, 10WA11 4103	Spear	Private	Domestic	Domestic		21/03/2006	5.00	5.00	Good	2.00	0.500		1055m	South West
GW107 846	10BL164 799, 10WA11 3861	Spear	Private	Domestic	Domestic		13/02/2006	6.00	6.00	Good	4.00	0.500		1058m	North West
GW109 137	10BL602 234, 10WA11 4467	Spear	Private	Domestic	Domestic		04/08/2008	6.00						1059m	North
GW028 300	10BL020 311, 10WA11 2996	Spear	Private	Domestic	General Use		01/01/1966	2.50	2.60	Good				1064m	West
GW111 704	10BL603 038, 10WA11 4566	Spear	Private	Domestic	Domestic		09/05/2009	6.71	6.71	good	3.50	1.000		1064m	North
GW110 490	10BL600 144, 10WA11 4111	Bore	Private	Domestic	Domestic		01/01/2006	8.00			2.00	2.500		1065m	South West
GW106 387	10BL163 564, 10WA11 3612	Spear	Private	Domestic	Domestic		05/09/2004	7.32	7.32		4.27	1.000		1066m	North
GW115 751					Domestic		28/11/2016	4.00			2.00			1073m	South
GW110 728	10BL601 291, 10WA11 4314	Spear	Private	Domestic	Domestic		01/01/1995	6.00			5.00			1074m	South West
GW106 408	10BL163 491, 10WA11 3594	Spear	Private	Domestic	Domestic		30/08/2004	4.00	4.00	Good	2.00	0.500		1082m	South West
GW106 229	10BL163 724, 10WA11 3662	Spear	Private	Domestic	Domestic		05/08/2004	6.00	6.00		1.50	0.500		1083m	South West
GW109 138	10BL165 470, 10WA11 3984	Excav ation	Private	Domestic	Domestic		04/08/2008	4.00		Good	2.00	0.500		1089m	South West
GW110 446	10BL602 817, 10WA11 4541	Spear	Private	Domestic	Domestic		02/03/2009	6.00	6.00	Good	2.50	0.500		1093m	North
GW108 935	10BL601 872, 10WA11 4418	Spear	Private	Domestic	Domestic		19/06/2008	8.00						1094m	South West
GW025 558	10BL016 296, 10WA11 2804	Bore	Private	Domestic	General Use		01/01/1938	5.90	5.90					1100m	North
GW105 819	10BL162 868, 10WA11 3503	Spear	Private	Domestic	Domestic		10/03/2004	4.00	4.00		2.00	0.500		1100m	South
GW108 049	10BL600 313, 10WA11 4135	Spear	Private	Domestic	Domestic		14/06/2006	4.00	4.00		2.00	0.500		1100m	South West
GW101 815	10BL157 323, 10WA11 3141	Bore		Domestic	Domestic		24/11/1995	5.50	5.50					1101m	North

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GW107773	10BL164706, 10WA113838	Spear	Private	Domestic	Domestic		14/03/2005	6.10	6.10		2.13	1.000		1107m	South West
GW108304	10BL600704, 10WA114200	Bore	Private	Domestic	Domestic		30/07/2007	16.00	16.00					1109m	South West
GW106252	10BL163418, 10WA113578	Bore		Domestic			19/07/2005							1110m	South West
GW105589	10BL162249, 10WA113380	Spear	Private	Domestic	Domestic		03/11/2003	4.00	4.00	Good	1.00	0.500		1116m	North
GW106976	10BL163487, 10WA113592	Spear	Private	Domestic	Domestic		17/02/2005	4.00	4.00	Good	2.00	0.500		1117m	South West
GW110655	10BL600728, 10WA114206	Spear	Private	Domestic	Domestic		01/01/2007	8.00			2.00	2.500		1117m	South West
GW106713	10BL162320, 10WA113402	Spear	Private	Domestic	Domestic		23/11/2004	4.00	4.00		2.00	0.500		1119m	South West
GW106767	10BL162331, 10WA113405	Spear	Private	Domestic	Domestic		28/12/2004	6.00	6.00					1128m	North
GW023995	10BL017418, 10WA112895	Spear	Private	Domestic	General Use		01/11/1965	5.70	5.80	Good				1132m	North
GW109129	10BL602194, 10WA114463	Spear	Private	Domestic	Domestic		28/07/2008	4.00		Good	2.00	0.500		1135m	South West
GW024352	10BL018507, 10WA112952	Spear	Private	Domestic	General Use		01/12/1965	5.60	5.60	Good				1138m	North
GW109936	10BL602776, 10WA114535	Bore	Private	Domestic	Domestic		09/12/2008	7.50	7.50		2.00	0.500		1141m	South West
GW101814	10BL157322, 10WA113140	Bore		Domestic	Domestic		30/11/1995	5.00	5.00					1142m	North
GW031412	10BL024351	Spear	Local Govt	Recreation (groundwater)	Irrigation		01/04/1969	6.40	6.40	Good				1145m	South
GW108438	10BL165082, 10WA113920	Spear	Private	Domestic	Domestic		01/07/2005	8.00	8.00		3.00	0.500		1146m	South West
GW107590	10BL165662, 10WA114013	Spear	Private	Domestic	Domestic		26/10/2005	4.00	4.00	Good	2.00	0.500		1148m	North
GW024675	10BL018993, 10WA112978	Spear	Private	Domestic	General Use		01/09/1966	5.40						1151m	North
GW026481	10BL018963, 10WA112976	Spear	Private	General Use	General Use		01/12/1966	4.20	4.30					1153m	South West
GW106832	10BL164793, 10WA113860	Spear	Private	Domestic	Domestic		29/03/2005	5.80	5.80		3.66	1.000		1155m	North

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GW024 397	10BL017 638, 10WA11 2919	Spear	Private	Domestic	General Use			3.50	3.50	Very Good				1158m	South West
GW105 590	10BL162 288, 10WA11 3394	Bore		Domestic	Domestic		10/03/2005							1161m	South West
GW101 871	10BL157 462, 10WA11 3159	Bore		Domestic	Domestic		29/01/1996	5.80	5.80	Good	1.83	1.000		1170m	North
GW105 761	10BL162 540, 10WA11 3442	Spear	Private	Domestic	Domestic		06/01/2004	7.00	7.00	Good	5.00	0.500		1175m	North
GW072 776		Spear	Private		Domestic		31/12/1995	2.50						1177m	South West
GW101 025	10BL157 001, 10WA11 3097	Spear	Private	Domestic	Domestic		17/09/1995	5.00	5.00					1178m	North
GW107 648	10BL165 728, 10WA11 4034	Spear	Private	Domestic	Domestic		02/11/2005	4.00	4.00	Good	2.00	0.500		1179m	South West
GW108 980	10BL602 126, 10WA11 4446	Spear	Private	Domestic	Domestic		27/06/2008	6.00			2.00	0.500		1179m	South West
GW108 222	10BL600 378, 10WA11 4144	Spear	Private	Domestic	Domestic		14/07/2006	6.00	6.00		2.00	0.500		1180m	North
GW105 516	10BL162 114, 10WA11 3350	Bore		Domestic	Domestic		20/10/2003	8.24	8.24		5.18	1.000		1183m	North
GW110 420	10BL602 975, 10WA11 4563	Spear	Private	Domestic	Domestic		30/03/2009	6.00	6.00	Good	4.00	0.500		1183m	South West
GW106 375	10BL163 871, 10WA11 3698	Spear	Private	Domestic	Domestic		17/08/2004	6.00	6.00	Good	3.00	0.500		1184m	North
GW105 822	10BL162 866, 10WA11 3502	Spear	Private	Domestic	Domestic		10/03/2004	4.00	4.00	Good	2.00	0.500		1188m	South West
GW107 851	10BL163 992, 10WA11 3714	Spear	Private	Domestic	Domestic		12/11/2004	4.00	4.00	Good	2.00	0.500		1189m	South West
GW026 485	10BL019 150, 10WA11 2981	Spear	Private	Domestic	General Use		01/12/1965	5.30						1191m	North
GW108 535	10BL601 008, 10WA11 4262	Spear	Private	Domestic	Domestic		15/01/2007	7.00	7.00	Good	4.00	0.500		1194m	North
GW108 349	10BL600 487, 10WA11 4157	Spear	Private	Domestic	Domestic		03/08/2006	4.00	4.00		2.00	0.500		1197m	South
GW108 402	10BL600 687, 10WA11 4195	Spear	Private	Domestic	Domestic		15/11/2006	8.54	8.54	Good	3.36	1.000		1201m	North
GW109 029	10BL161 849, 10WA11 4715	Spear	Private	Industrial	Industrial		11/07/2008	4.00	4.00	Good	2.00	0.500		1206m	North West

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GW110 866	10BL603 606, 10WA11 4592	Spear	Private	Domestic	Domestic		29/04/2010	6.00	6.00	Good	2.00	0.500		1216m	South West
GW106 276	10BL163 542, 10WA11 3606	Spear	Private	Domestic	Domestic		05/09/2004	5.00	5.00					1223m	North
GW107 270	10BL163 739, 10WA11 3667	Spear	Private	Domestic	Domestic		30/09/2004	5.50	5.50					1226m	South West
GW106 396	10BL163 456, 10WA11 3583	Spear	Private	Domestic	Domestic		05/08/2004	6.00	6.00		1.50	0.500		1231m	South West
GW023 289	10BL016 773, 10WA11 2844	Spear	Private	Domestic	General Use		01/11/1965	3.60						1232m	North
GW110 382	10BL600 116, 10WA11 4101	Bore	Private	Domestic	Domestic		01/01/2007	8.00				2.500		1234m	South
GW023 997	10BL017 869, 20BL017 407	Spear	Private	Domestic, Irrigation, Not Known, Stock	General Use		01/02/1966	4.20	4.30					1238m	South West
GW107 298	10BL165 094, 10WA11 3922	Spear	Private	Domestic	Domestic		26/08/2005	6.00	6.00					1243m	North
GW105 586	10BL162 242, 10WA11 3375	Spear	Private	Domestic	Domestic		17/11/2003	4.00	4.00	Good	1.50	0.500		1246m	South West
GW105 728	10BL162 278, 10WA11 3390	Bore	Private	Domestic	Domestic		17/02/2004	6.00	6.00	Good	3.00	0.500		1249m	North
GW111 764	10BL165 514, 10WA11 3986	Spear	Private	Domestic	Domestic		01/11/2005	7.00	7.00		5.00	0.500		1250m	South West
GW106 484	10BL163 846, 10WA11 3692	Spear	Private	Domestic	Domestic		25/10/2004	4.00	4.00	Good	2.00	0.500		1251m	South West
GW107 669	10BL164 346, 10WA11 3778	Spear	Private	Domestic	Domestic		24/11/2005	6.00	6.00	Good	4.00	0.500		1251m	North
GW109 094	10BL162 230, 10WA11 3371	Spear	Private	Domestic	Domestic		22/07/2008	7.00		Good	5.00	0.500		1255m	North
GW106 007	10BL163 131, 10WA11 3530	Spear	Private	Domestic	Domestic		16/06/2004	7.00	7.00	Good	5.00	0.500		1258m	North
GW106 456	10BL162 228, 10WA11 3370	Spear	Private	Domestic	Domestic		01/01/1995	6.00	6.00					1259m	North
GW107 020	10BL164 921, 10WA11 3891	Spear	Private	Domestic	Domestic		01/06/2001	5.00	5.00					1259m	North West
GW110 323	10BL600 231, 10WA11 4126	Spear	Private	Domestic	Domestic		04/04/2006	9.15	9.15		2.35	1.000		1260m	North
GW106 898	10BL164 345, 10WA11 3777	Spear	Private	Domestic	Domestic		01/02/2005	3.96	3.97	Good	2.13	1.000		1262m	South West

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW072078	10BL151405, 10WA113007	Spear	Private	Domestic	Domestic		30/01/1993	6.00	6.00					1267m	South West
GW112428	10BL603830, 10WA114598	Spear	Private	Domestic	Domestic		16/05/2010	6.00	6.00	Good	1.50	0.500		1274m	South West
GW106020	10BL162587, 10WA113455	Spear	Private	Domestic	Domestic		17/03/2004	4.00	4.00	Good	2.00	0.500		1280m	South West
GW108563	10BL601311, 10WA114315	Spear	Private	Domestic	Domestic		12/02/2007	8.23	8.23	Good	1.83	1.000		1284m	North
GW107458	10BL165663, 10WA114014	Spear	Private	Domestic	Domestic		24/10/2005	6.00	6.00	Good	2.00	0.500		1285m	South West
GW025711	10BL016418, 10WA112813	Spear	Private	Domestic	General Use		01/01/1959	4.80	4.90	Very Good				1289m	North
GW108652	10BL601192, 10WA114296	Spear	Private	Domestic	Domestic		06/02/2007	7.00	7.00		5.00	0.500		1290m	North
GW108513	10BL600718, 10WA114204	Spear	Private	Domestic	Domestic		29/11/2000	4.00	4.00	Good	2.00	0.500		1291m	South West
GW106367	10BL163800, 10WA113689	Spear	Private	Domestic	Domestic		30/09/2004	4.00	4.00		2.00	0.500		1296m	South West
GW106034	10BL162784, 10WA113485	Spear	Private	Domestic	Domestic		23/03/2004	4.00	4.00	Good	2.00	0.150		1297m	South West
GW108661	10BL601547, 10WA114370	Spear	Private	Domestic	Domestic		22/03/2007	7.00	7.00	Good	2.00	0.500		1298m	South West
GW027330	10BL018976	Spear	Private	Domestic	General Use		01/09/1966	5.40		Good				1309m	South West
GW108302	10BL600694, 10WA114198	Spear	Private	Domestic	Domestic		28/11/2006	4.58	4.58		2.13	1.000		1309m	South West
GW107695	10BL165292, 10WA113949	Spear	Private	Domestic	Domestic		20/08/2005	7.50	7.50					1310m	North
GW108549	10BL601197, 10WA114299	Spear	Private	Domestic	Domestic		19/02/2007	7.00	7.00	Good	5.00	0.500		1310m	North
GW106356	10BL163938, 10WA113707	Spear	Private	Domestic	Domestic		14/09/2004	4.00	4.00	Good	2.00	0.500		1311m	South West
GW023571	10BL017592, 10WA112916	Spear	Private	Domestic	General Use			3.60						1314m	South West
GW100520	10BL157638, 10WA114655	Spear	Private	Recreation (groundwater)	Recreation (groundwater)		01/07/1966	7.00	7.00					1319m	North
GW108816	10BL601791, 10WA114416	Spear	Private	Domestic	Domestic		29/05/2007	8.54	8.54	Good	1.83	1.000		1319m	North

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW106369	10BL163798, 10WA113687	Spear	Private	Domestic	Domestic		20/08/2004	6.00	6.00	Good	2.00	0.500		1324m	South West
GW106368	10BL163799, 10WA113688	Spear	Private	Domestic	Domestic		07/04/2004	6.00	6.00		2.00	0.500		1328m	South West
GW107722	10BL162466, 10WA113432	Spear	Private	Domestic	Domestic		18/01/2004	6.71	6.71	Good	3.05	1.000		1329m	North
GW106655	10BL164351, 10WA113780	Spear	Private	Domestic	Domestic		19/11/2004	4.00	4.00	Good	2.00	0.500		1331m	South West
GW026388	10BL018052, 10WA112937	Spear	Private	Domestic	General Use		01/03/1966	4.20	4.30					1332m	North
GW032031	10BL023897, 10WA112998	Bore	Private	Domestic	Domestic		01/10/1969	3.00	3.00			0.440		1333m	South West
GW108550	10BL601193, 10WA114297	Spear	Private	Domestic	Domestic		19/02/2007	7.00	7.00	Good	5.00	0.500		1333m	North
GW112352	10BL602148, 10WA114452	Spear	Private	Domestic	Domestic		10/02/2008	8.00	8.00		3.00	0.250		1335m	North
GW108574	10BL601420, 10WA114344	Spear	Private	Domestic	Domestic		10/03/2007	6.10	6.10	Good	2.75	1.000		1339m	North
GW111437	10BL600924, 10WA114247	Spear	Private	Domestic	Domestic		26/07/2007	4.88	4.88	good	2.13	1.000		1339m	South West
GW105769	10BL162614, 10WA113459	Spear	Private	Domestic	Domestic		14/02/2004	4.00	4.00	Good	2.00	0.500		1340m	South West
GW106922	10BL162580, 10WA113451	Spear	Private	Domestic	Domestic		01/07/2004	3.70	3.70		1.60	0.350		1341m	South West
GW105460	10BL162147, 10WA113354	Bore		Domestic	Domestic		22/10/2003	4.00	4.50	Good	1.50	0.500		1346m	North
GW107513	10BL165583, 10WA113997	Spear	Private	Domestic	Domestic		08/10/2005	4.00	4.00	Good	2.00	0.500		1346m	North
GW110206	10BL600363, 10WA114143	Spear	Private	Domestic	Domestic		18/07/2006	5.80	5.80	Good	2.13	1.000		1349m	North West
GW109148	10BL601885, 10WA114420	Spear	Private	Domestic	Domestic		05/08/2008	4.00		Good	2.00	0.500		1351m	South West
GW111225	10BL604161, 10WA114605	Spear	Private	Domestic	Domestic		02/09/2010	8.00	8.00	good	2.00	0.500		1352m	North
GW111896	10BL602153, 10WA114454	Spear	Private	Domestic	Domestic		02/12/2007	4.00	4.00	good	2.00	0.500		1353m	South West
GW109122	10BL602156, 10WA114455	Spear	Private	Domestic	Domestic		25/07/2008	6.00		Good	2.00	0.500		1355m	North

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW023994	10BL017512, 10WA112906	Spear	Private	Domestic	General Use		01/02/1966	5.40	5.50	Good				1357m	South West
GW100679	10BL157776, 10WA113177	Spear	Private	Domestic	Domestic		22/10/1996	4.58	4.58	Good	1.67	1.000		1357m	North
GW105742	10BL162260, 10WA113381	Spear	Private	Domestic	Domestic		25/02/2004	4.00	4.00	Good	2.00	0.500		1364m	North West
GW024373	10BL018578, 10WA112958	Spear	Private	Domestic	General Use		01/08/1966	5.10	5.20	Good				1368m	North
GW107576	10BL164148, 10WA113738	Spear	Private	Domestic	Domestic		04/11/2004	8.54	8.54	Good	2.45	1.000		1375m	North
GW110877	10BL603575, 10WA114590	Spear	Private	Domestic	Domestic		12/03/2010	6.00	6.00	Good	2.00	0.500		1375m	South West
GW109095	10BL162272, 10WA113388	Spear	Private	Domestic	Domestic		22/07/2008	7.00		Good	5.00	0.500		1381m	North
GW108650	10BL600828, 10WA114232	Spear	Private	Domestic	Domestic		09/01/2007	4.00	4.00	Good	2.00	0.500		1398m	North West
GW025539	10BL016547, 10WA112822	Spear	Private	Domestic, General Use	General Use		01/12/1965	4.50	4.60	Good				1402m	North
GW106485	10BL163765, 10WA113673	Spear	Private	Domestic	Domestic		03/11/2004	4.00	4.00	Good	2.00	0.500		1402m	South West
GW109136	10BL602164, 10WA109231	Spear	Private	Domestic	Domestic		31/07/2008	4.00		Good	2.00	0.500		1402m	South West
GW023427	10BL017149, 10WA112867	Spear	Private	Domestic	General Use		01/02/1966	5.40	5.50					1403m	North
GW107532	10BL163387, 10WA113572	Spear	Private	Domestic	Domestic		18/10/2005	5.50	5.50					1403m	North West
GW100564	10BL158043, 10WA113195	Spear	Private	Domestic	Domestic		09/05/1997	10.00	10.00					1411m	North
GW106400	10BL163462, 10WA113585	Spear	Private	Domestic	Domestic		23/07/2004	4.00	4.00		2.00	0.500		1411m	South West
GW110727	10BL601279, 10WA114313	Spear	Private	Domestic	Domestic		20/04/2007	6.00	6.00	Good	2.00	0.500		1412m	North
GW105569	10BL162164, 10WA113359	Bore		Domestic	Domestic		06/11/2003	4.00	4.50	Good	1.50	0.500		1413m	South West
GW108321	10BL164479, 10WA113800	Spear	Private	Domestic	Domestic		06/02/2006	5.60	5.60					1416m	North
GW108301	10BL600651, 10WA114189	Spear	Private	Domestic	Domestic		14/11/2006	6.00	6.00		2.00	0.500		1424m	South West

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW107595	10BL165646, 10WA114009	Spear	Private	Domestic	Domestic		29/10/2005	5.49	5.49	Good	2.75	1.000		1431m	North
GW105592	10BL162330, 10WA113404	Spear	Private	Domestic	Domestic		20/11/2003	6.00	6.00	Good	2.00	0.500		1434m	South West
GW106084	10BL162816, 10WA113490	Spear	Private	Domestic	Domestic		19/03/2004	6.00	6.00	Good	2.00	0.500		1435m	North
GW107314	10BL165075, 10WA113917	Spear	Private	Domestic	Domestic		26/06/2005	8.23	8.24	Good	4.88	1.000		1440m	North
GW024060	10BL017417, 10WA108127	Spear	Private	Domestic, Stock	General Use		01/01/1966	3.60	3.70	Good				1442m	South West
GW111245	10BL600196, 10WA114122	Bore	Private	Domestic	Domestic		10/11/2006	4.00	4.00	good	2.00	0.500		1448m	South West
GW107422	10BL165058, 10WA113909	Spear	Private	Domestic	Domestic		21/10/2005	4.00	4.00		2.00	0.500		1455m	South West
GW111295	10BL601463, 10WA114358	Spear	Private	Domestic	Domestic		01/01/2007	9.00	9.00		4.00	0.500		1457m	North
GW106881	10BL164470, 10WA113799	Spear	Private	Domestic	Domestic		26/11/2004	6.00	6.00	Good	2.00	0.500		1462m	North West
GW110302	10BL602998, 10WA114564	Spear	Private	Domestic	Domestic		05/06/2009	5.49	5.49	Good	3.50	1.000		1463m	South West
GW110493	10BL600195, 10WA114121	Bore	Private	Domestic	Domestic		06/11/2006	4.00	4.00	Good	2.00	0.500		1463m	South West
GW107690	10BL165774, 10WA114038	Spear	Private	Domestic	Domestic		17/11/2005	4.00	4.00	Good	1.50	0.500		1467m	South West
GW107682	10BL165544, 10WA113988	Spear	Private	Domestic	Domestic		05/10/2005	4.00	4.00		2.00	0.500		1470m	North West
GW106846	10BL164458, 10WA113795	Spear	Private	Domestic	Domestic		14/12/2004	7.93	7.93	Good	1.83	1.000		1479m	North
GW108747	10BL601473, 10WA114359	Spear	Private	Domestic	Domestic		17/04/2007	4.00	4.00	Good	2.00	0.500		1482m	South West
GW106308	10BL163674, 10WA113648	Spear	Private	Domestic	Domestic		16/08/2004	8.54	8.54		2.13	1.000		1485m	South West
GW108015	10BL162247, 10WA113378	Spear	Private	Domestic	Domestic		03/04/2006	5.00	5.00		3.00	0.500		1485m	South West
GW023134	10BL016772, 10WA112843	Spear	Private	Domestic	General Use		01/12/1965	5.30	5.30	Good				1493m	North

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GW101056	10BL157359, 10BL160595, 10WA114663	Spear	Local Govt	Recreation (groundwater)	Recreation (groundwater)		20/07/1995	6.00	6.00		4.00	5.000		1493m	North
GW109775	10BL165842, 10WA109026	Spear	Private	Domestic	Domestic		01/01/1990	5.00						1494m	North West
GW106101	10BL162480, 10WA108622	Spear	Private	Domestic	Domestic		22/03/2004	5.00	5.00	Good	2.00	0.500		1499m	South West
GW108716	10BL601597, 10WA109192	Spear	Private	Domestic	Domestic		10/04/2007	5.00	5.00					1501m	North West
GW023613	10BL017317, 10WA112891	Spear	Private	Domestic	General Use		01/03/1966	6.40	6.40					1504m	North
GW110418	10BL602956, 10WA114562	Spear	Private	Domestic	Domestic		04/03/2009	6.00	6.00	Good	4.00	0.500		1512m	North
GW075059		Bore	NSW Office of Water		Monitoring Bore	BOTANY BORE AT SCARBOROUGH PARK	28/05/2001	17.50	17.50				13.28	1513m	North
GW106939	10BL165002, 10WA113904	Bore	Private	Domestic	Domestic		01/07/2002	3.00	3.00		1.50			1514m	South West
GW107661	10BL165787, 10WA114039	Spear	Private	Domestic	Domestic		16/11/2005	7.00	7.00	Good	5.00	0.500		1516m	North
GW107279	10BL162332, 10WA108600	Spear	Private	Domestic	Domestic		30/11/2004	5.00	5.00	Good	3.00	0.500		1518m	South West
GW105367	10BL162005, 10WA113345	Bore		Domestic	Domestic		01/01/1990	5.00						1521m	South West
GW106431	10BL163472, 10WA113587	Spear	Private	Domestic	Domestic		24/08/2004	7.63	7.63		4.58	1.000		1522m	North
GW107506	10BL165440, 10WA113978	Spear	Private	Domestic	Domestic		29/09/2005	4.00	4.00	Good	2.00	0.500		1523m	North West
GW107078	10BL165050, 10WA108945	Spear	Private	Domestic	Domestic		19/04/2005	4.00	4.00	Good	2.00	0.500		1525m	South West
GW107735	10BL165892, 10WA114055	Spear	Private	Domestic	Domestic		09/01/2006	7.00	7.00	Good	5.00	0.500		1526m	North
GW109114	10BL602304, 10WA114483	Spear	Private	Domestic	Domestic		25/07/2008	7.00		Good	2.00	0.500		1539m	South West
GW107775	10BL165999, 10WA114077	Spear	Private	Domestic	Domestic		28/01/2006	6.71	6.71	Good	3.05	1.000		1541m	North
GW107889	10BL600004, 10WA114079	Spear	Private	Domestic	Domestic		03/02/2006	6.00	6.00		4.00	0.500		1543m	North

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GW111899	10BL602081, 10WA114436	Spear	Private	Domestic	Domestic		01/01/2007	6.00	6.00		4.00	0.580		1549m	North
GW114507	10WA118852	Spear	Private	Domestic	Domestic		28/02/2014	6.00	6.00		2.00	0.500		1551m	South West
GW108715	10BL601603, 10WA114386	Spear	Private	Domestic	Domestic		30/04/2007	7.93	7.93	Good	61.21	1.000		1558m	North
GW111414	10BL601570, 10WA114377	Spear	Private	Domestic	Domestic		30/04/2007	6.00	6.00					1565m	North West
GW107847	10BL165944, 10WA114064	Spear	Private	Domestic	Domestic		30/01/2006	4.00	4.00	Good	2.00	0.500		1568m	South West
GW111285	10BL601350, 10WA114325	Spear	Private	Domestic	Domestic		01/01/2007	9.00	9.00		5.00	0.500		1571m	North West
GW107086	10BL165066, 10WA113915	Bore		Domestic	Domestic		01/01/1983	4.50			2.00	0.500		1579m	South West
GW106984	10BL164221, 10WA113758	Spear	Private	Domestic	Domestic		06/04/2005	6.00	6.00					1583m	North
GW106189	10BL163793, 10WA113684	Spear	Private	Domestic	Domestic		26/03/2004	5.00	5.00					1584m	South West
GW072299		Spear	Private		Domestic		05/12/1994	8.40	8.40	Good				1596m	North
GW107184	10BL165139, 10WA113925	Spear	Private	Domestic	Domestic		08/07/2005	5.00	5.00					1598m	North
GW111906	10BL602178, 10WA114459	Spear	Private	Domestic	Domestic		06/12/2007	6.00	6.00		2.00			1602m	North West
GW106964	10BL164618, 10WA113820	Bore		Domestic			05/04/2006							1606m	South West
GW107747	10BL165791, 10WA114040	Spear	Private	Domestic	Domestic		13/05/2001	6.00	6.00					1610m	North West
GW108084	10BL165725, 10WA114033	Spear	Private	Domestic	Domestic		13/05/2006	6.00	6.00					1614m	North West
GW109152	10BL600145	Bore	Private	Test Bore	Test Bore		05/08/2008	204.00	204.00	7.03	4.00	2.000		1614m	North West
GW101329	10BL158407, 10WA113229	Spear	Private	Domestic	Domestic		04/02/1998	4.52	4.57	Good	1.52	1.000		1616m	North West
GW106416	10BL162659, 10WA113467	Spear	Private	Domestic	Domestic		13/09/2004	5.00	5.00		2.00	0.500		1621m	South West
GW107023	10BL164917, 10WA113889	Spear	Private	Domestic	Domestic		05/04/2005	6.00	6.00	Good	2.00	0.500		1636m	South West
GW111140	10BL165135, 10WA113923	Bore	Private	Domestic	Domestic		31/07/2005	7.00	7.00					1643m	North

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GW109 267	10BL164 768, 10WA11 3856	Bore	Private	Domestic	Domestic		26/08/2008	8.00			2.00	2.500		1644m	North
GW108 743	10BL601 454, 10WA11 4355	Spear	Private	Domestic	Domestic		28/03/2007	7.32	7.32	Good	3.66	1.000		1648m	North
GW106 301	10BL162 533, 10WA11 3441	Spear	Private	Domestic	Domestic		26/07/2004	4.27	4.27			1.000		1650m	South West
GW101 224	10BL158 320, 10WA11 3221	Spear	Private	Domestic	Domestic		06/12/1997	7.62	7.62	Good	4.27	1.000		1655m	North
GW106 481	10BL164 190, 10WA11 3751	Spear	Private	Domestic	Domestic		15/10/2004	4.00	4.00		2.00	0.500		1655m	South West
GW107 185	10BL163 572, 10WA11 3614	Spear		Domestic	Domestic		09/08/2005	7.00	7.00					1655m	South
GW106 270	10BL163 740, 10WA11 3668	Spear	Private	Domestic	Domestic		05/09/2004	5.00	5.00					1658m	North West
GW023 262	10BL017 087, 10WA11 2865	Spear	Private	Conservation Of Water, Domestic	General Use		01/11/1965	6.70	6.70					1661m	South West
GW109 102	10BL162 221, 10WA11 3367	Spear	Private	Domestic	Domestic		23/07/2008	6.00		Good	2.00	0.500		1663m	North
GW109 130	10BL602 214, 10WA11 4464	Spear	Private	Domestic	Domestic		28/07/2008	6.00		Good	2.00	0.500		1663m	South West
GW112 387	10WA11 8636	Spear	Private	Domestic	Domestic		14/03/2013	7.50	7.50		1.50	0.500		1664m	South West
GW115 037	10BL604 285, 10WA10 9311			Domestic	Domestic		01/01/2010	7.00	7.00		4.00			1664m	South West
GW109 925	10BL602 778, 10WA11 4537	Bore	Private	Domestic	Domestic		22/01/2009	6.00	6.00	Good	2.00	0.500		1672m	South West
GW072 456		Bore	Private		Domestic		07/11/1994	6.00	6.00					1674m	South West
GW107 216	10BL164 924, 10WA11 3892	Spear	Private	Domestic	Domestic		01/06/2005	6.00	6.00		3.00	0.500		1676m	North
GW111 925	10WA11 7313	Bore	Private	Domestic	Domestic		21/12/2011	8.00	8.00		2.00	0.500		1682m	North
GW109 935	10BL602 760, 10WA11 4533	Spear	Private	Domestic	Domestic		27/11/2008	7.63	7.63	Good	3.66	1.000		1684m	North
GW106 175	10BL163 406, 10WA11 3577	Spear	Private	Domestic	Domestic		18/06/2004	6.00	6.00		3.00	0.500		1685m	North
GW107 622	10BL165 720, 10WA11 4031	Spear	Private	Domestic	Domestic		17/11/2005	7.01	7.02	Good	3.96	1.000		1685m	North
GW108 735	10BL163 130, 10WA11 3529	Spear	Private	Domestic	Domestic		01/01/1970	4.00			3.00			1688m	South

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW106388	10BL163522, 10WA113599	Spear	Private	Domestic	Domestic		22/09/2004	4.00	4.00			0.500		1689m	North West
GW106850	10BL164423, 10WA113791	Spear	Private	Domestic	Domestic		01/12/2004	5.00	5.00	Good	2.00	0.500		1689m	South West
GW110202	10BL600043, 10WA114087	Spear	Private	Domestic	Domestic		10/03/2006	6.00	6.00					1689m	North
GW106860	10BL164689, 10WA113831	Spear	Private	Domestic	Domestic		22/03/2005	6.00	6.00	Good	2.00	0.500		1693m	North
GW107450	10BL163550, 10WA113608	Spear	Private	Domestic	Domestic		26/08/2005	4.00	4.00	Good	2.00	0.500		1695m	North
GW108633	10BL163478, 10WA113590	Spear	Private	Domestic	Domestic		06/11/2004	7.32	7.32	Good	4.27	1.000		1695m	North
GW025816	10BL017189, 10WA112871	Spear	Private	Domestic	General Use		01/12/1965	6.00	6.10	Good				1698m	North
GW106883	10BL164464, 10WA113796	Spear	Private	Domestic	Domestic		01/12/2004	6.00	6.00	Good	3.00	3.000		1702m	North
GW107849	10BL600085, 10WA114096	Spear	Private	Domestic	Domestic		02/03/2006	7.00	7.00	Good	2.00	0.500		1702m	North
GW109027	10BL602062, 10WA109218	Piezo meter	Private	Domestic	Domestic		11/07/2008	4.00		Good	2.00	0.500		1702m	North West
GW106894	10BL164369, 10WA113785	Spear	Private	Domestic	Domestic		24/11/2004	4.00	4.00	Good	2.00	0.500		1712m	South West
GW107859	10BL600081, 10WA114094	Spear	Private	Domestic	Domestic		02/03/2006	7.00	7.00		2.00	0.500		1712m	North
GW109945	10BL601825, 10WA114417	Spear	Private	Domestic	Domestic		22/12/2008	7.50	7.50	Good	4.00	0.500		1715m	North
GW025557	10BL016400, 10WA112811	Spear	Private	Domestic	Domestic		01/11/1965	3.30	3.40	Good	1.60	0.450		1718m	South West
GW107045	10BL162158, 10WA113356	Spear	Private	Domestic	Domestic		31/03/2005	6.00	6.00	Good	2.00	0.500		1725m	North
GW106275	10BL163551, 10WA113609	Spear	Private	Domestic	Domestic		03/09/2004	5.00	5.00					1732m	South West
GW109063	10BL602167, 10WA114458	Spear	Private	Domestic	Domestic		16/07/2008	4.00		Good	2.00	0.500		1733m	South West
GW108288	10BL600539, 10WA114162	Spear	Private	Domestic	Domestic		30/10/2006	4.00	4.00		2.00	0.500		1745m	North West
GW108007	10BL165061, 10WA108948	Spear		Domestic	Domestic		01/01/2005	5.00	5.00					1749m	North West

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW107 275	10BL165 285, 10WA11 3947	Spear	Private	Domestic	Domestic		07/07/2005	6.00	6.00		2.00	0.500		1750m	South West
GW107 553	10BL164 210, 10WA11 3755	Spear	Private	Domestic	Domestic		21/10/2005	4.00	4.00	Good	2.00	0.500		1751m	South West
GW106 861	10BL164 669, 10WA11 3828	Spear	Private	Domestic	Domestic		15/01/2005	4.00	4.00	Good	2.00	0.500		1752m	South West
GW106 379	10BL163 860, 10WA11 3694	Spear	Private	Domestic	Domestic		18/08/2004	6.00	6.00	Good	4.00	0.500		1753m	North
GW110 710	10BL603 669, 10WA11 4595	Spear	Private	Domestic	Domestic		13/02/2010	6.00	6.00	Good	1.52	1.000		1753m	South West
GW025 546	10BL016 473, 10WA10 8121	Bore	Private	Domestic	General Use		01/11/1965	3.30						1754m	South West
GW023 495	10BL017 314, 10WA11 2889	Spear	Private	Domestic	General Use		01/02/1966	5.40	5.50	Good				1755m	North West
GW111 797	10BL165 700	Spear	Private	Domestic	Domestic		24/10/2006	7.32	7.32	good		1.000		1756m	South West
GW106 882	10BL164 469, 10WA11 3798	Spear	Private	Domestic	Domestic		28/12/2004	5.00	5.00					1757m	North West
GW108 097	10BL164 928, 10WA11 3894	Spear	Private	Domestic	Domestic		03/05/2005	5.80	5.80		1.52	1.000		1758m	South West
GW105 976	10BL162 777, 10WA11 3483	Spear	Private	Domestic	Domestic		24/02/2004	8.23	8.24			1.000		1759m	South West
GW108 777	10BL601 436, 10WA11 4347	Spear	Private	Domestic	Domestic		10/04/2007	6.00	6.00	Good	2.00	0.500		1759m	North West
GW108 655	10BL600 067, 10WA11 4091	Spear	Private	Domestic	Domestic		12/02/2007	7.00	7.00	Good	2.00	0.500		1760m	South West
GW107 879	10BL165 961, 10WA11 4068	Spear	Private	Domestic	Domestic		09/03/2006	4.00	4.00		2.00	0.500		1761m	South West
GW108 176	10BL600 453, 10WA11 4148	Spear	Private	Domestic	Domestic		11/08/2006	4.00	4.00		2.00	0.500		1761m	South
GW110 652	10BL600 729, 10WA11 4207	Spear	Private	Domestic	Domestic		23/01/2007	5.49	5.49	Good	5.49	1.000		1761m	North
GW110 865	10BL603 570, 10WA11 4589	Spear	Private	Domestic	Domestic		13/04/2010	4.00	4.00		2.00	0.500		1761m	North West
GW107 887	10BL600 032, 10WA11 4083	Spear	Private	Domestic	Domestic		07/02/2006	6.00	6.00		4.00	0.500		1766m	North
GW107 206	10BL164 741, 10WA11 3850	Spear	Private	Domestic	Domestic		08/07/2005	4.00	4.00		2.00	0.500		1768m	South West

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW106421	10BL163477, 10WA113589	Bore		Domestic			01/09/2005							1772m	North West
GW106117	10BL162859, 10WA113500	Spear	Private	Domestic	Domestic		21/06/2004	4.00	4.00	Good	2.00	0.500		1774m	South West
GW106618	10BL162392, 10WA113421	Spear	Private	Domestic	Domestic		01/01/1985	6.00	6.00					1776m	North
GW107456	10BL164735, 10WA113847	Spear	Private	Domestic	Domestic		07/10/2005	4.00	4.00	Good	2.00	0.500		1781m	South West
GW108568	10BL601206, 10WA114301	Spear	Private	Domestic	Domestic		18/03/2007	7.00	7.00					1784m	North
GW107664	10BL165819, 10WA114046	Spear	Private	Domestic	Domestic		21/11/2005	6.00	6.00	Good	2.00	0.500		1786m	South West
GW105587	10BL162206, 10WA113365	Spear	Private	Domestic	Domestic		17/11/2003	6.00	6.00	Good	3.00	0.500		1792m	North
GW108690	10BL601645, 10WA114396	Spear	Private	Domestic	Domestic		09/05/2007	7.00	7.00	Good	2.00	0.500		1793m	South West
GW106009	10BL162650, 10WA113465	Spear	Private	Domestic	Domestic		09/03/2004	4.00	4.00	Good	2.00	0.500		1794m	South
GW111229	10BL600586, 10WA114172	Spear	Private	Domestic	Domestic		10/10/2006	6.00	6.00					1794m	North West
GW106392	10BL163723, 10WA113661	Spear	Private	Domestic	Domestic		10/09/2004	6.00	6.00	Good	1.00	0.500		1795m	South West
GW106424	10BL163594, 10WA113623	Spear	Private	Domestic	Domestic		22/07/2004	4.00	4.00	Good	2.00	0.500		1800m	South West
GW108005	10BL165049, 10WA113908	Spear	Private	Domestic	Domestic		24/07/2006	4.00	4.00		2.00	0.500		1804m	South West
GW106393	10BL163722, 10WA113660	Spear	Private	Domestic	Domestic		23/09/2004	6.00	6.00		1.00	0.500		1807m	South West
GW108646	10BL601387, 10WA114335	Spear	Private	Domestic	Domestic		01/03/2007	7.00	7.00		2.00	0.500		1814m	South West
GW072795		Spear	Private		Domestic		21/01/1995	8.40	8.40	Good				1815m	North
GW107060	10BL164857, 10WA113874	Spear	Private	Domestic	Domestic		06/04/2005	4.00	4.00		2.00	0.500		1821m	South West
GW105972	10BL162293, 10WA113396	Spear	Private	Domestic	Domestic		25/03/2004	5.00	5.00	Good	3.00	0.500		1827m	South West
GW106224	10BL163619, 10WA113633	Spear	Private	Domestic	Domestic		13/08/2004	6.00	6.00	Good	4.20	0.500		1828m	North

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW107731	10BL164566, 10WA113813	Spear	Private	Domestic	Domestic		10/01/2006	7.00	7.00	Good	5.00	0.500		1829m	North
GW108689	10BL165529	Spear	Private	Domestic	Domestic		04/10/2005	4.00	4.00	Good	2.00	0.500		1829m	South West
GW109023	10BL602051, 10WA114433	Spear	Private	Domestic	Domestic		11/07/2008	7.00		Good	3.00	0.500		1830m	South West
GW108887	10BL163346, 10WA113563	Spear	Private	Domestic	Domestic		30/05/2008	8.00		Good	6.00	0.500		1835m	North
GW106907	10BL164604, 10WA113819	Spear	Private	Domestic	Domestic		01/02/2005	4.00	4.00	Good	2.00	0.500		1836m	North
GW107281	10BL162225, 10WA113368	Spear	Private	Domestic	Domestic		06/07/2005	6.00	6.00		2.00	0.500		1838m	South West
GW106834	10BL164739, 10WA113848	Spear	Private	Domestic	Domestic		09/02/2005	4.00	4.00	Good	2.00	0.500		1839m	South West
GW107095	10BL164491, 10WA113802	Spear	Private	Domestic	Domestic		15/12/2005	5.80	5.80		2.75	1.000		1840m	South West
GW107136	10BL164583, 10WA113815	Bore		Domestic			26/05/2006							1841m	South
GW024674	10BL018961, 10WA112975	Spear	Private	Domestic	General Use			6.00						1842m	North
GW106185	10BL163494, 10WA113596	Bore		Domestic			04/07/2005							1843m	North
GW107493	10BL165555, 10WA113991	Spear	Private	Domestic	Domestic		08/10/2005	7.32	7.32	Good	4.27	1.000		1849m	North
GW025551	10BL016962, 10WA112854	Spear	Private	Domestic	General Use		01/01/1965	2.50						1851m	North
GW106112	10BL162841, 10WA113495	Spear	Private	Domestic	Domestic		23/03/2004	4.00	4.00	Good	2.00	0.500		1852m	North
GW109144	10BL165878, 10WA114053	Spear	Private	Domestic	Domestic		04/08/2008	8.85		Good	2.88	1.000		1856m	North
GW108028	10BL164486, 10WA113801	Spear	Private	Domestic	Domestic		01/08/2006	6.00	6.00		3.00	0.500		1857m	South
GW107357	10BL164198, 10WA113753	Spear	Private	Domestic	Domestic		25/08/2005	6.10	6.10	Good	3.50	1.000		1862m	North
GW107372	10BL164146, 10WA113737	Spear	Private	Domestic	Domestic		23/10/2004	5.80	5.80	Good	1.83	1.000		1864m	North
GW023354	10BL016698, 10WA108124	Bore	Private	Domestic	General Use		01/11/1965	3.60	3.70	Good				1865m	North West

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW106 032	10BL162 781, 10WA11 3484	Spear	Private	Domestic	Domestic		27/02/2004	4.00	4.00	Good	2.00	0.500		1867m	South West
GW107 482	10BL164 126, 10WA11 3732	Spear	Private	Domestic	Domestic		10/10/2005	6.00	6.00	Good	2.00	0.500		1868m	South West
GW109 131	10BL602 269, 10WA11 4477	Spear	Private	Domestic	Domestic		29/07/2008	6.00						1870m	North
GW110 422	10BL602 921, 10WA11 4560	Spear	Private	Domestic	Domestic		28/02/2009	6.00	6.00	Good	4.00	0.500		1876m	North
GW108 649	10BL601 381, 10WA11 4334	Spear	Private	Domestic	Domestic		12/03/2007	6.00	6.00	Good	2.00	0.500		1880m	South West
GW108 927	10BL602 084, 10WA11 4438	Spear	Private	Domestic	Domestic		18/06/2008	5.80		Good	1.83	1.000		1885m	North
GW109 183	10BL163 966, 10WA10 8810	Bore	Private	Domestic	Domestic		08/08/2008	8.00			2.00	1.000		1890m	North West
GW107 169	10BL165 255, 10WA11 3941	Spear	Private	Domestic	Domestic		06/07/2005	6.00	6.00	Good	2.00	0.500		1897m	South West
GW108 035	10BL600 151, 10WA11 4112	Spear	Private	Domestic	Domestic		10/04/2006	4.00	4.00		2.00	0.500		1897m	South
GW107 364	10BL165 166, 10WA11 3930	Spear	Private	Domestic	Domestic		24/08/2005	5.18	5.19	Hard	3.36	1.000		1899m	North
GW109 938	10BL602 758, 10WA11 4531	Bore	Private	Domestic	Domestic		09/12/2008	6.00	6.00	Good	3.00	0.500		1900m	South West
GW110 189	10BL602 322, 10WA11 4487	Spear	Private	Domestic	Domestic		01/04/2008	6.00	6.00					1904m	North
GW107 445	10BL165 464, 10WA11 3982	Spear	Private	Domestic	Domestic		01/01/1999	5.00	5.00					1907m	South
GW111 762	10BL164 772, 10WA10 8923	Spear	Private	Domestic	Domestic		01/05/2005	5.50	5.50		2.00			1908m	North West
GW107 684	10BL164 403, 10WA11 3789	Spear	Private	Domestic	Domestic		28/11/2005	6.00	6.00	Good	4.00	0.500		1914m	North
GW106 847	10BL164 449, 10WA11 3794	Spear	Private	Domestic	Domestic		09/12/2004	7.00	7.00	Good	2.00	0.500		1915m	South West
GW107 373	10BL163 703, 10WA11 3656	Spear	Private	Domestic	Domestic		05/05/2005	6.00	6.00					1915m	North
GW106 807	10BL164 119, 10WA11 3729	Spear	Private	Domestic	Domestic		24/11/2004	4.00	4.00	Good	2.00	0.500		1916m	South
GW106 133	10BL163 271, 10WA11 3551	Spear	Private	Domestic	Domestic		24/06/2004	4.88	4.88		2.13	1.000		1917m	South West

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW107876	10BL164713, 10WA113841	Bore		Domestic	Domestic		01/01/2005	6.00						1924m	North
GW108570	10BL601313, 10WA114316	Spear	Private	Domestic	Domestic		17/03/2007	7.93	7.93	Good	24.00	1.000		1924m	South West
GW108600	10BL601401, 10WA114339	Spear	Private	Domestic	Domestic		13/03/2007	5.80	5.80	Good	5.80	1.000		1930m	North
GW109559	10BL165436, 10WA113977	Spear	Private	Domestic	Domestic		27/08/2007	6.00	6.00					1931m	North
GW109491	10BL164620, 10WA113821	Spear	Private	Domestic	Domestic		05/12/2005	4.00	4.00		2.00	0.500		1932m	South
GW108694	10BL601501, 10WA114363	Spear	Private	Domestic	Domestic		18/04/2007	7.00	7.00	Good	2.00	0.500		1936m	South West
GW107484	10BL164122, 10WA113731	Spear	Private	Domestic	Domestic		01/01/2004	15.00	4.57			0.004		1941m	North
GW105591	10BL162291, 10WA113395	Bore	Private	Domestic	Domestic		15/11/2003	6.00	6.00	Good		0.500		1942m	North
GW106780	10BL164312, 10WA113772	Spear	Private	Domestic	Domestic		06/12/2004	7.32	7.32		3.96	1.000		1942m	North
GW107192	10BL164531, 10WA113807	Spear	Private	Domestic	Domestic		11/07/2005	7.32	7.32		4.27	1.000		1946m	North
GW107799	10BL600030, 10WA114082	Spear	Private	Domestic	Domestic		05/11/2006	5.50	5.50					1947m	North
GW107896	10BL600033, 10WA114084	Spear	P.W.D.	Domestic	Domestic		07/02/2006	6.00	6.00		4.00	0.500		1951m	North
GW110442	10BL602818, 10WA114542	Spear	Private	Domestic	Domestic		28/04/2009	6.00	6.00	Good	4.00	0.500		1951m	North
GW108496	10BL600789, 10WA114222	Spear	Private	Domestic	Domestic		05/02/2007	6.10	6.10	Good	2.75	1.000		1952m	North
GW109103	10BL162287, 10WA113393	Spear	Private	Domestic	Domestic		23/07/2008	6.00		Good	3.00	0.500		1953m	North
GW107606	10BL165683, 10WA114018	Spear	Private	Domestic	Domestic		30/10/2005	7.00	7.00					1954m	North
GW106755	10BL164343, 10WA113776	Spear	Private	Domestic	Domestic		10/01/2005	4.00	4.00	Good	2.00	0.500		1955m	South
GW107114	10BL162865, 10WA113501	Spear	Private	Domestic	Domestic		01/02/2004	5.85	5.85	Good	3.10	1.000		1956m	North
GW111497	10BL602544, 10WA114522	Spear	Private	Domestic	Domestic		25/05/2006	6.00	6.00					1956m	North

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW110167	10BL600252, 10WA114129	Spear	Private	Domestic	Domestic		20/05/2009	6.00	6.00	Good	4.00	0.500		1957m	North
GW110227	10BL600344, 10WA114137	Spear	Private	Domestic	Domestic		02/09/2006	7.00	7.00	Good	2.00	0.500		1968m	South West
GW111561	10BL600835, 10WA114235	Spear	Private	Domestic	Domestic		21/01/2007	6.00	6.00					1970m	North
GW023485	10BL017639, 10WA112920	Spear	Private	Domestic	General Use		01/01/1966	6.70	6.70					1975m	North
GW108109	10BL163673, 10WA113647	Spear	Private	Domestic	Domestic		07/09/2004	4.00	4.00		2.00	0.500		1979m	South West
GW108915	10BL601726, 10WA114408	Spear	Private	Domestic	Domestic		12/06/2008	6.00		Good	3.00	0.500		1979m	North
GW107374	10BL163614, 10WA113631	Spear	Private	Domestic	Domestic		01/10/2005	10.00	10.00					1980m	North
GW108559	10BL601258, 10WA114309	Spear	Private	Domestic	Domestic		13/02/2007	7.00	7.00	Good	5.00	0.500		1982m	North
GW107803	10BL165799, 10WA114045	Spear	Private	Domestic	Domestic		28/11/2005	6.10	6.10	Good	3.50	1.000		1983m	North
GW109105	10BL602338, 10WA114490	Spear	Private	Domestic	Domestic		23/07/2008	4.00		Good	2.00	0.500		1983m	South West
GW110219	10BL600362, 10WA114142	Spear	Private	Domestic	Domestic		07/09/2007	6.00	6.00					1983m	North
GW111954	10WA117979	Spear	Private	Domestic	Domestic		10/11/2012	7.00	7.00		2.00	0.500		1991m	South West
GW110271	10BL600360, 10WA114140	Bore	Private	Domestic	Domestic		30/08/2007	6.00	6.00					1992m	North
GW112523	10WA118033	Spear	Private	Domestic	Domestic		13/05/2013	6.00	6.00		2.00	0.500		1994m	North
GW107299	10BL165358, 10WA113967	Spear	Private	Domestic	Domestic		21/08/2005	5.60	5.60					1995m	North
GW016970	10BL008489, 10WA112793	Spear	Private	Domestic	General Use			7.30	7.30					1996m	South West

Hydrogeology & Groundwater

277 The Grand Parade, Ramsgate, NSW 2217

Driller's Logs

Drill log data relevant to the boreholes within the dataset buffer:

Groundwater No	Drillers Log	Distance	Direction
GW017349	0.00m-7.62m Sand	0m	On-site
GW106324	0.00m-0.30m topsoil 0.30m-3.00m sand, brown 3.00m-5.00m sand, grey	5m	South West
GW028205	0.00m-6.09m Sand White Water Supply	23m	North West
GW111186	0.00m-0.60m TOPSOIL,FINE SAND,SANDSTONE CHUNKS 0.60m-6.00m SAND,FINE,L/BROWN,DAMP,LOOSE,GREY,WET	29m	East
GW106419	0.00m-0.30m topsoil 0.30m-3.00m sand, brown 3.00m-4.00m sand, grey	39m	South West
GW106113	0.00m-5.18m sand, unconsolidated	44m	South West
GW111185	0.00m-0.10m ASPHALT 0.10m-0.50m CLAY,FINE,SANDY,M/GRAVEL,DARK BROWN 0.50m-6.00m SAND,FINE LOOSE,WELL SORTED,HOMOGENOUS,DAMP	48m	North East
GW017480	0.00m-7.62m Sand	52m	South
GW111187	0.00m-0.50m SAND FINE BROWN,DRY LOOSE,ORGANIC MATTER PRESENT 0.50m-2.00m SAND BUT NO ORGANIC MATTER 2.00m-3.00m SAND,FINE,L/BROWN,LOOSE,HOMOGENOUS 3.00m-6.00m SAND, WET	52m	North East
GW111184	0.00m-0.50m TOPSOIL,FINE SAND,DARK BROWN,SOME ORGANIC MATTER 0.50m-3.50m SAND,FINEM,VERY LOOSE,DAMP 3.50m-4.00m SAND,WET,HYDROCARBON ODOUR NOTICE 4.00m-6.00m SAND,WET,GREY AND HYDROCARBON ODOUR	78m	North East
GW028207	0.00m-18.28m Sand White Water Supply	79m	North East
GW106238	0.00m-0.30m topsoil 0.30m-3.30m sand, yellow 3.30m-5.00m sand, grey	85m	South
GW107637	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, grey	89m	North
GW111188	0.00m-0.10m CONCRETE 0.10m-0.60m SAND,FINE,LIGHT BROWN,MOIST,HOMOGENOUS,LOOSE 0.60m-3.50m SAND AS ABOVE BUT VERY LIGHT YELLOW 3.50m-6.00m SAND VERY L/YELLOW AND WET	93m	North
GW108560	0.00m-0.30m Ttopsoil 0.30m-2.50m Sand, yellow 2.50m-4.00m Sand, grey	108m	South West
GW111183	0.00m-0.50m SAND,FINE,TAN,DRY,ORGANIC MATTER PRESENT 0.50m-3.50m SAND FINE,L/BROWN,DAMP,VERY LOOSE 3.50m-6.00m SAND FINE,L/BROWN,DAMP,VERY LOOSE,WET	111m	North East
GW023601	0.00m-0.91m Sand Grey 0.91m-4.87m Sand White Water Supply	113m	South West
GW108174	0.00m-0.30m topsoil 0.30m-2.30m sand, yellow 2.30m-4.00m sand, grey	125m	North
GW108299	0.00m-0.30m topsoil 0.30m-3.50m sand, yellow 3.50m-4.00m sand, grey	131m	West
GW023603	0.00m-4.57m Sand Water Supply	136m	North
GW017476	0.00m-7.62m Sand	178m	South
GW071885	0.00m-4.00m sand, peaty grey 4.00m-6.00m sand, clean, grey	195m	South
GW108812	0.00m-0.30m topsoil 0.30m-4.00m sand, yellow	200m	South West

Groundwater No	Drillers Log	Distance	Direction
GW108591	0.00m-6.10m Sand, unconsolidated	246m	South
GW101761	0.00m-5.50m Sand	247m	North West
GW107341	0.00m-0.30m topsoil 0.30m-4.20m sand, yellow 4.20m-6.00m sand, grey and shells	253m	North
GW031679	0.00m-6.40m Sand Water Supply	275m	South West
GW108718	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, grey	286m	North
GW105767	0.00m-0.30m topsoil 0.30m-3.30m sand, yellow 3.30m-5.00m sand, light brown with some shells	318m	North
GW106325	0.00m-0.30m topsoil 0.30m-4.00m sand, white 4.00m-5.00m sand, yellow	323m	North
GW108701	0.00m-6.10m sand	327m	North
GW102629	1.00m-8.00m SAND	331m	South
GW110657	0.00m-5.49m UNCONSOLIDATED ALL SANDS	360m	South
GW108598	0.00m-5.18m sand	364m	South West
GW107724	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, grey	371m	South
GW111282	0.00m-2.00m SAND (CG) 2.00m-6.00m SAND / AQUIFER (CG)	371m	South West
GW106115	0.00m-4.00m sand	381m	West
GW108627	0.00m-0.30m topsoil 0.30m-0.35m sand, yellow 0.35m-6.00m sand, grey	385m	South
GW108490	0.00m-0.30m TOP SOIL 0.30m-1.20m BROWN SAND 1.20m-2.70m BROWN SILTY SAND 2.70m-4.70m GREY SANDY CLAY 4.70m-12.50m BROWN SILTY SAND	388m	North West
GW106849	0.00m-4.27m sand, unconsolidated	398m	West
GW024174	0.00m-4.26m Sand White Water Supply	412m	North
GW107149	0.00m-6.00m sand	413m	West
GW107077	0.00m-0.30m topsoil 0.30m-2.20m sand, yellow 2.20m-4.00m sand, grey	415m	South West
GW111766	0.00m-2.00m SAND GREY 2.00m-4.00m SAND YELLOW	425m	South West
GW111376	0.00m-7.00m ALL SAND	444m	North
GW109643	0.00m-6.71m UNCONSOLIDATED ALL SANDS	455m	North
GW107183	0.00m-5.50m sand	462m	South West
GW106331	0.00m-0.30m topsoil 0.30m-3.50m sand, yellow 3.50m-5.00m sand, grey	463m	West
GW109642	0.00m-6.71m UNCONSOILIDATED ALL SANDS	465m	North
GW109939	0.00m-6.10m UNCONSOLIDATED ALL SANDS.	469m	North
GW075063	0.00m-0.50m Fill; dark brown clay and brick fill 0.50m-1.50m Clayey sand; grey and moist 1.50m-3.00m Sandy clay; grey soft to hard weathered sandstone 3.00m-3.50m Bedrock; sandstone	471m	North West
GW031678	0.00m-6.40m Sand Water Supply	478m	North
GW108292	0.00m-0.30m topsoil 0.30m-3.40m sand, yellow 3.40m-4.00m sand, grey	483m	South

Groundwater No	Drillers Log	Distance	Direction
GW106732	0.00m-6.00m sand	484m	South West
GW114835	0.00m-3.00m SAND YELLOW 3.00m-6.00m SAND GREY	488m	South West
GW109641	0.00m-6.71m UNCONSOLIDATED ALL SANDS	490m	North
GW109947	0.00m-0.30m TOPSOIL 0.30m-5.40m YELLOW SAND 5.40m-7.00m WHITE SAND WITH SHELLS	508m	North
GW108644	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, grey	510m	South West
GW106152	0.00m-0.30m topsoil 0.30m-3.50m sand, yellow 3.50m-6.00m sand, grey	514m	North
GW108658	0.00m-0.30m topsoil 0.30m-2.20m sand, yellow 2.20m-4.00m sand, grey	514m	South West
GW106482	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, grey	518m	West
GW106399	0.00m-0.30m topsoil 0.30m-3.00m sand, white 3.00m-6.00m sand, grey	519m	North
GW108531	0.00m-0.30m Ttopsoil 0.30m-3.00m Sand, yellow 3.00m-4.00m Sand, grey	519m	South West
GW108173	0.00m-0.30m TOPSOIL 0.30m-3.50m sand, yellow 3.50m-5.00m sand, grey	520m	North
GW106262	0.00m-0.30m topsoil 0.30m-6.00m sand, yellow	521m	North
GW108763	0.00m-0.30m topsoil 0.30m-3.50m sand, yellow 3.50m-6.00m sand, white	524m	North
GW106234	0.00m-5.00m sand	525m	South West
GW106222	0.00m-0.30m topsoil 0.30m-3.00m sand, brown 3.00m-4.00m sand, grey	542m	South West
GW106840	0.00m-0.30m Topsoil 0.30m-2.50m Sand, yellow 2.50m-4.00m Sand, grey	545m	South West
GW105753	0.00m-0.30m topsoil 0.30m-4.00m sand, white	546m	South
GW106544	0.00m-0.30m topsoil 0.30m-3.20m sand, yellow 3.20m-4.00m sand, grey	546m	South West
GW105119	0.00m-6.10m UNCONSOLIDATE ALL SANDS	553m	South West
GW106809	0.00m-6.00m sand	561m	South West
GW108554	0.00m-0.30m Topsoil 0.30m-3.00m Sand, yellow 3.00m-4.00m Sand, grey	562m	West
GW105772	0.00m-0.20m topsoil 0.20m-3.20m sand, light brown 3.20m-3.80m sand, grey 3.80m-4.00m siltysand, brown with some brown clay	566m	West
GW108810	0.00m-0.30m topsoil 0.30m-4.50m sand, yellow 4.50m-6.00m sand, grey	566m	North
GW105616	0.00m-0.40m topsoil 0.40m-2.50m sand. brown 2.50m-4.50m sand, white	567m	South West
GW106920	0.00m-6.10m Sand, unconsolidated	575m	North
GW024591	0.00m-1.82m Sand Grey 1.82m-4.87m Sand White Water Supply	579m	South West
GW105249	0.00m-0.30m TOPSOIL 0.30m-3.30m SAND LT BROWN 3.30m-4.00m SAND GREY	581m	West

Groundwater No	Drillers Log	Distance	Direction
GW105250	0.00m-0.20m TOPSOIL 0.20m-3.20m LT BROWN SAND 3.20m-3.80m GREY SAND 3.80m-4.00m SAND WITH BROWN CLAY	592m	West
GW111475	0.00m-0.50m TOPSOIL 0.50m-4.00m SAND YELLOW	599m	South West
GW108697	0.00m-0.30m topsoil 0.30m-3.00m sand, yellow 3.00m-4.00m sand, grey	604m	South West
GW108745	0.00m-7.01m sand	604m	North
GW106564	0.00m-3.50m sand 3.50m-3.50m clay	606m	West
GW107667	0.00m-0.30m topsoil 0.30m-3.50m sand, yellow 3.50m-4.50m sand, partly brown 4.50m-5.20m sand, grey 5.20m-7.00m sand, brown	608m	South West
GW023984	0.00m-0.91m Sand Grey 0.91m-5.18m Sand White 5.18m-6.70m Sand Fossils:shell Fragments Water Supply	618m	North
GW107878	0.00m-0.30m topsoil 0.30m-3.20m sand, yellow 3.20m-4.00m sand, grey	623m	South West
GW101763	0.00m-6.00m Sand	629m	North West
GW106411	0.00m-0.30m topsoil 0.30m-2.00m sand, grey 2.00m-4.00m sand, brown	630m	West
GW028209	0.00m-3.05m Sand White 3.05m-4.57m Driller	632m	South
GW106896	0.00m-0.30m Topsoil 0.30m-4.50m Sand, yellow 4.50m-6.00m Sand, grey, some shells	632m	North
GW107426	0.00m-0.50m tospoil 0.50m-1.00m fill, rocks sand 1.00m-2.50m sand, yellow 2.50m-4.00m sand, grey	635m	South West
GW108268	0.00m-0.30m topsoil 0.30m-4.00m sand, brown	638m	North West
GW102137	0.00m-5.00m Sand	639m	North
GW107428	0.00m-0.30m topsoil 0.30m-2.60m sand, yellow 2.60m-4.00m sand, grey	641m	South West
GW024376	0.00m-0.91m Sand Grey 0.91m-4.87m Sand White Water Supply	643m	South West
GW107375	0.00m-0.30m topsoil 0.30m-1.50m sand, yellow 1.50m-4.00m sand, grey	645m	South West
GW106384	0.00m-6.10m sand	654m	North West
GW023508	0.00m-1.82m Sand 1.82m-5.48m Sand Shell Water Supply	655m	South West
GW106848	0.00m-0.30m topsoil 0.30m-2.20m sand, yellow 2.20m-3.00m sand, brown 3.00m-4.00m sand, grey	662m	South West
GW106434	0.00m-0.30m topsoil 0.30m-1.50m sand, brown 1.50m-4.00m sand, yellow 4.00m-6.00m sand, yellow with shells	674m	North
GW103228	0.00m-6.00m All sand	675m	North
GW108493	0.00m-0.30m Topsoil 0.30m-0.35m Sand, yellow 0.35m-6.00m Sand, grey	680m	North
GW108522	0.00m-0.30m Topsoil 0.30m-3.00m Sand, yellow	684m	West
GW106703	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, grey	685m	South

Groundwater No	Drillers Log	Distance	Direction
GW023986	0.00m-0.91m Loam Sandy 0.91m-2.43m Sand Water Supply	689m	South West
GW106578	0.00m-0.30m topsoil 0.30m-2.20m sand, yellow 2.20m-4.00m sand, grey	689m	South West
GW023966	0.00m-6.09m Sand 6.09m-7.01m Shale 7.01m-7.31m Aquifer Water Supply	690m	South
GW114902	0.00m-3.00m SAND YELLOW 3.00m-5.00m SAND GREY	690m	South West
GW107479	0.00m-0.30m topsoil 0.30m-3.50m sand, white 3.50m-6.00m sand, grey	692m	South
GW106804	0.00m-0.30m topsoil 0.30m-2.30m sand, yellow 2.30m-4.00m sand, grey	696m	South
GW106805	0.00m-0.30m topsoil 0.30m-2.30m sand, yellow 2.30m-4.00m sand, grey	696m	South
GW105773	0.00m-0.30m topsoil 0.30m-4.00m sand, yellow	701m	South
GW024375	0.00m-1.82m Soil Black 1.82m-3.65m Mud Black Water Supply	706m	North West
GW107065	0.00m-0.30m toposil 0.30m-3.00m sand, yellow 3.00m-6.00m sand, brown	706m	South
GW101154	0.00m-4.88m UNCONSOLIDATED, ALL SAND WITH SMALL SEA SHELLS.	708m	South West
GW107599	0.00m-6.00m sand	721m	North West
GW025681	0.00m-6.09m Sand Water Supply	722m	South
GW105310	0.00m-0.30m TOPSOIL 0.30m-3.00m WHITE SAND 3.00m-4.00m BROWN SAND	723m	North
GW104637	0.00m-7.32m UNCONSOLIDATED ALL SANDS	724m	North
GW111562	0.00m-6.00m ALL SAND	725m	South West
GW111467	0.00m-2.00m SAND YELLOW 2.00m-5.00m SAND DARK BROWN 5.00m-6.00m SAND GREY	730m	North West
GW110867	0.00m-0.30m TOPSOIL 0.30m-6.00m SAND YELLOW	731m	North
GW112351	0.00m-5.79m UNCONSOLIDATE ALL SANDS	732m	South
GW101889	0.00m-5.19m Unconsolidated Sand	734m	South
GW028206	0.00m-5.48m Sand White Water Supply	742m	North
GW107208	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, grey	744m	South
GW024371	0.00m-1.21m Topsoil Black 1.21m-2.43m Sand Grey 2.43m-4.26m Sand Light Grey Water Supply	752m	North
GW025714	0.00m-3.04m Sand Water Supply	760m	South
GW028208	0.00m-0.30m Clay 0.30m-6.09m Sand White Water Supply	765m	North
GW112490	0.00m-0.30m TOPSOIL 0.30m-3.00m SAND GREY 3.00m-7.00m SAND YELLOW	779m	North
GW107215	0.00m-0.30m topsoil 0.30m-4.00m sand, brown	785m	South West
GW107845	0.00m-0.30m topsoil 0.30m-3.20m sand, yellow 3.20m-5.00m sand, grey	787m	South
GW111613	0.00m-0.40m TOPSOIL 0.40m-2.00m SAND GREY 2.00m-4.00m SAND DARK BROWN 4.00m-6.00m SAND LIGHT BROWN	789m	North

Groundwater No	Drillers Log	Distance	Direction
GW107861	0.00m-6.00m sand	802m	North
GW024117	0.00m-0.30m Sand Grey 0.30m-5.48m Sand White Water Supply	804m	North
GW106729	0.00m-0.30m topsoil 0.30m-2.20m sand, brown 2.20m-4.00m sand, grey	807m	South
GW107170	0.00m-0.30m topsoil 0.30m-3.20m sand, brown 3.20m-4.00m sand,g rey	815m	South West
GW106458	0.00m-0.30m topsoil 0.30m-4.00m sand, white	818m	South West
GW072912	0.00m-6.00m Brown Sand	819m	South West
GW108274	0.00m-4.88m sand	821m	South West
GW105752	0.00m-7.32m sand, with small sea shells	823m	South West
GW106263	0.00m-0.30m topsoil 0.30m-3.00m sand, brown 3.00m-4.00m silt,sand grey 4.00m-6.00m sand, brown	825m	South
GW024669	0.00m-4.57m Sand Water Supply	828m	North
GW025559	0.00m-3.04m Sand Water Supply	830m	South West
GW023136	0.00m-3.20m Sand Water Supply	832m	North
GW023185	0.00m-0.91m Sand 0.91m-4.26m Sand White Water Supply	833m	North
GW107118	0.00m-6.00m Sand	834m	North
GW023125	0.00m-5.18m Sand Water Supply	839m	North
GW101586	0.00m-5.79m Unconsolidated sand with sea shells	841m	South
GW023573	0.00m-4.87m Sand Water Supply	842m	North
GW106136	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.20m-4.00m sand, yellow with shells	845m	South
GW111442	0.00m-4.27m UNCONSOLIDATED ALL SAND	845m	South West
GW025703	0.00m-4.57m Driller 4.57m-6.09m Sand	847m	North
GW106092	0.00m-4.58m sand, unconsolidated	849m	North
GW106382	0.00m-0.30m topsoil 0.30m-3.50m sand, yellow 3.50m-6.00m sand, yelow small shell	849m	North
GW108266	0.00m-0.30m topsoil 0.30m-4.20m sand, yellow 4.20m-6.00m sand, white	850m	North
GW106957	0.00m-7.32m Sand, unconsolidated	855m	North
GW027339	0.00m-1.52m Sand 1.52m-3.04m Sand Fossils:shell Fragments Water Supply	857m	South
GW106038	0.00m-7.00m sand	858m	South
GW101474	0.00m-4.27m SAND, UNCONSOLIDATED (SMALL SEA SHELLS)	859m	South
GW108290	0.00m-0.30m topsoil 0.30m-3.50m sand, yellow 3.50m-6.00m sand, grey	865m	North
GW023547	0.00m-3.35m Soil Sandy	866m	South West
GW108529	0.00m-0.30m Topsoil 0.30m-4.50m Sand, yellow 4.50m-6.00m Sand, grey	866m	North
GW105715	0.00m-0.30m topsoil 0.30m-2.50m sand, light brown 2.50m-4.00m sand, grey with samll shells	877m	South

Groundwater No	Drillers Log	Distance	Direction
GW111440	0.00m-5.18m UNCONSOLIDATED ALL SAND	882m	South West
GW108733	0.00m-4.50m sand, yellow 4.50m-6.00m sand, grey	884m	North
GW106963	0.00m-6.00m Sand	885m	North
GW026865	0.00m-0.30m Soil 0.30m-2.43m Sand	889m	South
GW106280	0.00m-6.41m sand	890m	North
GW113044	0.00m-7.32m UNCONSOLIDATED ALL SAND	891m	North
GW105680	0.00m-6.41m sand, unconsolidated	892m	North
GW106377	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand, grey	892m	South West
GW107920	0.00m-6.00m sand	893m	North
GW111226	0.00m-5.49m UNCONSOLIDATED ALL SAND	899m	South West
GW105741	0.00m-0.30m topsoil 0.30m-3.30m sand, light brown 3.30m-4.00m sand, grey with shells	907m	South West
GW115044	0.00m-0.50m TOPSOIL 0.50m-3.50m SAND YELLOW 3.50m-6.00m SAND GREY	910m	North
GW101678	0.00m-6.00m Sand	918m	South West
GW114841	0.00m-0.30m TOPSOIL 0.30m-3.00m SAND BROWN 3.00m-5.00m SAND GREY AND SHELLS 5.00m-7.00m SAND BROWN	918m	South West
GW024245	0.00m-0.30m Sand Grey 0.30m-1.82m Sand White 1.82m-2.13m Loam 2.13m-5.48m Sand White Water Supply	924m	South
GW106561	0.00m-0.30m topsoil 0.30m-3.00m sand, brown 3.00m-4.00m sand, grey	927m	South
GW106879	0.00m-5.49m Sand, unconsolidated	935m	South West
GW106204	0.00m-0.30m topsoil 0.30m-2.00m sand, brown 2.00m-3.00m silty sand, grey 3.00m-4.00m mud, mariner grey 4.00m-6.00m sand, grey	943m	South West
GW111003	0.00m-0.30m TOPSOIL 0.30m-4.00m SAND YELLOW	946m	South
GW106961	0.00m-0.30m Topsoil 0.30m-5.30m Sand, yellow 5.30m-7.00m Sand, yellow, & shells	947m	North
GW106104	0.00m-7.00m sand	953m	North
GW108533	0.00m-0.30m Topsoil 0.30m-4.50m Sand, yellow 4.50m-6.00m Sand, grey	958m	North
GW109942	0.00m-6.71m UNCONSOLIDATED ALL SANDS	958m	North
GW103229	0.00m-6.00m ALL SAND	960m	North
GW107177	0.00m-7.63m sand	968m	North
GW107505	0.00m-0.30m topsoil 0.30m-3.30m sand, yellow 3.30m-5.00m sand, grey	970m	North
GW024366	0.00m-0.60m Sand Black 0.60m-4.57m Sand White Water Supply	976m	North
GW108696	0.00m-0.30m topsoil' 0.30m-5.50m sand, yellow 5.50m-7.00m sand, grey	981m	North
GW107019	0.00m-0.30m topsoil 0.30m-4.00m sand, yellow 4.00m-7.00m sand, brown	982m	North

Groundwater No	Drillers Log	Distance	Direction
GW111315	0.00m-0.30m TOPSOIL 0.30m-3.20m SAND LIGHT BROWN 3.20m-4.00m SAND GREY	984m	South
GW106415	0.00m-6.10m sand, unconsolidated	986m	North
GW103780	0.00m-7.62m UNCONSOLIDATED ALL SANDS	989m	North
GW107051	0.00m-0.30m topsoil 0.30m-3.50m sand, yelow 3.50m-5.00m sand, brown silty 5.00m-7.00m sand, grey	989m	North
GW106371	0.00m-0.30m topsoil 0.30m-3.30m sand, yellow 3.30m-5.00m sand, brown	991m	North
GW106053	0.00m-6.10m sand, unconsolidated	993m	North
GW108536	0.00m-0.30m Topsoil 0.30m-3.00m Sand, brown 3.00m-4.00m Sand, orange	997m	South West
GW111420	0.00m-9.15m UNCONSOLIDATE ALL SAND	997m	North
GW023475	0.00m-4.57m Sand Water Supply	999m	South West
GW106054	0.00m-6.10m sand, unconsolidated	999m	North
GW111237	0.00m-3.00m YELLOW SAND 3.00m-6.00m GREY SAND	1002m	North
GW107891	0.00m-0.30m topsoil 0.30m-4.20m sand, yellow 4.20m-6.00m sand, white 6.00m-7.00m sand, grey	1003m	North
GW107836	0.00m-0.30m topsoil 0.30m-3.50m sand, yellow 3.50m-5.00m sand, grey	1006m	South West
GW110228	0.00m-8.85m UNCONSOLIDATED ALL SAND	1007m	North
GW107880	0.00m-0.30m topsoil 0.30m-2.60m sand, yellow 2.60m-4.00m sand, grey	1011m	South
GW100664	0.00m-5.79m Unconsolidated all Sand	1014m	North
GW110842	0.00m-8.54m UNCONSOLIDATED ALL SAND	1017m	North
GW023458	0.00m-0.45m Sand Grey 0.45m-4.87m Sand White Water Supply	1027m	South West
GW107273	0.00m-4.00m sand	1037m	South West
GW106413	0.00m-6.10m sand, unconsolidated	1038m	North
GW110566	0.00m-0.30m TOPSOIL 0.30m-3.00m SAND YELLOW 3.00m-4.00m SAND GREY	1045m	South West
GW106619	0.00m-0.30m topsoil 0.30m-2.30m sand, brown 2.30m-4.00m sand, grey	1049m	South West
GW111439	0.00m-7.32m UNCONSOLIDATED ALL SAND	1054m	North
GW107824	0.00m-0.30m topsoil 0.30m-3.40m sand, yellow 3.40m-5.00m sand, grey	1055m	South West
GW107846	0.00m-0.30m topsoil 0.30m-4.50m sand, brown 4.50m-6.00m sand, grey	1058m	North West
GW028300	0.00m-0.45m Topsoil 0.45m-1.37m Sand White Water Supply 1.37m-1.52m Clay 1.52m-2.59m Sand White Water Supply 2.59m-2.60m Clay Shale	1064m	West
GW106387	0.00m-7.32m sand,	1066m	North
GW106408	0.00m-0.30m topsoil 0.30m-2.80m sand, brown 2.80m-4.00m sand, yellow	1082m	South West

Groundwater No	Drillers Log	Distance	Direction
GW106229	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-5.00m silty, dark brown 5.00m-6.00m sand, grey	1083m	South West
GW110446	0.00m-0.30m TOPSOIL 0.30m-3.00m SAND YELLOW 3.00m-6.00m SAND GREY AND SHELLS	1093m	North
GW025558	0.00m-5.94m Sand Water Supply	1100m	North
GW105819	0.00m-0.30m topsoil 0.30m-2.00m sand, brown 2.00m-4.00m sand, yellow	1100m	South
GW108049	0.00m-0.30m topsoil 0.30m-3.20m sand, yellow 3.20m-4.00m sand, grey	1100m	South West
GW101815	0.00m-5.50m SAND	1101m	North
GW107773	0.00m-6.10m Sand, unconsolidated	1107m	South West
GW108304	0.00m-16.00m Sand	1109m	South West
GW105589	0.00m-0.30m topsoil 0.30m-2.30m sand, grey 2.30m-3.00m sand, plain brown 3.00m-4.00m sand, grey	1116m	North
GW106976	0.00m-0.30m Topsoil 0.30m-2.50m Sand, brown 2.50m-4.00m Sand, grey	1117m	South West
GW106713	0.00m-0.30m topsoil 0.30m-2.50m sand, white 2.50m-4.00m sand, grey	1119m	South West
GW106767	0.00m-6.00m sand	1128m	North
GW023995	0.00m-0.60m Sand Grey 0.60m-5.79m Sand White Water Supply	1132m	North
GW024352	0.00m-5.63m Sand Water Supply	1138m	North
GW109936	0.00m-0.30m TOPSOIL 0.30m-3.30m SAND YELLOW 3.30m-6.00m SAND,DARK BROWN SILTY 6.00m-7.50m SAND, LIGHT BROWN	1141m	South West
GW101814	0.00m-5.00m SAND	1142m	North
GW031412	0.00m-6.40m Sand Water Supply	1145m	South
GW107590	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand, grey and shells	1148m	North
GW026481	0.00m-4.26m Sand Water Supply	1153m	South West
GW106832	0.00m-5.79m sand, unconsolidated	1155m	North
GW024397	0.00m-3.50m Sand Water Supply	1158m	South West
GW101871	0.00m-5.79m Unconsolidated Sand with small seashells.	1170m	North
GW105761	0.00m-1.50m sand, fill tiles 1.50m-6.50m sand, yellow 6.50m-7.00m sand, yellow with crushed shells	1175m	North
GW101025	0.00m-5.00m SAND	1178m	North
GW107648	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand, grey	1179m	South West
GW108222	0.00m-0.30m topsoil 0.30m-3.30m sand, yellow 3.30m-5.20m sand, brown 5.20m-6.00m sand, grey	1180m	North
GW105516	0.00m-8.23m UNCONSOLIDATED ALL SANDS	1183m	North
GW110420	0.00m-0.30m TOPSOIL 0.30m-4.20m SAND BROWN 4.20m-6.00m SAND YELLOW	1183m	South West

Groundwater No	Drillers Log	Distance	Direction
GW106375	0.00m-0.30m topsoil 0.30m-3.30m sand, brown 3.30m-6.00m sand, yellow	1184m	North
GW105822	0.00m-0.30m topsoil 0.30m-2.20m sand, brown 2.20m-4.00m sand, yellow	1188m	South West
GW107851	0.00m-0.30m topsoil 0.30m-3.00m sand, yellow 3.00m-4.00m sand, yellow and shells	1189m	South West
GW108535	0.00m-5.20m Sand, yellow 5.20m-7.00m Sand, yellow & crushed Shells	1194m	North
GW108349	0.00m-0.30m topsoil 0.30m-3.20m sand, light brown 3.20m-4.00m sand, grey	1197m	South
GW108402	0.00m-8.54m Sand, unconsolidated	1201m	North
GW109029	0.00m-0.10m CONCRETE 0.10m-4.00m BROWN SANDS SILTY	1206m	North West
GW110866	0.00m-2.00m SAND YELLOW 2.00m-4.00m SAND BROWN 4.00m-6.00m SAND GREY	1216m	South West
GW106276	0.00m-5.00m sand	1223m	North
GW107270	0.00m-5.50m sand	1226m	South West
GW106396	0.00m-0.30m topsoil 0.30m-2.00m sand, brown 2.00m-5.00m sand, silty brown 5.00m-6.00m sand, grey	1231m	South West
GW023997	0.00m-3.65m Sand White Water Supply 3.65m-4.26m Sand Grey 4.26m-4.28m Sand Grey Clay	1238m	South West
GW107298	0.00m-6.00m sand	1243m	North
GW105586	0.00m-0.20m top soil 0.20m-2.50m sand, brown 2.50m-4.00m sand, grey	1246m	South West
GW105728	0.00m-0.30m topsoil 0.30m-1.50m sand, light brown 1.50m-6.00m sand, yellow	1249m	North
GW106484	0.00m-0.30m topsoil 0.30m-2.90m sand, brown 2.90m-4.00m sand, grey	1251m	South West
GW107669	0.00m-0.30m topsoil 0.30m-4.50m sand, yellow 4.50m-6.00m sand, grey	1251m	North
GW106007	0.00m-0.30m topsoil 0.30m-2.00m sand, light brown 2.00m-6.00m sand, yellow 6.00m-7.00m sand, yellow with shells	1258m	North
GW106456	0.00m-0.30m topsoil 0.30m-6.00m sand	1259m	North
GW107020	0.00m-5.00m sand	1259m	North West
GW110323	0.00m-9.15m UNCONSOLIDATED ALL SANDS	1260m	North
GW106898	0.00m-3.96m Sand, unconsolidated	1262m	South West
GW072078	0.00m-6.00m SAND	1267m	South West
GW112428	0.00m-0.30m TOPSOIL 0.30m-3.00m SAND YELLOW 3.00m-5.00m SAND SILTY DARK BROWN 5.00m-6.00m SAND BROWN	1274m	South West
GW106020	0.00m-0.30m topsoil 0.30m-2.50m sand, light brown 2.50m-4.00m sand, grey	1280m	South West
GW108563	0.00m-8.23m Sand, unconsolidated	1284m	North
GW107458	0.00m-0.30m topsoil 0.30m-1.30m ash, grey silty 1.30m-3.50m sand, grey 3.50m-5.00m sand, silty brown 5.00m-6.00m sand, grey	1285m	South West

Groundwater No	Drillers Log	Distance	Direction
GW025711	0.00m-4.87m Sand Water Supply	1289m	North
GW108652	0.00m-0.30m topsoil 0.30m-7.00m sand, yellow	1290m	North
GW108513	0.00m-0.30m Topsoil 0.30m-3.40m Sand, yellow 3.40m-4.00m Sand, grey	1291m	South West
GW106367	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand, grey	1296m	South West
GW106034	0.00m-0.30m topsoil 0.30m-2.00m sand, light brown 2.00m-4.00m sand, grey	1297m	South West
GW108661	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-5.50m sand, dark brown 5.50m-7.00m sand, light brown	1298m	South West
GW108302	0.00m-4.58m sand,	1309m	South West
GW107695	0.00m-7.50m sand	1310m	North
GW108549	0.00m-0.30m Topsoil 0.30m-4.20m Sand, yellow 4.20m-7.00m Sand, grey	1310m	North
GW106356	0.00m-0.30m topsoil 0.30m-2.20m sand, brown 2.20m-4.00m sand, grey	1311m	South West
GW100520	0.00m-7.00m SAND	1319m	North
GW108816	0.00m-8.54m sand	1319m	North
GW106369	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-5.00m sand, silty dark brown 5.00m-6.00m sand, fine grey	1324m	South West
GW106368	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.50m sand, silty brown 4.50m-6.00m sand, silty grey	1328m	South West
GW107722	0.00m-6.71m Sand, unconsolidated	1329m	North
GW106655	0.00m-0.30m topsoil 0.30m-3.00m sand, yellow 3.00m-4.00m sand, grey	1331m	South West
GW026388	0.00m-4.26m Sand Water Supply	1332m	North
GW108550	0.00m-0.30m Topsoil 0.30m-4.20m Sand, yellow 4.20m-7.00m Sand, grey	1333m	North
GW108574	0.00m-6.10m sand	1339m	North
GW111437	0.00m-4.88m UNCONSOLIDATED ALL SAND	1339m	South West
GW105769	0.00m-0.30m topsoil 0.30m-3.30m sand, light yellow 3.30m-4.00m sand, grey with shells	1340m	South West
GW105460	0.00m-2.00m SAND,DARK, BROWN, SILTY 2.00m-4.00m SAND GREY 4.00m-4.50m MUD BROWN	1346m	North
GW110206	0.00m-5.79m UNCONSOLIDATED ALL SAND.	1349m	North West
GW111225	0.00m-2.00m SAND BROWN 2.00m-6.00m SAND DARK BROWN 6.00m-8.00m SAND LIGHT BROWN	1352m	North
GW111896	0.00m-0.30m TOPSOIL 0.30m-2.00m YELLOW SAND 2.00m-4.00m GREY SAND	1353m	South West
GW023994	0.00m-3.04m Silt River Water Supply 3.04m-5.48m Sand Grey 5.48m-5.50m Clay Grey	1357m	South West
GW100679	0.00m-4.58m unconsolidated all Sand with Small Sea Shells	1357m	North

Groundwater No	Drillers Log	Distance	Direction
GW105742	0.00m-0.30m topsoil 0.30m-2.40m sand, light brown 2.40m-3.60m sand, silty white 3.60m-4.00m sand, silty yellow	1364m	North West
GW024373	0.00m-5.18m Sand Yellow Water Supply	1368m	North
GW107576	0.00m-8.54m Sand, unconsolidated	1375m	North
GW110877	0.00m-2.00m SAND YELLOW 2.00m-5.00m SAND BROWN DARK 5.00m-6.00m SAND LIGHT BROWN	1375m	South West
GW108650	0.00m-0.30m topsoil 0.30m-1.50m sand, yellow 1.50m-4.00m sand, brown	1398m	North West
GW025539	0.00m-0.60m Sand 0.60m-4.57m Sand White Water Supply	1402m	North
GW106485	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand, grey	1402m	South West
GW023427	0.00m-5.48m Sand Water Supply	1403m	North
GW107532	0.00m-5.50m sand	1403m	North West
GW100564	0.00m-10.00m Sand	1411m	North
GW106400	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand,g rey	1411m	South West
GW110727	0.00m-3.00m SAND YELLOW 3.00m-5.00m DARK BROWN SAND 5.00m-6.00m LIGHT BROWN SAND	1412m	North
GW105569	0.00m-0.30m TOPSOIL 0.30m-4.00m YELLOW SAND 4.00m-4.50m BROWN MARINE / SHELLS	1413m	South West
GW108321	0.00m-5.60m sand	1416m	North
GW108301	0.00m-0.30m topsoil 0.30m-4.00m sand, brown 4.00m-5.00m sand, grey and mud 5.00m-6.00m sand, brown	1424m	South West
GW107595	0.00m-5.49m Sand, unconsolidated	1431m	North
GW105592	0.00m-0.20m topsoil 0.20m-1.50m sand,grey 1.50m-4.00m sand, brown 4.00m-6.00m sand, yellow	1434m	South West
GW106084	0.00m-0.30m topsoil 0.30m-4.00m sand, brown 4.00m-6.00m sand, yellow	1435m	North
GW107314	0.00m-8.23m Sand, unconsolidated	1440m	North
GW024060	0.00m-0.60m Soil Sandy 0.60m-0.76m Sand Hard 0.76m-3.65m Sand White Water Supply	1442m	South West
GW111245	0.00m-0.30m TOPSOIL 0.30m-2.50m SAND YELLOW 2.50m-4.00m SAND GREY	1448m	South West
GW107422	0.00m-0.30m topsoil 0.30m-3.20m sand, brown 3.20m-4.00m sand, grey	1455m	South West
GW106881	0.00m-0.30m Topsoil 0.30m-2.50m Sand, brown 2.50m-4.20m Sand, silty yellow 4.20m-6.00m Sand, grey	1462m	North West
GW110302	0.00m-5.49m UNCONSOLIDATED ALL SAND	1463m	South West
GW110493	0.00m-0.30m TOPSOIL 0.30m-2.50m YELLOW SAND 2.50m-4.00m GREY SAND	1463m	South West
GW107690	0.00m-0.30m topsoil 0.30m-3.50m sand, brown 3.50m-4.00m sand, grey	1467m	South West

Groundwater No	Drillers Log	Distance	Direction
GW107682	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand, grey	1470m	North West
GW106846	0.00m-7.93m Sand, unconsolidated, with small sea shells	1479m	North
GW108747	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, grey	1482m	South West
GW106308	0.00m-8.54m sand	1485m	South West
GW108015	0.00m-0.50m topsoil 0.50m-3.50m sand, yellow 3.50m-5.00m sand, grey	1485m	South West
GW023134	0.00m-5.33m Sand Water Supply	1493m	North
GW101056	0.00m-6.00m SAND	1493m	North
GW106101	0.00m-0.30m topsoil 0.30m-2.00m sand, brown 2.00m-2.30m rock, coffee 2.30m-3.00m sand, brown 3.00m-5.00m sand, white	1499m	South West
GW108716	0.00m-5.00m sand	1501m	North West
GW023613	0.00m-0.91m Sand Grey 0.91m-6.40m Sand White Water Supply	1504m	North
GW110418	0.00m-0.30m TOPSOIL 0.30m-4.50m SAND YELLOW 4.50m-6.00m SAND GREY AMD SHELLS	1512m	North
GW075059	0.00m-0.50m clay; red brown; dry fill material 0.50m-1.00m sander dust 1.00m-1.50m clay; with incorporated sander dust and resin material 1.50m-2.00m clay; red dry 2.00m-2.80m clay 2.80m-3.20m clay; layer of grey black material 3.20m-4.00m clay; red brown dry 4.00m-17.50m shale; moist light brown layer with minimal brown clay component	1513m	North
GW107661	0.00m-0.30m topsoil 0.30m-4.00m sand, yellow 4.00m-7.00m sand, grey	1516m	North
GW107279	0.00m-0.30m topsoil 0.30m-1.20m sand, brown 1.20m-2.00m rock, coffee 2.00m-4.00m sand, brown 4.00m-5.00m sand, yellow	1518m	South West
GW106431	0.00m-7.63m sand, unconsolidated	1522m	North
GW107506	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand, grey	1523m	North West
GW107078	0.00m-0.30m topsoil 0.30m-3.00m sand, yellow 3.00m-4.00m sand, grey	1525m	South West
GW107735	0.00m-0.30m topsoil 0.30m-7.00m sand, yellow	1526m	North
GW107775	0.00m-6.71m Sand, unconsolidated	1541m	North
GW107889	0.00m-0.30m topsoil 0.30m-4.50m sand, yellow 4.50m-6.00m sand, grey	1543m	North
GW114507	0.00m-0.30m TOPSOIL 0.30m-2.00m SAND YELLOW 2.00m-4.00m SAND GREY/SILTY AND SHELLS 4.00m-6.00m SAND BROWN	1551m	South West
GW108715	0.00m-7.93m sand	1558m	North
GW111414	0.00m-6.00m ALL SAND	1565m	North West
GW107847	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, grey	1568m	South West
GW106984	0.00m-6.00m Sand	1583m	North
GW106189	0.00m-5.00m sand	1584m	South West

Groundwater No	Drillers Log	Distance	Direction
GW072299	0.00m-1.53m Brick Tile Filling 1.53m-8.44m Unconsoldated Sand With Small Sea Shells	1596m	North
GW107184	0.00m-5.00m sand	1598m	North
GW107747	0.00m-6.00m ALL SAND	1610m	North West
GW108084	0.00m-6.00m sand	1614m	North West
GW109152	0.00m-6.00m BLACK CLAY 6.00m-20.00m RED CLAY 20.00m-78.00m FINE GREY SANDSTONE 78.00m-80.00m SHALE 80.00m-130.00m FINE GREY SANDSTONE 130.00m-132.00m SHALE 132.00m-198.00m FINE GREY SANDSTONE 198.00m-204.00m SHALE	1614m	North West
GW101329	0.00m-4.57m unconsolidated - all sand.	1616m	North West
GW106416	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand, silty grey 4.00m-5.00m sand, grey	1621m	South West
GW107023	0.00m-1.50m Fill, Rocks Sand 1.50m-4.00m Sand, brown, Silty 4.00m-6.00m Sand, grey	1636m	South West
GW111140	0.00m-7.00m ALL SAND	1643m	North
GW108743	0.00m-7.32m sand	1648m	North
GW106301	0.00m-4.27m sand	1650m	South West
GW101224	0.00m-7.62m Unconsolidated - all sand with small sea shells	1655m	North
GW106481	0.00m-0.30m topsoil 0.30m-2.70m sand, light brown 2.70m-4.00m sand, grey	1655m	South West
GW106270	0.00m-5.00m sand	1658m	North West
GW023262	0.00m-6.70m Sand Water Supply	1661m	South West
GW112387	0.00m-0.30m TOPSOIL 0.30m-2.00m SAND YELLOW 2.00m-4.00m SAND GREY SILTY,AND SHELLS 4.00m-7.50m SAND BROWN	1664m	South West
GW109925	0.00m-0.30m TOPSOIL 0.30m-2.70m YELLOW SAND 2.70m-4.00m BROWN SAND,SHELLS AND MUD 4.00m-6.00m LIGHT BROWN SAND	1672m	South West
GW072456	0.00m-6.00m	1674m	South West
GW107216	0.00m-3.50m sand, brown 3.50m-6.00m sand, grey	1676m	North
GW111925	0.00m-3.00m SAND YELLOW 3.00m-6.00m DARK BROWN SILTY SAND 6.00m-8.00m SAND LIGHT BROWN	1682m	North
GW109935	0.00m-7.63m UNCONSOLIDATED ALL SANDS	1684m	North
GW106175	0.00m-0.30m topsoil 0.30m-4.00m sand, yellow 4.00m-6.00m sand, grey	1685m	North
GW107622	0.00m-7.01m Sand, unconsolidated	1685m	North
GW106388	0.00m-0.30m topsoil 0.30m-1.50m fill, bricks etc 1.50m-2.20m clay, grey sand 2.20m-3.20m sand, grey 3.20m-4.00m sand, brown	1689m	North West
GW106850	0.00m-0.30m topsoil 0.30m-2.00m sand, brown 2.00m-3.00m sand, black 3.00m-4.00m sand, grey with big shells 4.00m-5.00m sand, brown	1689m	South West
GW110202	0.00m-5.50m ALL SAND	1689m	North

Groundwater No	Drillers Log	Distance	Direction
GW106860	0.00m-0.30m topsoil 0.30m-3.00m sand, yellow 3.00m-4.50m sand, brown silty 4.50m-6.00m sand, grey	1693m	North
GW107450	0.00m-0.30m topsoil 0.30m-2.20m sand, yellow 2.20m-4.00m sand, grey	1695m	North
GW108633	0.00m-7.32m sand	1695m	North
GW025816	0.00m-6.09m Soil Sandy Water Supply	1698m	North
GW106883	0.00m-0.30m Topsoil 0.30m-4.30m Sand, yellow 4.30m-6.00m Sand, brown	1702m	North
GW107849	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-5.00m sand, grey 5.00m-7.00m sand, brown	1702m	North
GW106894	0.00m-0.30m Topsoil 0.30m-1.50m Fill - Rocks 1.50m-4.00m Sand, grey	1712m	South West
GW107859	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-5.20m sand, grey 5.20m-7.00m sand, brown	1712m	North
GW109945	0.00m-5.50m SAND YELLOW 5.50m-7.50m SAND WHITE AND SHELLS	1715m	North
GW025557	0.00m-3.35m Sand Water Supply	1718m	South West
GW107045	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, silty brown 4.00m-6.00m sand, light brown	1725m	North
GW106275	0.00m-5.00m sand	1732m	South West
GW108288	0.00m-0.30m topsoil 0.30m-2.50m sand, grey 2.50m-4.00m sand, brown	1745m	North West
GW107275	0.00m-0.30m topsoil 0.30m-3.00m sand, brown 3.00m-5.00m sand, black 5.00m-6.00m sand, brown	1750m	South West
GW107553	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand, grey	1751m	South West
GW106861	0.00m-0.50m Topsoil & Fill 0.50m-2.50m Sand, yellow 2.50m-4.00m Sand, grey	1752m	South West
GW106379	0.00m-0.30m topsoil 0.30m-3.50m sand, yellow 3.50m-6.00m sand, yellow with small shells	1753m	North
GW110710	0.00m-5.18m UNCONSOLIDATED ALL SAND	1753m	South West
GW023495	0.00m-5.48m Sand Water Supply	1755m	North West
GW106882	0.00m-5.00m Sand	1757m	North West
GW108097	0.00m-5.79m sand	1758m	South West
GW105976	0.00m-8.23m sand, unconsolidated with small sea shells	1759m	South West
GW108777	0.00m-0.30m topsoil 0.30m-6.00m sand, grey	1759m	North West
GW108655	0.00m-0.30m topsoil 0.30m-3.20m sand, yellow 3.20m-5.80m sand, silty brown 5.80m-7.00m sand, brown	1760m	South West
GW107879	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, grey	1761m	South West
GW108176	0.00m-0.30m topsoil 0.30m-3.40m sand, yellow 3.40m-4.00m sand, grey	1761m	South

Groundwater No	Drillers Log	Distance	Direction
GW110652	0.00m-5.49m UNCONSOLIDATED ALL SANDS	1761m	North
GW110865	0.00m-0.30m TOPSOIL 0.30m-4.00m SAND BROWN	1761m	North West
GW107887	0.00m-0.30m topsoil 0.30m-4.50m sand, yellow 4.50m-6.00m sand, grey	1766m	North
GW107206	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand, grey	1768m	South West
GW106117	0.00m-0.30m topsoil 0.30m-1.50m sand, brown 1.50m-3.00m sand, grey 3.00m-4.00m sand, yellow with shells	1774m	South West
GW106618	0.00m-6.00m sand	1776m	North
GW107456	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, brown	1781m	South West
GW108568	0.00m-7.00m Sand	1784m	North
GW107664	0.00m-0.30m topsoil 0.30m-3.50m sand, brown 3.50m-5.00m sand, hard, black 5.00m-6.00m sand, grey	1786m	South West
GW105587	0.00m-0.02m topsoil 0.02m-6.00m sand, yellow	1792m	North
GW108690	0.00m-0.50m fill, rocks 0.50m-2.20m sand, yellow 2.20m-3.40m sand, grey 3.40m-6.00m sand, hard dark brown 6.00m-7.00m sand, light brown	1793m	South West
GW106009	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand, grey	1794m	South
GW111229	0.00m-6.00m ALL SAND	1794m	North West
GW106392	0.00m-0.30m topsoil 0.30m-1.00m sand, brown 1.00m-3.00m mud, grey 3.00m-5.00m sand, sitly grey with shells 5.00m-6.00m sand, round	1795m	South West
GW106424	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, grey	1800m	South West
GW108005	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, grey	1804m	South West
GW106393	0.00m-0.30m topsoil 0.30m-3.00m sand, dark brown 3.00m-6.00m sand, slity light brown	1807m	South West
GW108646	0.00m-0.30m topsoil 0.30m-3.00m sand, yellow 3.00m-5.00m sand, dark brown 5.00m-7.00m sand, light brown	1814m	South West
GW072795	0.00m-8.40m Unconsolidated Sand With Small Seashells	1815m	North
GW107060	0.00m-0.30m topsoil 0.30m-3.00m sand, brown 3.00m-4.00m sand, grey	1821m	South West
GW105972	0.00m-1.50m fill bricks 1.50m-3.00m sand, brown 3.00m-5.00m sand, yellow	1827m	South West
GW106224	0.00m-0.30m topsoil 0.30m-4.50m sand, yellow 4.50m-6.00m sand, yellow with small shells	1828m	North
GW107731	0.00m-0.30m topsoil 0.30m-4.50m sand, yellow 4.50m-7.00m sand, yellow and shells	1829m	North
GW108689	0.00m-0.30m topsoil 0.30m-1.70m sand, brown 1.70m-4.00m sand, grey	1829m	South West
GW106907	0.00m-0.30m Topsoil 0.30m-1.80m Sand, yellow 1.80m-4.00m Sand, brown	1836m	North

Groundwater No	Drillers Log	Distance	Direction
GW107281	0.00m-0.30m topsoil 0.30m-1.50m sand, brown 1.50m-3.50m sand, black platy 3.50m-6.00m sand, yellow	1838m	South West
GW106834	0.00m-0.50m topsoil 0.50m-2.20m sand, yellow 2.20m-4.00m sand, grey	1839m	South West
GW107095	0.00m-5.79m sand, unconsolidated	1840m	South West
GW107493	0.00m-7.32m Sand, unconsolidated	1849m	North
GW106112	0.00m-0.30m topsoil 0.30m-2.30m sand, brown 2.30m-4.00m sand, yellow with some shells	1852m	North
GW108028	0.00m-0.30m topsoil 0.30m-2.50m sand, brown and fill 2.50m-4.50m sand, ligth brown 4.50m-6.00m sand, grey	1857m	South
GW107357	0.00m-6.10m Sand, unconsolidated	1862m	North
GW107372	0.00m-5.79m Sand, unconsolidated	1864m	North
GW023354	0.00m-3.65m Sand Water Supply	1865m	North West
GW106032	0.00m-0.30m topsoil 0.30m-2.20m sand, brown 2.20m-2.40m rock coffee 2.40m-4.00m sand, brown	1867m	South West
GW107482	0.00m-0.30m topsoil 0.30m-1.20m fill, bricks 1.20m-3.20m sand, brown 3.20m-5.40m sand, hard block 5.40m-6.00m sand, yellow	1868m	South West
GW110422	0.00m-0.30m TOPSOIL 0.30m-4.00m SAND WHITE 4.00m-6.00m SAND, GREY WITH SHELLS	1876m	North
GW108649	0.00m-0.30m topsoil 0.30m-3.00m sand, yellow 3.00m-5.00m sand, dark brown 5.00m-6.00m sand, light brown	1880m	South West
GW107169	0.00m-0.30m topsoil 0.30m-2.50m sand, grey 2.50m-3.50m mud, grey marine 3.50m-5.00m sand, black 5.00m-6.00m sand, brown	1897m	South West
GW108035	0.00m-0.30m topsoil 0.30m-2.50m sand, yellow 2.50m-4.00m sand, grey	1897m	South
GW107364	0.00m-5.18m sand	1899m	North
GW109938	0.00m-0.30m TOPSOIL 0.30m-4.30m YELLOW SAND 4.30m-6.00m GREY SAND AND SHELLS	1900m	South West
GW110189	0.00m-6.00m ALL SAND	1904m	North
GW107445	0.00m-5.00m sand	1907m	South
GW107684	0.00m-0.30m topsoil 0.30m-4.20m sand, yellow 4.20m-6.00m sand, grey	1914m	North
GW106847	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand, grey and big shells 4.00m-5.50m sand, dark brown consolidated 5.50m-7.00m sand, silty brown	1915m	South West
GW107373	0.00m-6.00m sand	1915m	North
GW106807	0.00m-0.30m topsoil 0.30m-2.50m sand, brown 2.50m-4.00m sand, grey	1916m	South
GW106133	0.00m-4.88m sand,with small shells	1917m	South West
GW108570	0.00m-7.93m Sand, unconsolidated	1924m	South West

Groundwater No	Drillers Log	Distance	Direction
GW108600	0.00m-5.79m sand,	1930m	North
GW109491	0.00m-0.30m TOPSOIL 0.30m-2.70m YELLOW SAND 2.70m-4.00m GREY SAND	1932m	South
GW108694	0.00m-0.30m topsoil 0.30m-3.00m sand, yellow 3.00m-6.00m sand, brown hard 6.00m-7.00m sand, light brown	1936m	South West
GW105591	0.00m-0.20m top soil 0.20m-1.00m sand, grey 1.00m-3.00m sand, brown 3.00m-6.00m sand, yelleo	1942m	North
GW106780	0.00m-7.32m sand, unconsolidated	1942m	North
GW107192	0.00m-7.32m sand	1946m	North
GW107799	0.00m-5.50m sand	1947m	North
GW107896	0.00m-0.30m topsoil 0.30m-4.50m sand, yellow 4.50m-6.00m sand, grey	1951m	North
GW110442	0.00m-0.30m TOPSOIL 0.30m-4.50m SAND YELLOW 4.50m-6.00m SAND GREY AND SHELLS	1951m	North
GW108496	0.00m-6.10m Sand , unconsolidated	1952m	North
GW107606	0.00m-7.00m sand	1954m	North
GW106755	0.00m-0.30m topsoil 0.30m-1.50m fill and bricks 1.50m-4.00m sand, grey	1955m	South
GW107114	0.00m-5.85m Sand, unconsolidated	1956m	North
GW111497	0.00m-6.00m ALL SAND	1956m	North
GW110167	0.00m-0.30m TOPSOIL 0.30m-3.50m YELLOW SAND 3.50m-5.50m GREY SAND 5.50m-6.00m GREY SAND AND SHELLS	1957m	North
GW110227	0.00m-3.00m SAND BROWN 3.00m-6.00m SAND BLACK HARD SAND 6.00m-7.00m SAND LIGHT BROWN	1968m	South West
GW111561	0.00m-6.00m ALL SAND	1970m	North
GW023485	0.00m-6.70m Sand Water Supply	1975m	North
GW108109	0.00m-0.30m topsoil 0.30m-2.20m sand, light brown 2.20m-4.00m sand, yellow	1979m	South West
GW107374	0.00m-10.00m sand	1980m	North
GW108559	0.00m-0.30m Topsoil 0.30m-4.50m Sand, yellow 4.50m-7.00m Sand, grey	1982m	North
GW107803	0.00m-6.10m Sand, unconsolidated	1983m	North
GW110219	0.00m-6.00m ALL SAND	1983m	North
GW111954	0.00m-3.00m SAND YELLOW 3.00m-5.00m SAND BROWN 5.00m-7.00m SAND GREY	1991m	South West
GW110271	0.00m-6.00m ALL SAND	1992m	North
GW112523	0.00m-1.00m TOPSOIL 1.00m-2.00m SAND SILTY YELLOW 2.00m-4.00m SAND SILTY GREY 4.00m-6.00m SAND GREY	1994m	North
GW107299	0.00m-5.60m sand	1995m	North
GW016970	0.00m-7.31m Sand	1996m	South West

Geology

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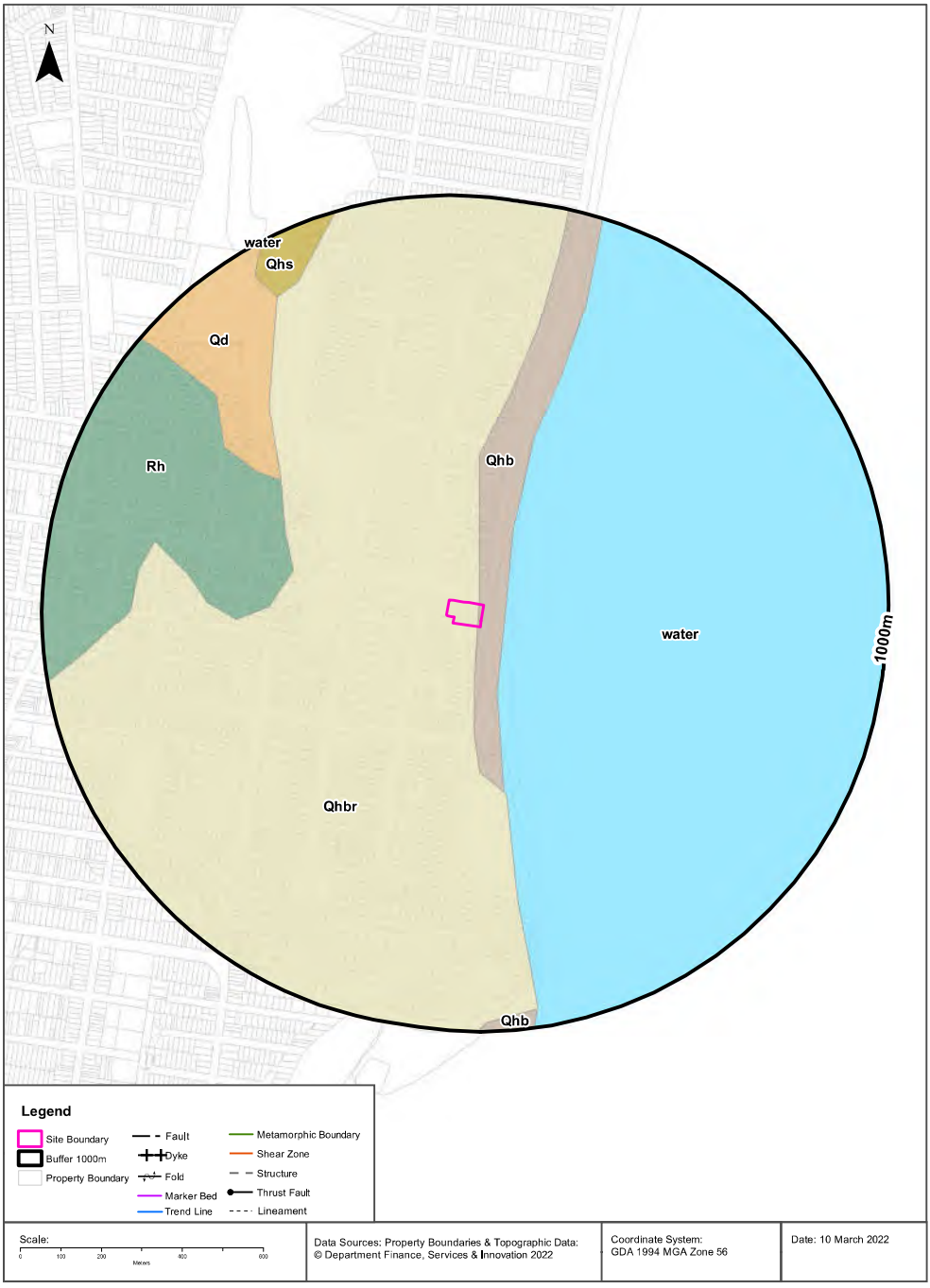

Geology

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Geological Units 1:100,000

What are the Geological Units within the dataset buffer?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dist	Dir
Qhbr	Quartz sand, minor shell content, interdune (swale) silt and fine sand				Quaternary		Sydney	0m	On-site
Qhb	Coarse quartz sand, verying amounts of shell fragment				Quaternary		Sydney	0m	On-site
water							Sydney	55m	East
Rh	Medium to coarse grained quartz sandstone, very minor shale and laminate lenses				Triassic		Sydney	391m	West
Qd	Medium to fine-grained marine sand with podsols				Quaternary		Sydney	509m	North West
Qhs	Peat, sandy peat, and mud.				Quaternary		Sydney	862m	North West

Geological Structures 1:100,000

What are the Geological Structures within the dataset buffer?

Feature	Name	Description	Map Sheet	Distance	Direction
N/A	No records in buffer				

Geological Data Source : NSW Department of Industry, Resources & Energy

Naturally Occurring Asbestos Potential

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Naturally Occurring Asbestos Potential

Naturally Occurring Asbestos Potential within the dataset buffer:

Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
No records in buffer												

Naturally Occurring Asbestos Potential Data Source: © State of New South Wales through NSW Department of Industry, Resources & Energy

Atlas of Australian Soils

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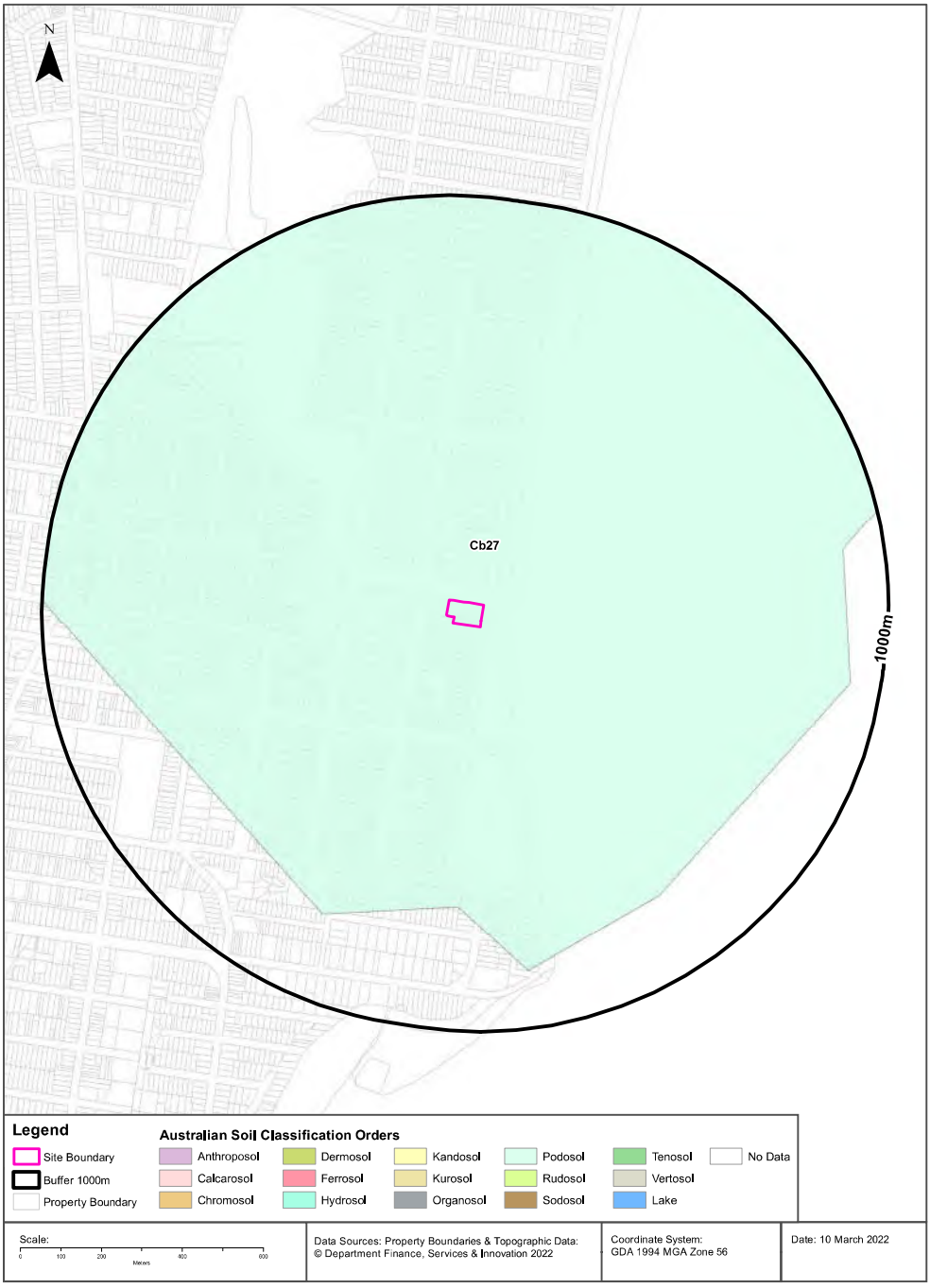

Soils

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Atlas of Australian Soils

Soil mapping units and Australian Soil Classification orders within the dataset buffer:

Map Unit Code	Soil Order	Map Unit Description	Distance	Direction
Cb27	Podosol	Coastal sand plains and dunes, lagoons, and swampy areas: chief soils are leached sands (Uc2.3 and Uc2.2). Associated are dunes of siliceous sands (Uc1.2) and/or calcareous sands (Uc1.l) fringing the coastline; and swampy areas of (Uf6) soils and (Uc1.2) soils with peaty surfaces. Unit Cb27 has similarities with units Cb28 and Ca6.	0m	On-site

Soil Landscapes of Central and Eastern NSW

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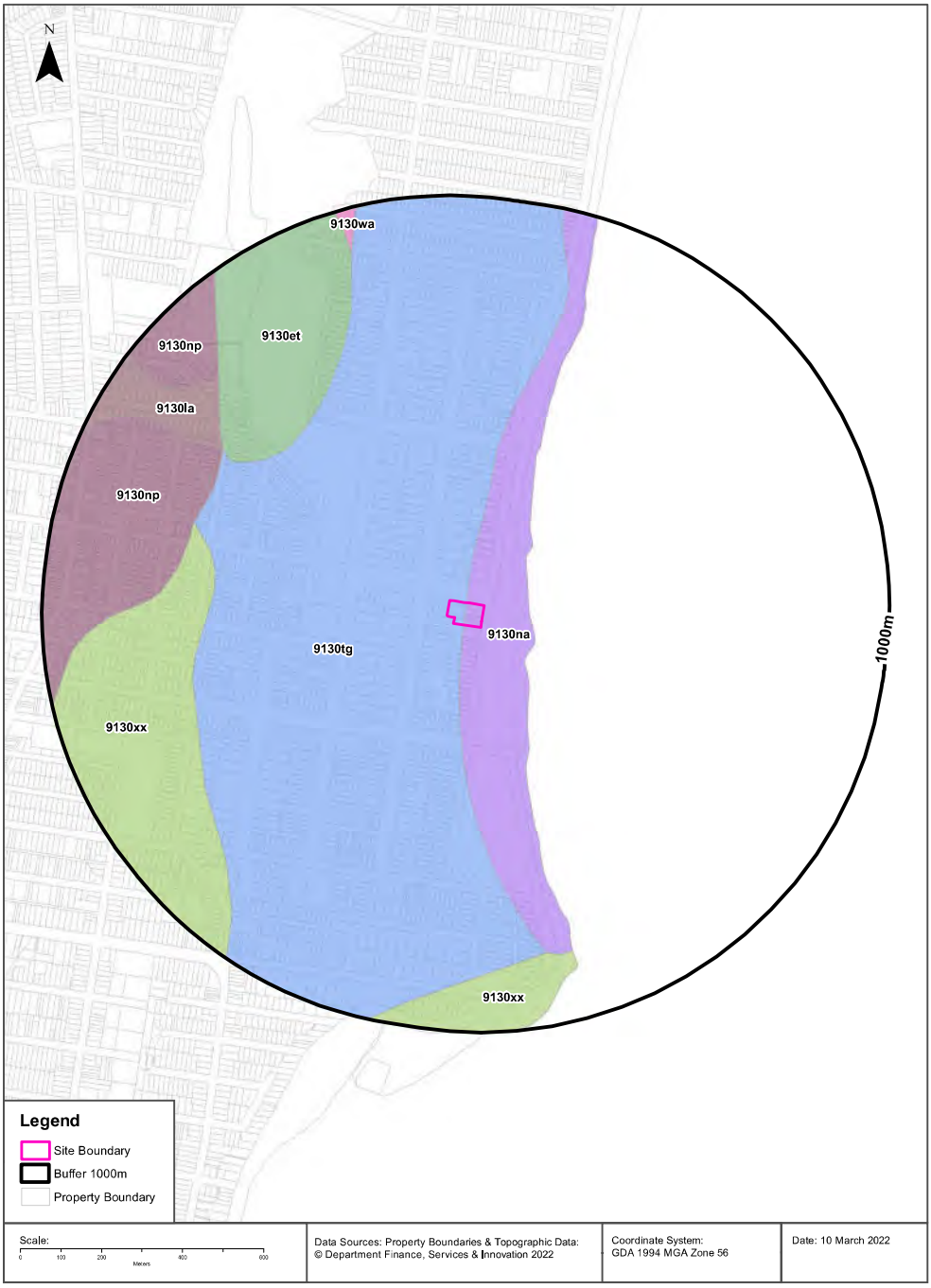

Soils

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Soil Landscapes of Central and Eastern NSW

Soil Landscapes of Central and Eastern NSW within the dataset buffer:

Soil Code	Name	Distance	Direction
9130na	Narrabeen	0m	On-site
9130tg	Tuggerah	0m	On-site
9130et	Ettalong	546m	North West
9130xx	Disturbed Terrain	577m	South West
9130np	Newport	644m	West
9130la	Lambert	671m	North West
9130wa	Warriewood	892m	North

Acid Sulfate Soils

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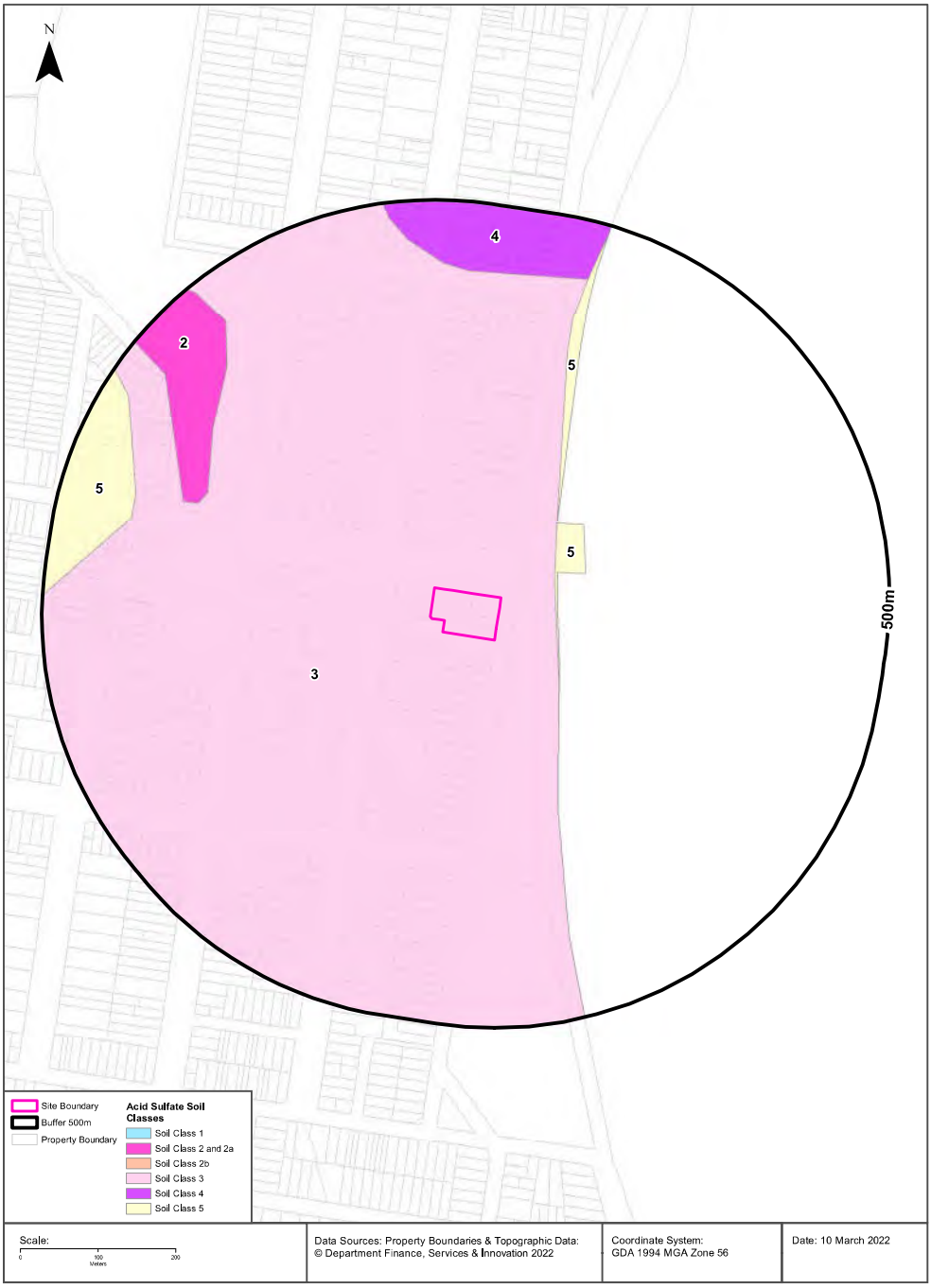

Acid Sulfate Soils

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Environmental Planning Instrument - Acid Sulfate Soils

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

Soil Class	Description	EPI Name
3	Works more than 1 metre below natural ground surface present an environmental risk; Works by which the watertable is likely to be lowered more than 1 metre below natural ground surface, present an environmental risk	Bayside Local Environmental Plan 2021

If the on-site Soil Class is 5, what other soil classes exist within 500m?

Soil Class	Description	EPI Name	Distance	Direction
N/A				

Atlas of Australian Acid Sulfate Soils

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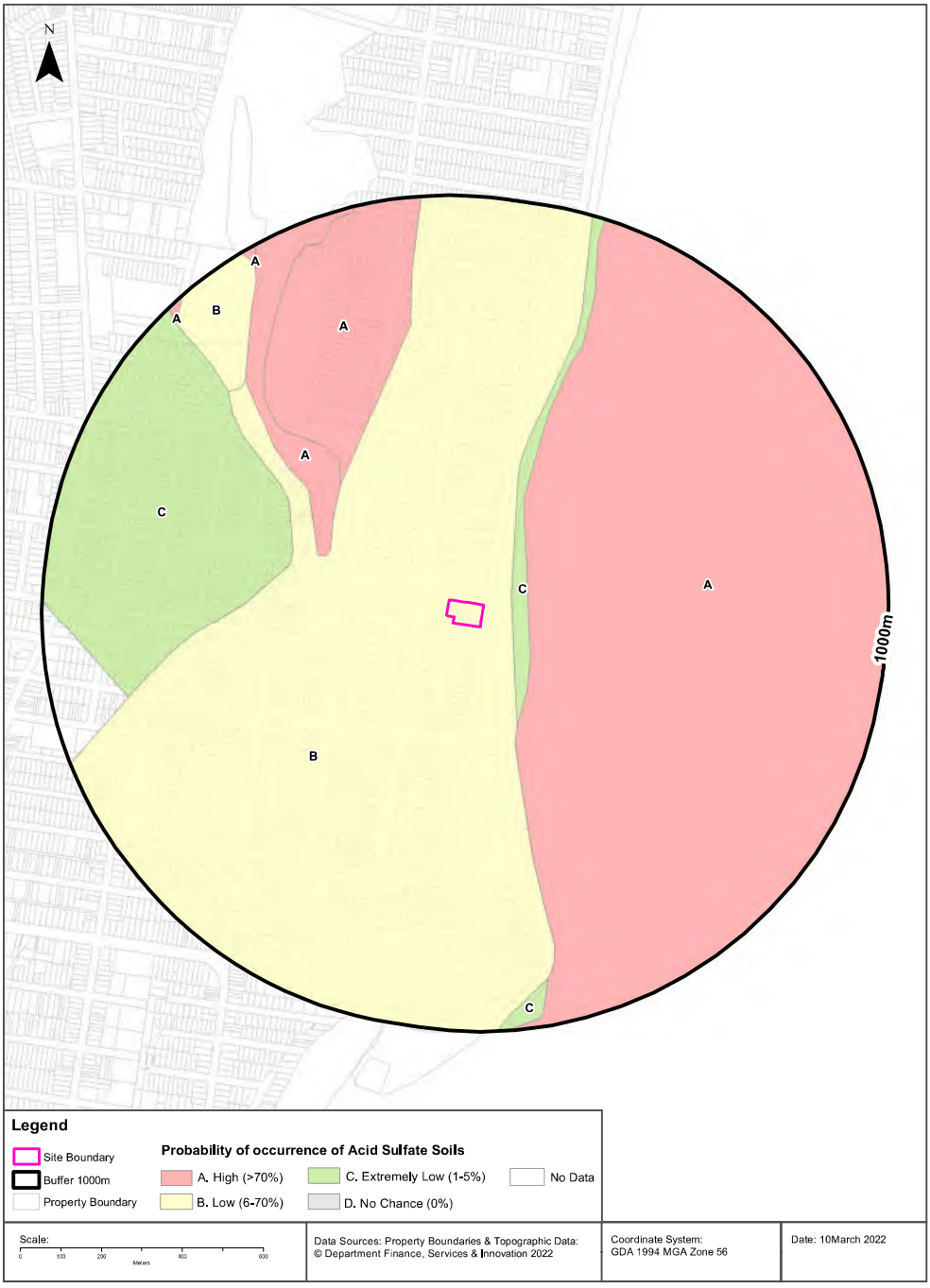

Acid Sulfate Soils

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Atlas of Australian Acid Sulfate Soils

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance	Direction
B	Low Probability of occurrence. 6-70% chance of occurrence.	0m	On-site
A	High Probability of occurrence. >70% chance of occurrence.	317m	North West
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	884m	South

Dryland Salinity

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Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

No

Is there Dryland Salinity - National Assessment data within the dataset buffer?

No

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
N/A	N/A	N/A		

Dryland Salinity Data Source : National Land and Water Resources Audit
The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.
In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

Mining

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Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Mining & Exploration Titles

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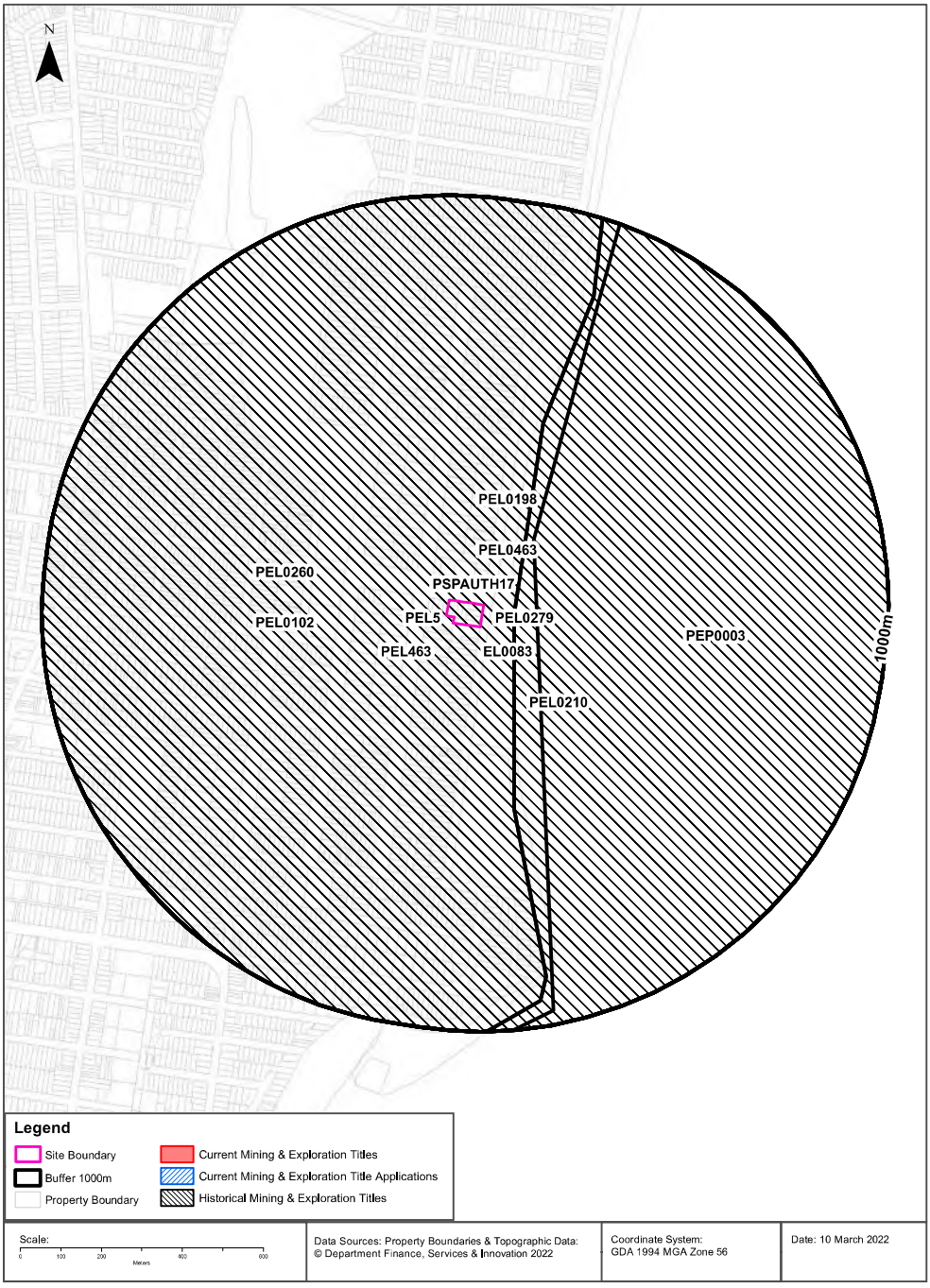

Mining

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Current Mining & Exploration Titles

Current Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Grant Date	Expiry Date	Last Renewed	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer								

Current Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

Current Mining & Exploration Title Applications

Current Mining & Exploration Title Applications within the dataset buffer:

Application Ref	Applicant	Application Date	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer						

Current Mining & Exploration Title Applications Data Source: © State of New South Wales through NSW Department of Industry

Mining

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Historical Mining & Exploration Titles

Historical Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Start Date	End Date	Resource	Minerals	Dist	Dir
PEL0210	THE AUSTRALIAN GAS LIGHT COMPANY (AGL), NORTH BULLI COLLIERIES PTY LTD			PETROLEUM	Petroleum	0m	On-site
PEL0279	THE ELECTRICITY COMMISSION OF NSW (TRADING AS PACIFIC POWER)	17/04/1990	11/11/1993	PETROLEUM	Petroleum	0m	On-site
PEL0198	JOHN STREVENS (TERRIGAL) NL			PETROLEUM	Petroleum	0m	On-site
PEL0463	DART ENERGY (APOLLO) PTY LTD	22/10/2008	6/03/2015	PETROLEUM	Petroleum	0m	On-site
PEL0013	AUSTRALIAN OIL AND GAS CORPORATION LTD			PETROLEUM	Petroleum	0m	On-site
PEL0102	AUSTRALIAN OIL AND GAS CORPORATION LTD			PETROLEUM	Petroleum	0m	On-site
PEL0005	AGL UPSTREAM INVESTMENTS PTY LIMITED	11/11/1993	4/03/2015	PETROLEUM	Petroleum	0m	On-site
PEL0260	NORTH BULLI COLLIERIES PTY LTD, AGL PETROLEUM OPERATIONS PTY LTD, THE AUSTRALIAN GAS LIGHT CO.	9/09/1981	8/03/1993	PETROLEUM	Petroleum	0m	On-site
PEL463	DART ENERGY (APOLLO) PTY LTD			MINERALS		0m	On-site
PEL5	AGL UPSTREAM INVESTMENTS PTY LIMITED			MINERALS		0m	On-site
PSPAUTH17	MACQUARIE ENERGY PTY LTD	8/03/2007	7/03/2008	PETROLEUM	Petroleum	0m	On-site
EL0083	CONTINENTAL OIL CO OF AUSTRALIA LIMITED	01 Feb 1967	01 Feb 1968	MINERALS		0m	On-site
PEP0003	LONGREACH OIL LTD, ENDEAVOUR OIL COMPANY NL, RESOURCE EXPLORATION NL, LASKAN MINERALS PTY LTD			PETROLEUM	Petroleum	130m	East

State Environmental Planning Policy

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State Significant Precincts

What SEPP State Significant Precincts exist within the dataset buffer?

Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
N/A	No records in buffer							

EPI Planning Zones

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Environmental Planning Instrument

277 The Grand Parade, Ramsgate, NSW 2217

Land Zoning

What EPI Land Zones exist within the dataset buffer?

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
B4	Mixed Use		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		0m	On-site
R3	Medium Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		0m	South West
SP2	Infrastructure	Classified Road	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		0m	West
RE1	Public Recreation		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		20m	South
R2	Low Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		30m	South
B4	Mixed Use		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		60m	North
R4	High Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		77m	North West
W2	Recreational Waterways		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		80m	North East
R4	High Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		89m	South West
R3	Medium Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		100m	North
R2	Low Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		100m	North
R2	Low Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		221m	South West
RE1	Public Recreation		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		264m	West
RE1	Public Recreation		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		269m	North West
R2	Low Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		345m	North West
R3	Medium Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		456m	South West
R2	Low Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		631m	South
RE1	Public Recreation		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		654m	North
R3	Medium Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		681m	South West
R2	Low Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		707m	West
R2	Low Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		716m	North West
R4	High Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		769m	South
RE1	Public Recreation		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		805m	North West
RE1	Public Recreation		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		813m	South West
R3	Medium Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		838m	West
B4	Mixed Use		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		838m	West
B4	Mixed Use		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		840m	West
R4	High Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		844m	West

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
R4	High Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		847m	West
R4	High Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		852m	West
R3	Medium Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		853m	North West
R3	Medium Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		853m	South West
W2	Recreational Waterways		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		860m	South
RE1	Public Recreation		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		861m	South
R2	Low Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		882m	South West
SP2	Infrastructure	Electricity Generating Works	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		911m	South West
IN2	Light Industrial		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		927m	North West
RE1	Public Recreation		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		936m	South West
R4	High Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		939m	North West
SP2	Infrastructure	Classified Road	Georges River Local Environmental Plan 2021	08/10/2021	08/10/2021	08/10/2021		940m	West
B2	Local Centre		Georges River Local Environmental Plan 2021	08/10/2021	08/10/2021	08/10/2021		950m	West
B2	Local Centre		Georges River Local Environmental Plan 2021	08/10/2021	08/10/2021	08/10/2021		951m	West
R4	High Density Residential		Georges River Local Environmental Plan 2021	08/10/2021	08/10/2021	08/10/2021		957m	West
R2	Low Density Residential		Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021		969m	South West
R2	Low Density Residential		Georges River Local Environmental Plan 2021	08/10/2021	08/10/2021	08/10/2021		978m	North West
R4	High Density Residential		Georges River Local Environmental Plan 2021	08/10/2021	08/10/2021	08/10/2021		996m	West
R4	High Density Residential		Georges River Local Environmental Plan 2021	08/10/2021	08/10/2021	08/10/2021		997m	West

Heritage Items

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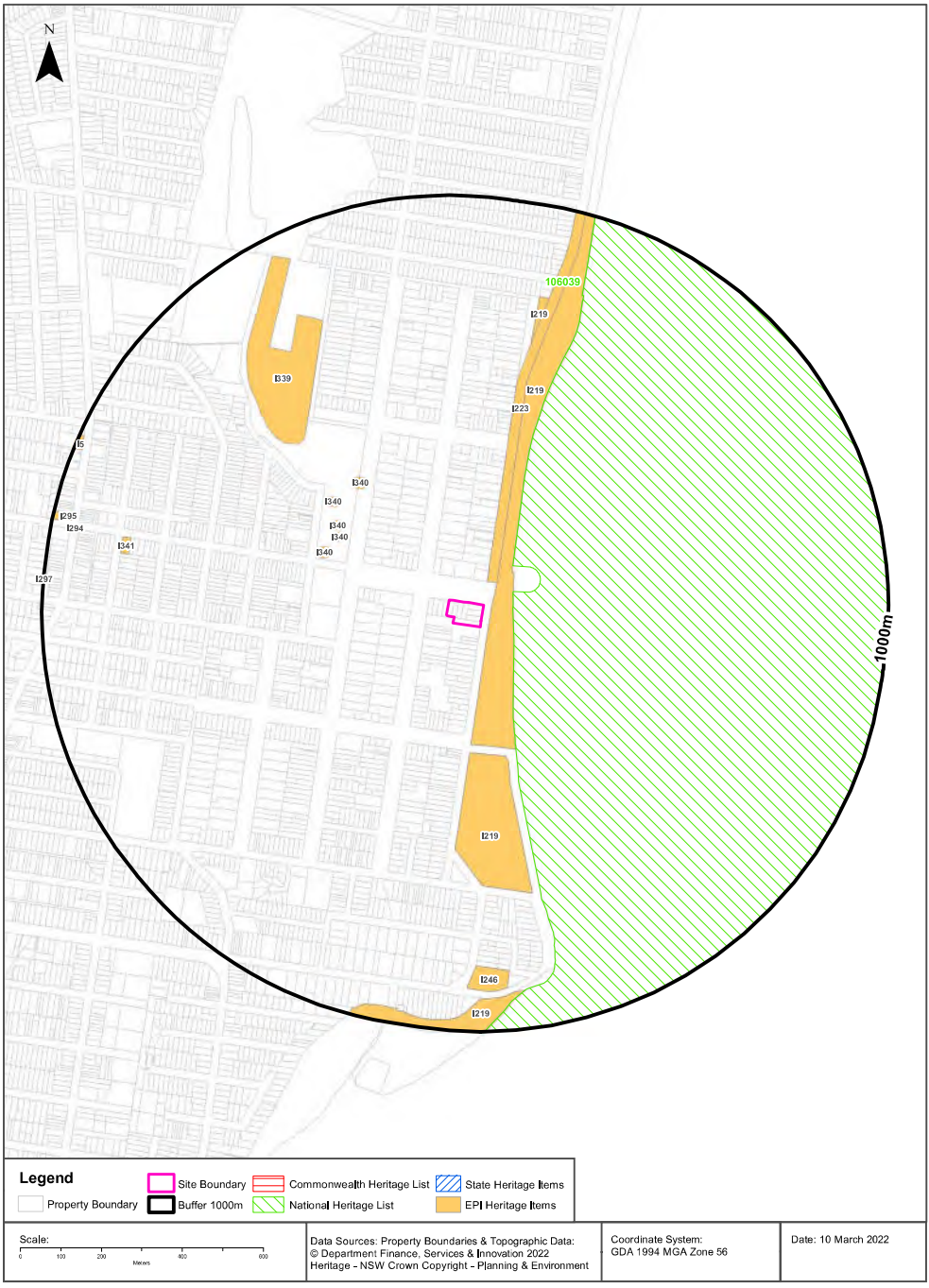

Heritage

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Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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National Heritage List

What are the National Heritage List Items located within the dataset buffer?
Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
106039	Botany Bay	Foreshore Rd, Botany NSW	1/16/007/0013	Historic	Nomination now ineligible for PPAL		72m	East

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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State Heritage Register - Curtilages

What are the State Heritage Register Items located within the dataset buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: NSW Crown Copyright - Office of Environment & Heritage
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Environmental Planning Instrument - Heritage

What are the EPI Heritage Items located within the dataset buffer?

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I219	Cook Park	Item - General	Local	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021	20m	North East
I223	Row of Araucaria trees	Item - General	Local	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021	60m	North
I340	Fig trees	Item - General	Local	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021	301m	North West

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I219	Cook Park	Item - General	Local	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021	311m	South
I340	Fig trees	Item - General	Local	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021	316m	North West
I340	Fig trees	Item - General	Local	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021	317m	North West
I340	Fig trees	Item - General	Local	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021	349m	North West
I340	Fig trees	Item - General	Local	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021	362m	North West
I339	Hawthorne Street Reserve / Leo Smith Reserve	Item - General	Local	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021	532m	North West
I219	Cook Park	Item - General	Local	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021	654m	North
I341	Sans Souci Literary Institute	Item - General	Local	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021	798m	West
I246	Primrose House	Item - General	Local	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021	837m	South
I219	Cook Park	Item - General	Local	Bayside Local Environmental Plan 2021	27/08/2021	27/08/2021	27/08/2021	903m	South
I294	Residential Flat Building, 'Roma'	Item - General	Local	Georges River Local Environmental Plan 2021	08/10/2021	08/10/2021	08/10/2021	952m	West
I295	Shops	Item - General	Local	Georges River Local Environmental Plan 2021	08/10/2021	08/10/2021	08/10/2021	952m	West
I5	Former Ramsgate Methodist Church - Ramsgate Community Church	Item - General	Local	Georges River Local Environmental Plan 2021	08/10/2021	08/10/2021	08/10/2021	978m	North West
I297	House and garden, 'Torwood'	Item - General	Local	Georges River Local Environmental Plan 2021	08/10/2021	08/10/2021	08/10/2021	997m	West

Natural Hazards

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Bush Fire Prone Land

What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
No records in buffer		

Ecological Constraints - Vegetation & Ramsar Wetlands

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Ecological Constraints

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Native Vegetation

What native vegetation exists within the dataset buffer?

Map ID	Map Unit Name	Threatened Ecological Community NSW	Threatened Ecological Community EPBC Act	Understorey	Disturbance	Disturbance Index	Dominant Species	Dist	Dir
Plant_n	Plant_n: Plantation (native and/or exotic)			00: Not assessed	00: Not assessed	0: Not assessed	Native or Exotic Plantations	18m	East
Urban_E/N	Urban_E/N: Urban Exotic/Native			00: Not assessed	00: Not assessed	0: Not assessed	Urban Exotic/Native	55m	North East
Weed_Ex	Weed_Ex: Weeds and Exotics			00: Not assessed	00: Not assessed	0: Not assessed	Exotic Species >90%cover	405m	North
S_FoW12	S_FoW12: Coastal Swamp Paperbark-Swamp Oak Scrub	Swamp Oak Floodplain Forest		15: Grassy natives and exotics	31: Parkland open understorey	4: Very high	C.glauca/M.ericifolia	475m	North West
S_FoW03	S_FoW03: Coastal Freshwater Swamp Forest			18: Swampy sedges, shrubs, ferns and herbs	15: Regrowth	3: High	C.glauca/M.ericifolia	530m	North West
S_DSF21	S_DSF21: Coastal Sand Bangalay Forest	Bangalay Sand Forest		11: Semi sheltered dry/mesic	20: Previously cleared 1943	3: High	E.botryoides/A.costata	531m	North West
Cleared	Cleared			00: Not assessed	00: Not assessed	0: Not assessed	Cleared	710m	North West
Water	Water			00: Not assessed	00: Not assessed	0: Not assessed	Water	926m	South
S_SW01	S_SW01: Estuarine Mangrove Forest			00: Not assessed	00: Not assessed	0: Not assessed	Mangroves	927m	South
S_SW03	S_SW03: Seagrass Meadows			00: Not assessed	00: Not assessed	0: Not assessed	Seagrass (DPI)	940m	South
Weed_Ex	Weed_Ex: Weeds and Exotics			00: Not assessed	00: Not assessed	0: Not assessed	Constructed drainage channels	944m	South West

Native Vegetation of the Sydney Metropolitan Area : NSW Office of Environment and Heritage

Ramsar Wetlands

What Ramsar Wetland areas exist within the dataset buffer?

Map Id	Ramsar Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

Ramsar Wetlands Data Source: © Commonwealth of Australia - Department of Agriculture, Water and the Environment

Ecological Constraints

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Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
N/A	No records in buffer					

Ecological Constraints

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Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
N/A	No records in buffer					

Ecological Constraints

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NSW BioNet Atlas

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Crinia tinnula	Wallum Froglet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Amphibia	Pseudophryne australis	Red-crowned Toadlet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Actitis hypoleucos	Common Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Anous stolidus	Common Noddy	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Anseranas semipalmata	Magpie Goose	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Not Sensitive	Critically Endangered	
Animalia	Aves	Apus pacificus	Fork-tailed Swift	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Ardenna carneipes	Flesh-footed Shearwater	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Ardenna grisea	Sooty Shearwater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ardenna pacifica	Wedge-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ardenna tenuirostris	Short-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Arenaria interpres	Ruddy Turnstone	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Botaurus poiciloptilus	Australasian Bittern	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Burhinus grallarius	Bush Stone-curlew	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Calamanthus fuliginosus	Striated Fieldwren	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Calidris acuminata	Sharp-tailed Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris alba	Sanderling	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris canutus	Red Knot	Not Listed	Not Sensitive	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris ferruginea	Curlew Sandpiper	Endangered	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris melanotos	Pectoral Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Calidris ruficollis	Red-necked Stint	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris subminuta	Long-toed Stint	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris tenuirostris	Great Knot	Vulnerable	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Calyptorhynchus banksii banksii	Red-tailed Black-Cockatoo (coastal subspecies)	Critically Endangered	Category 2	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Calyptorhynchus banksii samueli	Red-tailed Black-Cockatoo (inland subspecies)	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Certhionyx variegatus	Pied Honeyeater	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Charadrius leschenaultii	Greater Sand-plover	Vulnerable	Not Sensitive	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Charadrius mongolus	Lesser Sand-plover	Vulnerable	Not Sensitive	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Charadrius veredus	Oriental Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Chlidonias leucopterus	White-winged Black Tern	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Circus assimilis	Spotted Harrier	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Cuculus optatus	Oriental Cuckoo	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Dasyornis brachypterus	Eastern Bristlebird	Endangered	Category 2	Endangered	
Animalia	Aves	Diomedea exulans	Wandering Albatross	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Ephippiorhynchus asiaticus	Black-necked Stork	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Epthianura albifrons	White-fronted Chat	Endangered Population, Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Esacus magnirostris	Beach Stone-curlew	Critically Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Falco subniger	Black Falcon	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Fregata ariel	Lesser Frigatebird	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Gelochelidon nilotica	Gull-billed Tern	Not Listed	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Glossopsitta porphyrocephala	Purple-crowned Lorikeet	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Gygis alba	White Tern	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haematopus fuliginosus	Sooty Oystercatcher	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haematopus longirostris	Pied Oystercatcher	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Halobaena caerulea	Blue Petrel	Not Listed	Not Sensitive	Vulnerable	
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Hydroprogne caspia	Caspian Tern	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ixobrychus flavicollis	Black Bittern	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Lathamus discolor	Swift Parrot	Endangered	Category 3	Critically Endangered	
Animalia	Aves	Limicola falcinellus	Broad-billed Sandpiper	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Limosa lapponica	Bar-tailed Godwit	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Limosa lapponica baueri	Bar-tailed Godwit (baueri)	Not Listed	Not Sensitive	Vulnerable	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Limosa limosa	Black-tailed Godwit	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Lophochroa leadbeateri	Major Mitchell's Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Lophoictinia isura	Square-tailed Kite	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Macronectes giganteus	Southern Giant Petrel	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Manorina melanotis	Black-eared Miner	Critically Endangered	Not Sensitive	Endangered	
Animalia	Aves	Motacilla flava	Yellow Wagtail	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Neochmia ruficauda	Star Finch	Presumed Extinct	Not Sensitive	Endangered	
Animalia	Aves	Neophema pulchella	Turquoise Parrot	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Ninox connivens	Barking Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Ninox strenua	Powerful Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Numenius madagascariensis	Eastern Curlew	Not Listed	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Numenius minutus	Little Curlew	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Numenius phaeopus	Whimbrel	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Oceanites oceanicus	Wilson's Storm-Petrel	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Onychoprion fuscata	Sooty Tern	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Oxyura australis	Blue-billed Duck	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pandion cristatus	Eastern Osprey	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica phoenicea	Flame Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica rodinogaster	Pink Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Phaethon lepturus	White-tailed Tropicbird	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Philomachus pugnax	Ruff	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pluvialis fulva	Pacific Golden Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pluvialis squatarola	Grey Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Polytelis swainsonii	Superb Parrot	Vulnerable	Category 3	Vulnerable	
Animalia	Aves	Procelsterna cerulea	Grey Ternlet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pterodroma leucoptera leucoptera	Gould's Petrel	Vulnerable	Not Sensitive	Endangered	
Animalia	Aves	Pterodroma neglecta neglecta	Kermadec Petrel (west Pacific subspecies)	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Aves	Pterodroma nigripennis	Black-winged Petrel	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pterodroma solandri	Providence Petrel	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ptilinopus superbus	Superb Fruit-Dove	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Puffinus assimilis	Little Shearwater	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Rostratula australis	Australian Painted Snipe	Endangered	Not Sensitive	Endangered	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Stagonopleura guttata	Diamond Firetail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Stercorarius parasiticus	Arctic Jaeger	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Stercorarius pomarinus	Pomarine Jaeger	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Sterna hirundo	Common Tern	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Sternula albifrons	Little Tern	Endangered	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Sternula nereis nereis	Fairy Tern	Not Listed	Not Sensitive	Vulnerable	
Animalia	Aves	Stictonetta naevosa	Freckled Duck	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Sula leucogaster	Brown Booby	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Thalassarche cauta	Shy Albatross	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Aves	Thalassarche melanophris	Black-browed Albatross	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Aves	Thalasseus bergii	Crested Tern	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Thinornis cucullatus cucullatus	Eastern Hooded Dotterel	Critically Endangered	Not Sensitive	Vulnerable	
Animalia	Aves	Tringa brevipes	Grey-tailed Tattler	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa glareola	Wood Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa incana	Wandering Tattler	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Tringa nebularia	Common Greenshank	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa stagnatilis	Marsh Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tyto longimembris	Eastern Grass Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Tyto novaehollandiae	Masked Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Xenus cinereus	Terek Sandpiper	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Mammalia	Arctocephalus forsteri	New Zealand Fur-seal	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Arctocephalus pusillus doriferus	Australian Fur-seal	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Cercartetus nanus	Eastern Pygmy-possum	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Dugong dugon	Dugong	Endangered	Not Sensitive	Not Listed	
Animalia	Mammalia	Eubalaena australis	Southern Right Whale	Endangered	Not Sensitive	Endangered	
Animalia	Mammalia	Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Megaptera novaeangliae	Humpback Whale	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus australis	Little Bent-winged Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Myotis macropus	Southern Myotis	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Perameles nasuta	Long-nosed Bandicoot	Endangered Population	Not Sensitive	Not Listed	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Vulnerable	Not Sensitive	Endangered	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Vespadelus troughtoni	Eastern Cave Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Reptilia	Caretta caretta	Loggerhead Turtle	Endangered	Not Sensitive	Endangered	
Animalia	Reptilia	Chelonia mydas	Green Turtle	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Eretmochelys imbricata	Hawksbill Turtle	Not Listed	Not Sensitive	Vulnerable	
Animalia	Reptilia	Eulamprus leuraensis	Blue Mountains Water Skink	Endangered	Not Sensitive	Endangered	
Animalia	Reptilia	Hoplocephalus bungaroides	Broad-headed Snake	Endangered	Category 2	Vulnerable	
Animalia	Reptilia	Hoplocephalus stephensii	Stephens' Banded Snake	Vulnerable	Not Sensitive	Not Listed	
Animalia	Reptilia	Suta flagellum	Little Whip Snake	Vulnerable	Not Sensitive	Not Listed	
Animalia	Reptilia	Tiliqua occipitalis	Western Blue-tongued Lizard	Vulnerable	Not Sensitive	Not Listed	
Animalia	Reptilia	Uvidicolus sphyrurus	Border Thick-tailed Gecko	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Acacia bynoeana	Bynoe's Wattle	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Acacia prominens	Gosford Wattle	Endangered Population	Not Sensitive	Not Listed	
Plantae	Flora	Acacia pubescens	Downy Wattle	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Acacia terminalis subsp. Eastern Sydney	Sunshine wattle	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Allocasuarina diminuta subsp. mimica		Endangered Population	Not Sensitive	Not Listed	
Plantae	Flora	Caladenia tessellata	Thick Lip Spider Orchid	Endangered	Category 2	Vulnerable	
Plantae	Flora	Callistemon linearifolius	Netted Bottle Brush	Vulnerable	Category 3	Not Listed	
Plantae	Flora	Chamaesyce psammogeton	Sand Spurge	Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Doryanthes palmeri	Giant Spear Lily	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Endiandra hayesii	Rusty Rose Walnut	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Epacris purpurascens var. purpurascens		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Eucalyptus leucoxylon subsp. pruinosa	Yellow Gum	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Eucalyptus nicholii	Narrow-leaved Black Peppermint	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus scoparia	Wallangarra White Gum	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Hibbertia puberula		Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Leucopogon exolasius	Woronora Beard-heath	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Macadamia tetraphylla	Rough-shelled Bush Nut	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Maundia triglochinoides		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Melaleuca deanei	Deane's Paperbark	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Persoonia hirsuta	Hairy Geebung	Endangered	Category 3	Endangered	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	Prostanthera densa	Villous Mint-bush	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Pterostylis sp. Botany Bay	Botany Bay Bearded Orchid	Endangered	Category 2	Endangered	
Plantae	Flora	Pultenaea aristata	Prickly Bush-pea	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Rhodamnia rubescens	Scrub Turpentine	Critically Endangered	Not Sensitive	Critically Endangered	
Plantae	Flora	Senecio spathulatus	Coast Groundsel	Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Senna acclinis	Rainforest Cassia	Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Syzygium paniculatum	Magenta Lilly Pilly	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Tetratheca juncea	Black-eyed Susan	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Thelymitra atronitida	Black-hooded Sun Orchid	Critically Endangered	Category 2	Not Listed	
Plantae	Flora	Thesium australe	Austral Toadflax	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Tinospora tinosporoides	Arrow-head Vine	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Wilsonia backhousei	Narrow-leafed Wilsonia	Vulnerable	Not Sensitive	Not Listed	

Data does not include NSW category 1 sensitive species.

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Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a code is given under the field heading “LC” or “LocConf”. These codes lookup to the following location confidences:

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Premise Match	Georeferenced to the site location / premise or part of site
Area Match	Georeferenced to an approximate or general area
Road Match	Georeferenced to a road or rail corridor
Road Intersection	Georeferenced to a road intersection
Buffered Point	A point feature buffered to x metres
Adjacent Match	Land adjacent to a georeferenced feature
Network of Features	Georeferenced to a network of features
Suburb Match	Georeferenced to a suburb boundary
As Supplied	Spatial data supplied by provider

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Land Title Records

ABN: 36 092 724 251
Ph: 02 9099 7400
(Ph: 0412 199 304)

Level 14, 135 King Street, Sydney
Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

Summary of Owners Report

Address: Thomastown

Description: - Lots 6 to 11 D.P. 11037, Lot 8 Section D D.P. 10747 & Lot 55 D.P. 613007

As regards Lot 6 D.P. 11037

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
08.04.1926 (1926 to 1926)	William James Court (Clerk)	Vol 3848 Fol 156
01.04.1926 (1926 to 1926)	Amelia Alice Court (Widow)	Vol 3848 Fol 156
21.07.1926 (1926 to 1958)	Arthur Ashley Pemberton (Manufacturer)	Vol 3848 Fol 156
11.02.1958 (1958 to 1970)	Pemberton Investments Pty Limited	Vol 3848 Fol 156
17.08.1970 (1970 to	G.J. Coles & Coy Liimited	Vol 3848 Fol 156 Now 6/11037
17.05.1991 (1991 to 1996)	Barkly Square Shopping Centre Pty Limited	6/11037
24.01.1996 (1996 to date)	# Moside Pty Limited	6/11037

# Denotes Current Registered Proprietor

Leases, excluding shop premises: -

- 24.01.1996 (O 862674) – expired, not investigated.
- 20.03.2021 (AQ 884251) to Coles Supermarkets Australia Pty Ltd, of Coles Supermarket – expires 30.06.2023, also 2 x 5 year options.

Easements: - NIL

ABN: 36 092 724 251
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(Ph: 0412 199 304)

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Sydney 2000
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DX 967 Sydney

As regards Lot 7 D.P. 11037

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
04.03.1925 (1925 to 1958	Arthur Ashley Pemberton (Manufacturer)	Vol 3702 Fol 16
11.02.1958 (1958 to 1970)	Pemberton Investments Pty Limited	Vol 3702 Fol 16
17.08.1970 (1970 to	G.J. Coles & Coy Liimited	Vol 3702 Fol 16 Now 7/11037
17.05.1991 (1991 to 1996)	Barkly Square Shopping Centre Pty Limited	7/11037
24.01.1996 (1996 to date)	# Moside Pty Limited	7/11037

# Denotes Current Registered Proprietor

Leases, excluding shop premises: -

- 26.05.1983 to Sydney County Council, of Substation premises No. 559. Together with a Right of Way and Easement for Electricity purposes – expires 31.12.2010.
- 24.01.1996 (O 862674) – expired, not investigated.
- 10.07.2012 (AG 931159) to Ausgrid, of Substation premises No. 10559, See also D.P. 1163168. Together with a Right of Way and Easement for Electricity purposes – expires 31.12.2040, also 25 year option.
    - Lessee now Alpha Distribution Ministerial Holding Corporation
    - 28.02.2017 (AK 971351) Lease of Lease to Blue Asset Partner Pty Ltd, Eric Alpha Asset Corporation 1 Pty Ltd, Eric Alpha Asset Corporation 2 Pty Ltd, Eric Alpha Asset Corporation 3 Pty Ltd Eric Alpha Asset Corporation 4 Pty Ltd
    - 28.02.2017 (AK 971352) Sub Lease to Blue Op Partner Pty Ltd, Eric Alpha Operator Corporation 1 Pty Ltd, Eric Alpha Operator Corporation 2 Pty Ltd, Eric Alpha Operator Corporation 3 Pty Ltd Eric Alpha Operator Corporation 4 Pty Ltd
- 20.03.2021 (AQ 884251) to Coles Supermarkets Australia Pty Ltd, of Coles Supermarket – expires 30.06.2023, also 2 x 5 year options.

Easements: - NIL

ABN: 36 092 724 251
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(Ph: 0412 199 304)

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As regards Lot 8 D.P. 11037

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
22.10.1923 (1923 to 1958)	Arthur Ashley Pemberton (Manufacturer)	Vol 3531 Fol 64
11.02.1958 (1958 to 1970)	Pemberton Investments Pty Limited	Vol 3531 Fol 64
17.08.1970 (1970 to	G.J. Coles & Coy Liimited	Vol 3531 Fol 64 Now 8/11037
17.05.1991 (1991 to 1996)	Barkly Square Shopping Centre Pty Limited	8/11037
24.01.1996 (1996 to date)	# Moside Pty Limited	8/11037

# Denotes Current Registered Proprietor

Leases, excluding shop premises: -

- 24.01.1996 (O 862674) – expired, not investigated.
- 20.03.2021 (AQ 884251) to Coles Supermarkets Australia Pty Ltd, of Coles Supermarket – expires 30.06.2023, also 2 x 5 year options.

Easements: -

- 26.05.1983 Right of Way and Easement for Electricity purposes – expires 31.12.2010.
- 10.07.2012 (AG 931159) See also D.P. 1163168. Right of Way and Easement for Electricity purposes – expires 31.12.2040 (?also 25 year option.)
- 10.07.2012 (AG 931159) See also D.P. 1163168. Right of Way – expires 31.12.2040 (?also 25 year option.)

As regards Lot 9 D.P. 11037

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
27.08.1915 (1915 to 1920)	Elsie Lane (Spinster) Thomas Edgar Lane (Mechanic)	Vol 458 Fol 163
27.10.1920 (1920 to 1923)	Cletus Joseph Egan (Carpenter)	Vol 458 Fol 163
27.08.1923 (1923 to 1958)	Arthur Ashley Pemberton (Manufacturer)	Vol 458 Fol 163 Now Vol 3508 Fol 75
11.02.1958 (1958 to 1970)	Pemberton Investments Pty Limited	Vol 3508 Fol 75
17.08.1970 (1970 to 1991)	G.J. Coles & Coy Limited Now Cock Myer Ltd	Vol 3508 Fol 75 Now 9/11037
17.05.1991 (1991 to 1996)	Barkly Square Shopping Centre Pty Limited	9/11037
24.01.1996 (1996 to date)	# Moside Pty Limited	9/11037

 # Denotes current registered proprietor

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Ph: 02 9099 7400
(Ph: 0412 199 304)

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Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

Leases, excluding shop premises: -

- 24.01.1996 (O 862674) – expired, not investigated.
- 20.03.2021 (AQ 884251) to Coles Supermarkets Australia Pty Ltd, of Coles Supermarket – expires 30.06.2023, also 2 x 5 year options.

Easements: - NIL

As regards Lot 10 D.P. 11037

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
16.05.1923 (1923 to 1958)	Arthur Ashley Pemberton (Manufacturer)	Vol 3453 Fol 237
11.02.1958 (1958 to 1970)	Pemberton Investments Pty Limited	Vol 3453 Fol 237
17.08.1970 (1970 to 1991)	G.J. Coles & Coy Limited Now Cock Myer Ltd	Vol 3453 Fol 237
17.05.1991 (1991 to 1996)	Barkly Square Shopping Centre Pty Limited	Vol 3453 Fol 237 Now 10/11037
24.01.1996 (1996 to date)	# Moside Pty Limited	10/11037

# Denotes Current Registered Proprietor

Leases, excluding shop premises: -

- 24.01.1996 (O 862674) – expired, not investigated.
- 20.03.2021 (AQ 884251) to Coles Supermarkets Australia Pty Ltd, of Coles Supermarket – expires 30.06.2023, also 2 x 5 year options.

Easements: - NIL

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Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

As regards Lot 11 D.P. 11037

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
16.05.1923 (1923 to 1958)	Arthur Ashley Pemberton (Manufacturer)	Vol 3453 Fol 236
11.02.1958 (1958 to 1970)	Pemberton Investments Pty Limited	Vol 3453 Fol 236
17.08.1970 (1970 to 1991)	G.J. Coles & Coy Limited Now Cock Myer Ltd	Vol 3453 Fol 236
17.05.1991 (1991 to 1996)	Barkly Square Shopping Centre Pty Limited	Vol 3453 Fol 236 Now 11/11037
24.01.1996 (1996 to date)	# Moside Pty Limited	11/11037

# Denotes Current Registered Proprietor

Leases, excluding shop premises: -

- 24.01.1996 (O 862674) – expired, not investigated.
- 20.03.2021 (AQ 884251) to Coles Supermarkets Australia Pty Ltd, of Coles Supermarket – expires 30.06.2023, also 2 x 5 year options.

Easements: - NIL

As regards Lot 8 Section D D.P. 10747

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
01.11.1924 (1924 to 1958)	Arthur Ashley Pemberton (Manufacturer)	Vol 3669 Fol 247
11.02.1958 (1958 to 1970)	Pemberton Investments Pty Limited	Vol 3669 Fol 247
17.08.1970 (1970 to 1991)	G.J. Coles & Coy Limited Now Cock Myer Ltd	Vol 3669 Fol 247 Now 8/D/10747
17.05.1991 (1991 to 1996)	Barkly Square Shopping Centre Pty Limited	8/D/10747
24.01.1996 (1996 to date)	# Moside Pty Limited	8/D/10747

# Denotes Current Registered Proprietor

ABN: 36 092 724 251
Ph: 02 9099 7400
(Ph: 0412 199 304)

Level 14, 135 King Street, Sydney
Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

Leases, excluding shop premises: -

- 24.01.1996 (O 862674) – expired, not investigated.
- 20.03.2021 (AQ 884251) to Coles Supermarkets Australia Pty Ltd, of Coles Supermarket – expires 30.06.2023, also 2 x 5 year options.

Easements: - NIL

As regards Lot 55 D.P. 613007

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
08.04.1926 (1926 to 1927)	Albert William Allen (Packer)	Vol 3848 Fol 157
24.02.1927 (1927 to 1958)	Arthur Ashley Pemberton (Manufacturer)	Vol 3848 Fol 157
11.02.1958 (1958 to 1970)	Pemberton Investments Pty Limited	Vol 3848 Fol 157
17.08.1970 (1970 to 1991)	G.J. Coles & Coy Limited Now Cock Myer Ltd	Vol 3848 Fol 157 Then Vol 14309 Fol 52 Now 55/613007
17.05.1991 (1991 to 1996)	Barkly Square Shopping Centre Pty Limited	55/613007
24.01.1996 (1996 to date)	# Moside Pty Limited	55/613007

# Denotes Current Registered Proprietor

Leases, excluding shop premises: -

- 24.01.1996 (O 862674) – expired, not investigated.
- 20.03.2021 (AQ 884251) to Coles Supermarkets Australia Pty Ltd, of Coles Supermarket – expires 30.06.2023, also 2 x 5 year options.

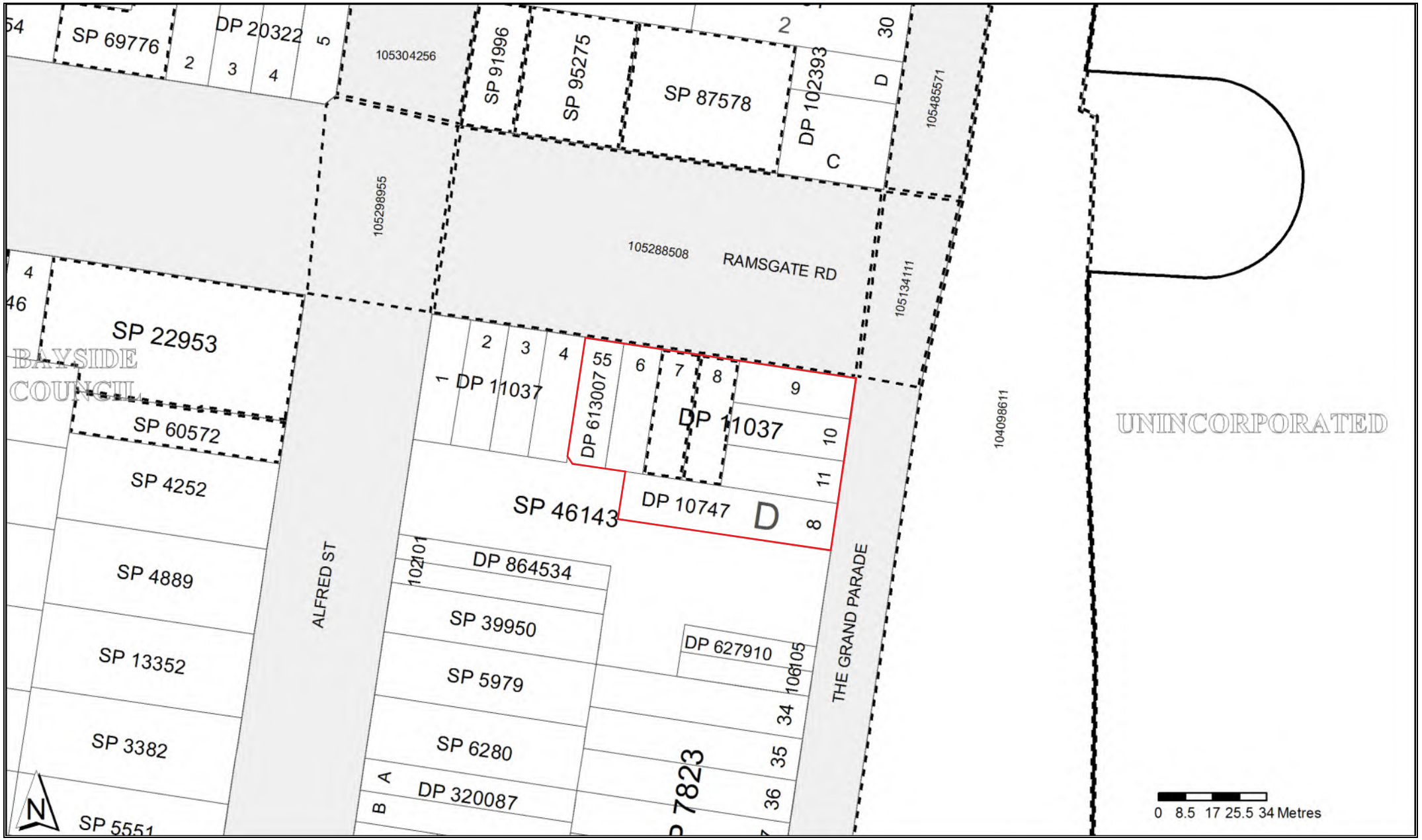
Easements: - NIL

Yours Sincerely
Mark Groll
23 March 2022

Cadastral Records Enquiry Report : Lot 8 DP 11037

Ref : Coles Ramsgate, 277 Grand Parade

Locality : RAMSGATE BEACH
Parish : ST GEORGE
LGA : BAYSIDE
County : CUMBERLAND



This information is provided as a searching aid only.Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For ALL ACTIVITY PRIOR TO SEPTEMBER 2002 you must refer to the RGs Charting and Reference Maps

LAND REGISTRY SERVICES Historical Search

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE

22/3/2022 6:15PM

FOLIO: 6/11037

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 3848 FOL 156

Recorded	Number	Type of Instrument	C.T. Issue
16/2/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
20/7/1990		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
17/5/1991	Z493893	TRANSFER	EDITION 1
24/1/1996	O862673	TRANSFER	
24/1/1996	O862674	LEASE	EDITION 2
15/10/1998	5332606	VARIATION OF LEASE	
31/8/2001	7900262	MORTGAGE	EDITION 3
15/7/2003	9790665	VARIATION OF LEASE	
7/2/2014	AI360759	VARIATION OF LEASE	
1/9/2018	AN678863	DEPARTMENTAL DEALING	EDITION 4 CORD ISSUED
20/3/2021	AQ884251	LEASE	EDITION 5 CORD ISSUED

*** END OF SEARCH ***

Coles Ramsgate, 277 Grand Parade PRINTED ON 22/3/2022

Received: 22/03/2022 18:15:43

RP 13 STAMP DUTY [redacted]

Z 493893 X

156

See Annexures A to G

TRANSFER

REAL PROPERTY ACT, 1900

T CB ~~/~~ X R/
$ 47

	Torrens Title Reference	If Part Only, Delete Whole and Give Details	Location
DESCRIPTION OF LAND Note (a)	See Annexure "A"	WHOLE	See Annexure "A"

D

TRANSFEROR Note (b): COLES MYER LTD (formerly G.J. Coles & Coy. Limited and originally called G.J. Coles & Coy. Proprietary Limited).

ESTATE Note (c): (the abovenamed TRANSFEROR) hereby ~~acknowledges receipt of the consideration of $~~ ~~and~~ transfers an estate in fee simple as part of a company reconstruction in the land above described to the TRANSFEREE

TRANSFEREE Note (d): BARKLY SQUARE SHOPPING CENTRE PTY LTD of 800 Toorak Road, Tooronga, Victoria, 3146

OFFICE USE ONLY: See Annexures A to G

TENANCY Note (e): as joint tenants/tenants in common

PRIOR ENCUMBRANCES Note (f): subject to the following PRIOR ENCUMBRANCES 1. See Annexure "B"
2. .... 3. ....

DATE 8 DECEMBER 1990

We hereby certify this dealing to be correct for the purposes of the Real Property Act, 1900.

EXECUTION Note (g)

Signed in my presence by the transferor who is personally known to me

.... Signature of Witness

.... Name of Witness (BLOCK LETTERS)

.... Address and occupation of Witness

THE COMMON SEAL of COLES MYER LTD was hereunto affixed in the presence of:

Secretary

Director

.... Signature of Transferor

Note (g)

Signed in my presence by the transferee who is personally known to me

.... Signature of Witness

.... Name of Witness (BLOCK LETTERS)

.... Address and occupation of Witness

.... Signature of Transferee

BRIAN McFADYEN
SOLICITOR, SYDNEY

TO BE COMPLETED BY LODGING PARTY Notes (h) and (i)

LODGED BY FREEHILL, HOLLINGDALE & PAGE
Level 30, MLC Centre
19-29 Martin Place
SYDNEY NSW 2000
Phone: 225 5000 DX 361 Sydney
BJMcF: COL900750

Ref:
Delivery Box Number 27C 7//37J17626

LOCATION OF DOCUMENTS		
CT	OTHER	
		Herewith.
		In L.T.O. with
		Produced by

OFFICE USE ONLY

Checked	Passed	REGISTERED -19
BB A		1991
Signed	Extra Fee	

Secondary Directions	
Delivery Directions	See Annexures A to G

MANUAL ENDT. COMPLETE 29/4/1991.

29-4

Caveat T391356 (re 20/244814) should have lapsed upon regn of T407779

& certificate of incorporation sighted

LAND REGISTRY SERVICES

Title Search

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 6/11037

SEARCH DATE	TIME	EDITION NO	DATE
22/3/2022	6:14 PM	5	20/3/2021

LAND

LOT 6 IN DEPOSITED PLAN 11037
LOCAL GOVERNMENT AREA BAYSIDE
PARISH OF ST GEORGE COUNTY OF CUMBERLAND
TITLE DIAGRAM DP11037

FIRST SCHEDULE

MOSIDE PTY. LIMITED (T O862673)

SECOND SCHEDULE (3 NOTIFICATIONS)

---

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 7900262 MORTGAGE TO AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED
3 AQ884251 LEASE TO COLES SUPERMARKETS AUSTRALIA PTY LTD OF COLES SUPERMARKET, 277 THE GRAND PARADE, RAMSGATE. EXPIRES: 30/6/2023. OPTION OF RENEWAL: 5 YEARS AND ONE FURTHER OPTION OF 5 YEARS.

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Received: 22/03/2022 18:14:38

LAND REGISTRY SERVICES Historical Search

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
22/3/2022 6:15PM

FOLIO: 7/11037

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 3702 FOL 16

Recorded	Number	Type of Instrument	C.T. Issue
16/2/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
5/7/1990		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
17/5/1991	Z493893	TRANSFER	EDITION 1
24/1/1996	O862673	TRANSFER	
24/1/1996	O862674	LEASE	EDITION 2
15/10/1998	5332606	VARIATION OF LEASE	
31/8/2001	7900262	MORTGAGE	EDITION 3
15/7/2003	9790665	VARIATION OF LEASE	
30/3/2011	DP1163168	DEPOSITED PLAN	
10/7/2012	AG931159	LEASE	EDITION 4
7/2/2014	AI360759	VARIATION OF LEASE	
28/2/2017	AK971351	LEASE	
28/2/2017	AK971352	SUB-LEASE	
28/2/2017	AK971502	MORTGAGE OF LEASE	
28/2/2017	AK971571	CHANGE OF NAME	
28/2/2017	AM29580	DEPARTMENTAL DEALING	
1/9/2018	AN678863	DEPARTMENTAL DEALING	EDITION 5 CORD ISSUED
20/3/2021	AQ884251	LEASE	EDITION 6 CORD ISSUED

*** END OF SEARCH ***

Coles Ramsgate, 277 Grand Parade PRINTED ON 22/3/2022

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 7/11037

SEARCH DATE	TIME	EDITION NO	DATE
22/3/2022	6:14 PM	6	20/3/2021

LAND

LOT 7 IN DEPOSITED PLAN 11037
LOCAL GOVERNMENT AREA BAYSIDE
PARISH OF ST GEORGE COUNTY OF CUMBERLAND
TITLE DIAGRAM DP11037

FIRST SCHEDULE

MOSIDE PTY. LIMITED (T O862673)

SECOND SCHEDULE (4 NOTIFICATIONS)

---

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 7900262 MORTGAGE TO AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED
3 AG931159 LEASE TO AUSGRID OF SUBSTATION NO 10559 TOGETHER WITH A RIGHT OF WAY AND EASEMENT FOR ELECTRICITY PURPOSES AFFECTING THE PART DESIGNATED (C1) IN DP1163168. EXPIRES: 31/12/2040. OPTION OF RENEWAL: 25 YEARS.
AK971351 LEASE OF LEASE AG931159 TO BLUE ASSET PARTNER PTY LTD, ERIC ALPHA ASSET CORPORATION 1 PTY LTD, ERIC ALPHA ASSET CORPORATION 2 PTY LTD, ERIC ALPHA ASSET CORPORATION 3 PTY LTD & ERIC ALPHA ASSET CORPORATION 4 PTY LTD EXPIRES: SEE DEALING. CLAUSE 2.3 (b) (ii).
AK971352 LEASE OF LEASE AK971351 TO BLUE OP PARTNER PTY LTD, ERIC ALPHA OPERATOR CORPORATION 1 PTY LTD, ERIC ALPHA OPERATOR CORPORATION 2 PTY LTD, ERIC ALPHA OPERATOR CORPORATION 3 PTY LTD & ERIC ALPHA OPERATOR CORPORATION 4 PTY LTD EXPIRES: SEE DEALING. CLAUSE 12.1
AK971502 MORTGAGE OF LEASE AK971351 TO ANZ FIDUCIARY SERVICES PTY LTD
AK971571 CHANGE OF NAME AFFECTING LEASE AG931159 LESSEE NOW ALPHA DISTRIBUTION MINISTERIAL HOLDING CORPORATION
4 AQ884251 LEASE TO COLES SUPERMARKETS AUSTRALIA PTY LTD OF COLES SUPERMARKET, 277 THE GRAND PARADE, RAMSGATE. EXPIRES: 30/6/2023. OPTION OF RENEWAL: 5 YEARS AND ONE FURTHER OPTION OF 5 YEARS.

END OF PAGE 1 - CONTINUED OVER

FOLIO: 7/11037 PAGE 2

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

LAND REGISTRY SERVICES

Historical Search

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
22/3/2022 6:15PM

FOLIO: 8/11037

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 3531 FOL 64

Recorded	Number	Type of Instrument	C.T. Issue
18/2/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
30/11/1990		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
17/5/1991	Z493893	TRANSFER	EDITION 1
24/1/1996	O862673	TRANSFER	
24/1/1996	O862674	LEASE	EDITION 2
15/10/1998	5332606	VARIATION OF LEASE	
31/8/2001	7900262	MORTGAGE	EDITION 3
15/7/2003	9790665	VARIATION OF LEASE	
30/3/2011	DP1163168	DEPOSITED PLAN	
10/7/2012	AG931159	LEASE	EDITION 4
7/2/2014	AI360759	VARIATION OF LEASE	
1/9/2018	AN678863	DEPARTMENTAL DEALING	EDITION 5 CORD ISSUED
15/9/2020	AP912711	DEPARTMENTAL DEALING	
20/3/2021	AQ884251	LEASE	EDITION 6 CORD ISSUED

*** END OF SEARCH ***

Coles Ramsgate, 277 Grand Parade PRINTED ON 22/3/2022

LAND REGISTRY SERVICES

Title Search

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 8/11037

SEARCH DATE	TIME	EDITION NO	DATE
22/3/2022	6:14 PM	6	20/3/2021

LAND

LOT 8 IN DEPOSITED PLAN 11037
AT RAMSGATE BEACH
LOCAL GOVERNMENT AREA BAYSIDE
PARISH OF ST GEORGE COUNTY OF CUMBERLAND
TITLE DIAGRAM DP11037

FIRST SCHEDULE

MOSIDE PTY. LIMITED (T 0862673)

SECOND SCHEDULE (5 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 7900262 MORTGAGE TO AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED
3 AG931159 RIGHT OF WAY AND EASEMENT FOR ELECTRICITY PURPOSES AFFECTING THE SITE DESIGNATED (C1) IN DP1163168. EXPIRES 31/12/2040
4 AG931159 RIGHT OF WAY AFFECTING THE SITE DESIGNATED (R1) IN DP1163168. EXPIRES 31/12/2040
5 AQ884251 LEASE TO COLES SUPERMARKETS AUSTRALIA PTY LTD OF COLES SUPERMARKET, 277 THE GRAND PARADE, RAMSGATE. EXPIRES: 30/6/2023. OPTION OF RENEWAL: 5 YEARS AND ONE FURTHER OPTION OF 5 YEARS.

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

LAND REGISTRY SERVICES Historical Search

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
22/3/2022 6:15PM

FOLIO: 9/11037

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 3508 FOL 75

Recorded	Number	Type of Instrument	C.T. Issue
18/2/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
25/9/1989		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
17/5/1991	Z493893	TRANSFER	EDITION 1
24/1/1996	O862673	TRANSFER	
24/1/1996	O862674	LEASE	EDITION 2
15/10/1998	5332606	VARIATION OF LEASE	
31/8/2001	7900262	MORTGAGE	EDITION 3
15/7/2003	9790665	VARIATION OF LEASE	
7/2/2014	AI360759	VARIATION OF LEASE	
1/9/2018	AN678863	DEPARTMENTAL DEALING	EDITION 4 CORD ISSUED
20/3/2021	AQ884251	LEASE	EDITION 5 CORD ISSUED

*** END OF SEARCH ***

Coles Ramsgate, 277 Grand Parade PRINTED ON 22/3/2022

LAND REGISTRY SERVICES

Title Search

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 9/11037

SEARCH DATE	TIME	EDITION NO	DATE
22/3/2022	6:14 PM	5	20/3/2021

LAND

LOT 9 IN DEPOSITED PLAN 11037
LOCAL GOVERNMENT AREA BAYSIDE
PARISH OF ST GEORGE COUNTY OF CUMBERLAND
TITLE DIAGRAM DP11037

FIRST SCHEDULE

MOSIDE PTY. LIMITED (T O862673)

SECOND SCHEDULE (3 NOTIFICATIONS)

---

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 7900262 MORTGAGE TO AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED
3 AQ884251 LEASE TO COLES SUPERMARKETS AUSTRALIA PTY LTD OF COLES SUPERMARKET, 277 THE GRAND PARADE, RAMSGATE. EXPIRES: 30/6/2023. OPTION OF RENEWAL: 5 YEARS AND ONE FURTHER OPTION OF 5 YEARS.

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Received: 22/03/2022 18:14:35

LAND REGISTRY SERVICES Historical Search

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
22/3/2022 6:15PM

FOLIO: 10/11037

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 3453 FOL 237

Recorded	Number	Type of Instrument	C.T. Issue
18/2/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
31/12/1993		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
24/1/1996	O862673	TRANSFER	
24/1/1996	O862674	LEASE	EDITION 1
15/10/1998	5332606	VARIATION OF LEASE	
31/8/2001	7900262	MORTGAGE	EDITION 2
15/7/2003	9790665	VARIATION OF LEASE	
7/2/2014	AI360759	VARIATION OF LEASE	
1/9/2018	AN678863	DEPARTMENTAL DEALING	EDITION 3 CORD ISSUED
20/3/2021	AQ884251	LEASE	EDITION 4 CORD ISSUED

*** END OF SEARCH ***

Coles Ramsgate, 277 Grand Parade PRINTED ON 22/3/2022

Received: 22/03/2022 18:15:40

LAND REGISTRY SERVICES

Title Search

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 10/11037

SEARCH DATE	TIME	EDITION NO	DATE
22/3/2022	6:14 PM	4	20/3/2021

LAND

LOT 10 IN DEPOSITED PLAN 11037
LOCAL GOVERNMENT AREA BAYSIDE
PARISH OF ST GEORGE COUNTY OF CUMBERLAND
TITLE DIAGRAM DP11037

FIRST SCHEDULE

MOSIDE PTY. LIMITED (T O862673)

SECOND SCHEDULE (3 NOTIFICATIONS)

---

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 7900262 MORTGAGE TO AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED
3 AQ884251 LEASE TO COLES SUPERMARKETS AUSTRALIA PTY LTD OF COLES SUPERMARKET, 277 THE GRAND PARADE, RAMSGATE. EXPIRES: 30/6/2023. OPTION OF RENEWAL: 5 YEARS AND ONE FURTHER OPTION OF 5 YEARS.

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

LAND REGISTRY SERVICES Historical Search

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE

22/3/2022 6:15PM

FOLIO: 11/11037

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 3453 FOL 236

Recorded	Number	Type of Instrument	C.T. Issue
18/2/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
31/12/1993		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
24/1/1996	O862673	TRANSFER	
24/1/1996	O862674	LEASE	EDITION 1
15/10/1998	5332606	VARIATION OF LEASE	
31/8/2001	7900262	MORTGAGE	EDITION 2
15/7/2003	9790665	VARIATION OF LEASE	
7/2/2014	AI360759	VARIATION OF LEASE	
1/9/2018	AN678863	DEPARTMENTAL DEALING	EDITION 3 CORD ISSUED
15/9/2020	AP912711	DEPARTMENTAL DEALING	
20/3/2021	AQ884251	LEASE	EDITION 4 CORD ISSUED

*** END OF SEARCH ***

Coles Ramsgate, 277 Grand Parade PRINTED ON 22/3/2022

LAND REGISTRY SERVICES

Title Search

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 11/11037

SEARCH DATE	TIME	EDITION NO	DATE
22/3/2022	6:14 PM	4	20/3/2021

LAND

LOT 11 IN DEPOSITED PLAN 11037
AT RAMSGATE BEACH
LOCAL GOVERNMENT AREA BAYSIDE
PARISH OF ST GEORGE COUNTY OF CUMBERLAND
TITLE DIAGRAM DP11037

FIRST SCHEDULE

MOSIDE PTY. LIMITED (T 0862673)

SECOND SCHEDULE (3 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 7900262 MORTGAGE TO AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED
3 AQ884251 LEASE TO COLES SUPERMARKETS AUSTRALIA PTY LTD OF COLES SUPERMARKET, 277 THE GRAND PARADE, RAMSGATE. EXPIRES: 30/6/2023. OPTION OF RENEWAL: 5 YEARS AND ONE FURTHER OPTION OF 5 YEARS.

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Received: 22/03/2022 18:14:38

LAND REGISTRY SERVICES Historical Search

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
22/3/2022 6:15PM

FOLIO: 8/D/10747

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 3669 FOL 247

Recorded	Number	Type of Instrument	C.T. Issue
17/9/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
3/7/1990		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
17/5/1991	Z493893	TRANSFER	EDITION 1
24/1/1996	O862673	TRANSFER	
24/1/1996	O862674	LEASE	EDITION 2
15/10/1998	5332606	VARIATION OF LEASE	
31/8/2001	7900262	MORTGAGE	EDITION 3
15/7/2003	9790665	VARIATION OF LEASE	
7/2/2014	AI360759	VARIATION OF LEASE	
1/9/2018	AN678863	DEPARTMENTAL DEALING	EDITION 4 CORD ISSUED
20/3/2021	AQ884251	LEASE	EDITION 5 CORD ISSUED

*** END OF SEARCH ***

Coles Ramsgate, 277 Grand Parade PRINTED ON 22/3/2022

LAND REGISTRY SERVICES

Title Search

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 8/D/10747

SEARCH DATE	TIME	EDITION NO	DATE
22/3/2022	6:14 PM	5	20/3/2021

LAND

LOT 8 OF SECTION D IN DEPOSITED PLAN 10747
LOCAL GOVERNMENT AREA BAYSIDE
PARISH OF ST GEORGE COUNTY OF CUMBERLAND
TITLE DIAGRAM DP10747

FIRST SCHEDULE

MOSIDE PTY. LIMITED (T O862673)

SECOND SCHEDULE (3 NOTIFICATIONS)

---

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 7900262 MORTGAGE TO AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED
3 AQ884251 LEASE TO COLES SUPERMARKETS AUSTRALIA PTY LTD OF COLES SUPERMARKET, 277 THE GRAND PARADE, RAMSGATE. EXPIRES: 30/6/2023. OPTION OF RENEWAL: 5 YEARS AND ONE FURTHER OPTION OF 5 YEARS.

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

14309052

CERTIFICATE OF TITLE

NEW SOUTH WALES — REAL PROPERTY ACT, 1900

Appln. No.2331

Prior Title Vol.3848 Fol.157

Vol. 14309 Fol. 52

EDITION ISSUED 12 12 1980

14309 Fol. 52 (Page 1) Vol.

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

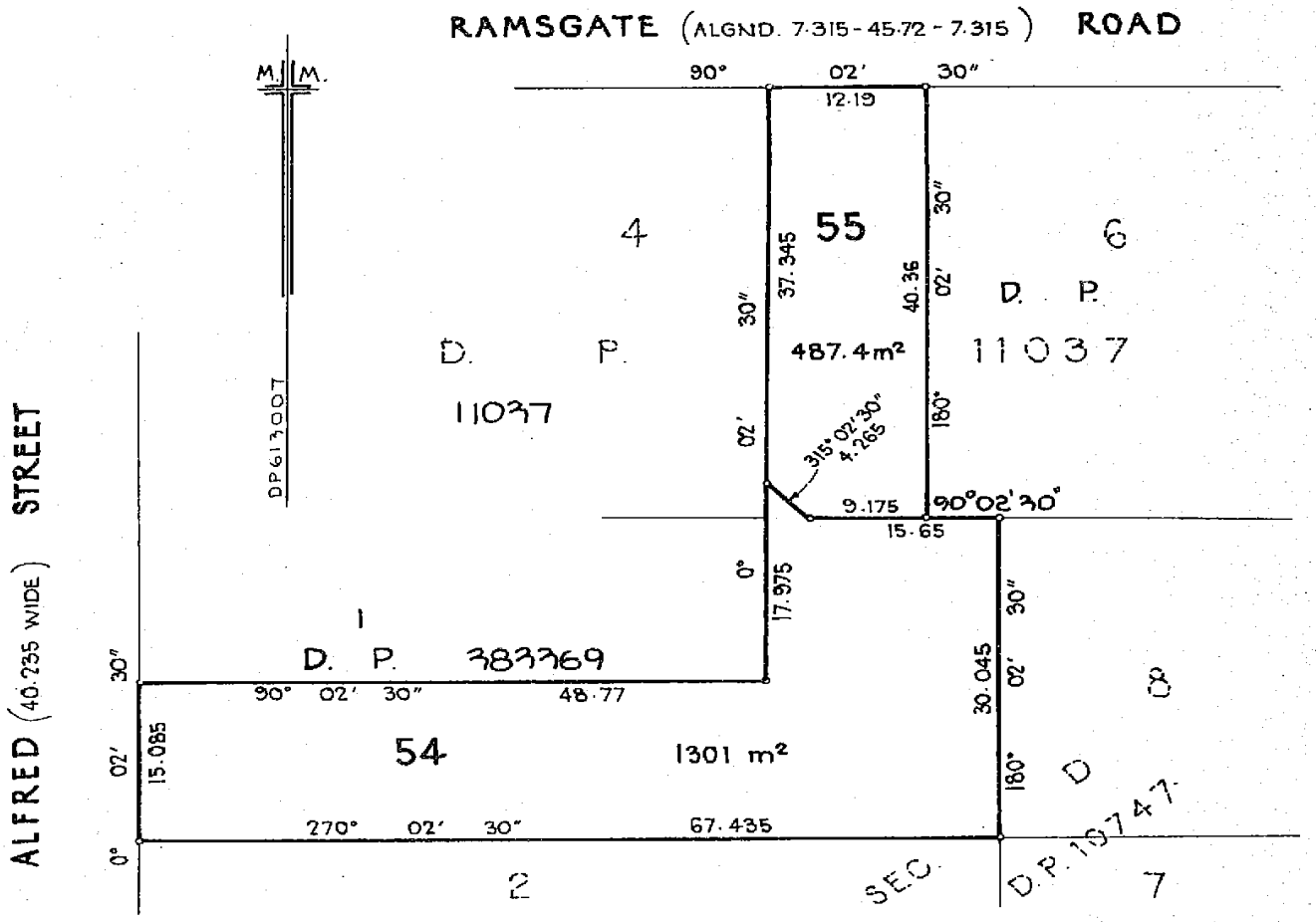
CANCELLED

Registrar General.

SEE AUTO FOLIO

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



ESTATE AND LAND REFERRED TO

S Estate in Fee Simple in Lot 55 in Deposited Plan 613007 at Ramsgate in the Municipality of Rockdale Parish of St.George and County of Cumberland being part of Portion 42 granted to George Alfred Lloyd on 23-2-1854.

FIRST SCHEDULE

G. J. COLES & COY. LIMITED.

SECOND SCHEDULE

GRY 1. Reservations and conditions, if any, contained in the Crown Grant above referred to.

RG 2/64

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

Vol. 14309 Fol. 52

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	REGISTERED	Signature of Registrar General
CANCELLED				
SEE AUTO FOLIO				

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	PARTICULARS	REGISTERED	Signature of Registrar General	CANCELLATION	

(Page 2 of 2 pages)

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

LAND REGISTRY SERVICES Historical Search

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
22/3/2022 6:15PM

FOLIO: 55/613007

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 14309 FOL 52

Recorded	Number	Type of Instrument	C.T. Issue
28/3/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
8/9/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
17/5/1991	Z493893	TRANSFER	EDITION 1
24/1/1996	O862673	TRANSFER	
24/1/1996	O862674	LEASE	EDITION 2
15/10/1998	5332606	VARIATION OF LEASE	
31/8/2001	7900262	MORTGAGE	EDITION 3
15/7/2003	9790665	VARIATION OF LEASE	
7/2/2014	AI360759	VARIATION OF LEASE	
1/9/2018	AN678863	DEPARTMENTAL DEALING	EDITION 4 CORD ISSUED
20/3/2021	AQ884251	LEASE	EDITION 5 CORD ISSUED

*** END OF SEARCH ***

Coles Ramsgate, 277 Grand Parade PRINTED ON 22/3/2022

Received: 22/03/2022 18:15:38

Title Search

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 55/613007

SEARCH DATE	TIME	EDITION NO	DATE
22/3/2022	6:14 PM	5	20/3/2021

LAND

LOT 55 IN DEPOSITED PLAN 613007
AT RAMSGATE
LOCAL GOVERNMENT AREA BAYSIDE
PARISH OF ST GEORGE COUNTY OF CUMBERLAND
TITLE DIAGRAM DP613007

FIRST SCHEDULE

MOSIDE PTY. LIMITED (T 0862673)

SECOND SCHEDULE (3 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 7900262 MORTGAGE TO AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED
3 AQ884251 LEASE TO COLES SUPERMARKETS AUSTRALIA PTY LTD OF COLES SUPERMARKET, 277 THE GRAND PARADE, RAMSGATE. EXPIRES: 30/6/2023. OPTION OF RENEWAL: 5 YEARS AND ONE FURTHER OPTION OF 5 YEARS.

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Received: 22/03/2022 18:14:34

Section 10.7 Certificates

Bayside Council
Serving Our Community

8 March 2022

Our Ref: Certificate No. 66382
Contact: Customer Service 1300 581 299

JK Environments
PO BOX 976
NORTH RYDE BC NSW 1670

Dear Sir/Madam

Following is your planning certificate issued under section 10.7 (2) and (5) of the Environmental Planning and Assessment Act 1979.

This Section 10.7 Certificate has been issued by Bayside Council. Information contained within this Certificate is based on data from Council's records as they existed at the date of this Certificate.

Should you have any enquiries, please contact the Council's Customer Service Centre on 1300 581 299.

SECTION 10.7 PLANNING CERTIFICATE

(under section 10.7 of the Environmental Planning and Assessment Act 1979)

ISSUED TO:

JK Environments
PO BOX 976
NORTH RYDE BC NSW 1670

		Fee:	133.00
Council:	Bayside	Receipt No:	4972429
County:	Cumberland	Receipt Date:	
Parish:	St George	Your Ref:	E34871PT:59795

PROPERTY: 277 THE GRAND PARADE, RAMSGATE BEACH NSW 2217

Lot 6 DP 11037, Lot 7 DP 11037, Lot 8 DP 11037, Lot 9 DP 11037, Lot 10 DP 11037, Lot 11 DP 11037, Lot 8 SecD DP 10747, Lot 55 DP 613007

CT Assessment No: 29117

Date: 8 March 2022

For
Meredith Wallace
General Manager

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Notes: (1) Where this certificate refers to a specific allotment (or allotments) within a strata plan the certificate is issued for the whole of the land within the strata plan, not just the specific allotment or allotments referred to, and any information contained in the certificate may relate to the whole or any part of the strata plan.

1 Names of relevant planning instruments and development control plans

(1) The name of each environmental planning instrument and development control plan that applies to the carrying out of development on the land.

Bayside Local Environmental Plan 2021

State Environmental Planning Policy No 65	Design Quality of Residential Apartment Development
State Environmental Planning Policy	(Building Sustainability Index: BASIX) 2004
State Environmental Planning Policy	(Exempt and Complying Development Codes) 2008
State Environmental Planning Policy	(Housing) 2021
State Environmental Planning Policy	(Biodiversity and Conservation) 2021
State Environmental Planning Policy	(Resilience and Hazards) 2021
State Environmental Planning Policy	(Transport and Infrastructure) 2021
State Environmental Planning Policy	(Industry and Employment) 2021
State Environmental Planning Policy	(Resources and Energy) 2021
State Environmental Planning Policy	(Precincts – Eastern Harbour City) 2021
State Environmental Planning Policy	(Planning Systems) 2021

Greater Metropolitan Regional Environmental Plan No. 2 – Georges River Catchment
(only applies to land within the Georges River Catchment, referred to in Clause 2 of the Plan, being, in the Bayside Council area, certain land within the suburbs of Dolls Point, Ramsgate, Sandringham and Sans Souci).

Rockdale Development Control Plan 2011

(2) The name of each proposed environmental planning instrument and draft development control plan, which is or has been subject to community consultation or public exhibition under the Act, that will apply to the carrying out of development on the land.

No Planning Proposal applies to the land.

No draft Development Control Plan applies to the land.

Draft State Environmental Planning Policy – Design and Place

For more information or to determine whether these policies apply to your property, visit the Department of Planning and Environment website at www.planning.nsw.gov.au.

(3) Subsection (2) does not apply in relation to a proposed environmental planning instrument or draft development control plan if—

- **a) it has been more than 3 years since the end of the public exhibition period for the proposed instrument or draft plan, or**
- **b) for a proposed environmental planning instrument—the Planning Secretary has notified the council that the making of the proposed instrument has been deferred indefinitely or has not been approved.**

(4) In this section—

proposed environmental planning instrument **means a draft environmental planning instrument and includes a planning proposal for a local environmental plan.**

2 Zoning and land use under relevant planning instruments

The following matters for each environmental planning instrument or draft environmental planning instrument that includes the land in a zone, however described—

2(a) the identity of the zone, whether by reference to—
(i) a name, such as "Residential Zone" or "Heritage Area", or
(ii) a number, such as "Zone No 2 (a)",

2(b) the purposes for which development in the zone—
(i) may be carried out without development consent, and
(ii) may not be carried out except with development consent, and
(iii) is prohibited,

The following zone or zones apply under the environmental planning instrument or draft environmental planning instrument referred to in section 2:

Zone B4 Mixed Use

1 Objectives of zone

- To provide a mixture of compatible land uses.
- To integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling.

2 Permitted without consent

Home-based child care; Home businesses; Home occupations

3 Permitted with consent

Artisan food and drink industries; Boarding houses; Centre-based child care facilities; Commercial premises; Community facilities; Educational establishments; Entertainment facilities; Exhibition homes; Function centres; Group Homes; Hostels; Hotel or motel accommodation; Information and education facilities; Medical centres; Oyster aquaculture; Passenger transport facilities; Recreation facilities (indoor); Registered clubs; Residential flat buildings; Respite day care centres; Restricted premises; Roads; Seniors housing; Shop top housing; Tank-based aquaculture; Waste or resource transfer stations; Any other development not specified in item 2 or 4

4 Prohibited

Advertising structures; Agriculture; Air transport facilities; Airstrips; Animal boarding or training establishments; Biosolids treatment facilities; Boat building and repair facilities; Boat launching ramps; Boat sheds; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Correctional centres; Crematoria; Depots; Eco-tourist facilities; Exhibition villages; Extractive industries; Farm buildings; Forestry; Freight transport facilities; Heavy industrial storage establishments; Highway service centres; Home occupations (sex services); Industrial training facilities; Industries; Jetties; Marinas; Mooring pens; Moorings; Open cut mining; Pond-based aquaculture; Port facilities; Recreation facilities (major); Research stations; Residential accommodation; Rural industries; Sewage treatment plants; Sex services premises; Storage premises; Transport depots; Truck depots; Vehicle body

repair workshops; Vehicle repair stations; Warehouse or distribution centres; Waste or resource management facilities; Wharf or boating facilities; Wholesale supplies

2(c) whether any additional permitted uses apply to the land,

No additional permitted uses apply to the land.

2(d) whether any development standards applying to the land fix minimum land dimensions for the erection of a dwelling house on the land and, if so, the fixed minimum land dimensions,

No development standards apply to the land that fixes minimum land dimensions for the erection of a dwelling house.

Note: The above information does not imply that the erection of a dwelling-house is necessarily permissible on the land to which this certificate applies. Refer to the relevant local environmental plan, deemed environmental planning instrument or draft local environmental plan applying to the land to confirm this.

2(e) whether the land is in an area of outstanding biodiversity value under the *Biodiversity Conservation Act 2016*,

The land **is not** an area of outstanding biodiversity value.

2(g) whether the land is in a conservation area, however described,

The land **is not** in a conservation area.

2(h) whether an item of environmental heritage, however described, is situated on the land.

There is **no such item** situated on the land.

3 Contributions plans

(1) The name of each contributions plan under the Act, Division 7.1 applying to the land, including draft contributions plan

Rockdale Section 94A Development Contributions Plan 2008
Rockdale Section 94 Contributions Plan 2004

Note: If land is within the former Rockdale City local government area, the *Rockdale Section 94 Contributions Plan (Amendment No 4)* and *Rockdale Section 94 Contributions Plan 1998* will continue to apply to all development applications and applications for complying development certificates made prior to 1 June 2004.

(2) If the land is in a special contributions area under the Act, Division 7.1, the name of the area.

A Special Infrastructure Contributions Plan does not apply to the land.

4 Complying development

(1) If the land is land on which complying development may be carried out under each of the complying development codes under *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*, because of that Policy, clause 1.17A(1)(c)–(e), (2), (3) or (4), 1.18(1)(c3) or 1.19.

(2) If complying development may not be carried out on the land because of 1 of those clauses, the reasons why it may not be carried out under the clause

(3) If the council does not have sufficient information to ascertain the extent to which complying development may or may not be carried out on the land, a statement that—

- **(a) a restriction applies to the land, but it may not apply to all of the land, and**
- **(b) the council does not have sufficient information to ascertain the extent to which complying development may or may not be carried out on the land.**

(4) If the complying development codes are varied, under that Policy, clause 1.12, in relation to the land.

Housing Code
Complying development **may be** carried out on the land under the above code.

Inland Code
Complying development **may be** carried out on the land under the above code.

Low Rise Housing Diversity Code
Complying development **may be** carried out on the land under the above code.

Rural Housing Code
Complying development **may be** carried out on the land under the above code.

Greenfield Housing Code
Complying development **may be** carried out on the land under the above code.

Commercial and Industrial (New Buildings and Additions) Code
Complying development **may be** carried out on the land under the above code.

Housing Alterations Code
Complying development **may be** carried out on the land under the above code.

General Development Code
Complying development **may be** carried out on the land under the above code.

Commercial and Industrial Alterations Code
Complying development **may be** carried out on the land under the above code.

Container Recycling Facilities Code
Complying development **may be** carried out on the land under the above code.

Subdivisions Code
Complying development **may be** carried out on the land under the above code.

Demolition Code
Complying development **may be** carried out on the land under the above code.

Fire Safety Code
Complying development **may be** carried out on the land under the above code.

Notes:
(1) If a reference is made to "part of the land", Complying Development **may be** carried out on the portion of the land not subject to such a restriction.
(2) This certificate only addresses matters raised in Clause 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1)(c3) and 1.19 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*. It is your responsibility to ensure that you comply with any other general requirements of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*.

5 Exempt development

(1) If the land is land on which exempt development may be carried out under each of the exempt development codes under *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*, because of that Policy, clause 1.16(1)(b1)–(d) or 1.16A.

(2) If exempt development may not be carried out on the land because of 1 of those clauses, the reasons why it may not be carried out under the clause.

(3) If the council does not have sufficient information to ascertain the extent to which exempt development may or may not be carried out on the land, a statement that—
- **(a) a restriction applies to the land, but it may not apply to all of the land, and**
- **(b) the council does not have sufficient information to ascertain the extent to which exempt development may or may not be carried out on the land.**

(4) If the exempt development codes are varied, under that Policy, clause 1.12, in relation to the land.

General Exempt Development Code
Exempt development **may be** carried out on the land under the above code.

Advertising and Signage Exempt Development Code
Exempt development **may be** carried out on the land under the above code.

Temporary Uses and Structures Exempt Development Code
Exempt development **may be** carried out on the land under the above code.

6 Affected building notices and building product rectification orders

(1) Whether the council is aware that—
- **a) an affected building notice is in force in relation to the land, or**
- **b) a building product rectification order is in force in relation to the land that has not been fully complied with, or**
- **c) a notice of intention to make a building product rectification order given in relation to the land is outstanding.**

(2) In this section—

affected building notice **has the same meaning as in the *Building Products (Safety) Act 2017*, Part 4.**
building product rectification order **has the same meaning as in the *Building Products (Safety) Act 2017*.**

Council **is not aware of an issue** of a notice of intention or order pertaining to building product rectification works (Building Products Safety Act 2017).

7 Land reserved for acquisition

Whether or not any environmental planning instrument or proposed environmental planning instrument referred to in section 1 makes provision in relation to the acquisition of the land by an authority of the State, as referred to in section 3.15.

The land **is not affected** by any provision in an environmental planning instrument, deemed environmental planning instrument or draft environmental planning instrument that provides for the acquisition of the land by a public authority, as referred to in section 3.15 of the Act.

8 Road widening and road realignment

Whether or not the land is affected by any road widening or road realignment under:

(a) The *Roads Act 1993*, Part 3, Division 2, or

The land **is not affected by** any road widening or road realignment under Division 2 of Part 3 of the *Roads Act 1993.*

(b) Any environmental planning instrument, or

The land **is not affected by** any road widening or road realignment under any environmental planning instrument.

(c) Any resolution of the council

The land **is not affected by** any road widening or road realignment under any resolution of the Council.

9 Flood related development controls

(1) If the land or part of the land is within the flood planning area and subject to flood related development controls.

Yes – *Bayside Local Environmental Plan 2021* applies to the land.
Yes – *Rockdale Development Control Plan 2011* applies to the land.

(2) If the land or part of the land is between the flood planning area and the probable maximum flood and subject to flood related development controls.

Yes – *Bayside Local Environmental Plan 2021* applies to the land.
Yes – *Rockdale Development Control Plan 2011* applies to the land.

Note: (1) Further information relating to flooding is provided in the "Advice under Section 10.7 (5)" attached.

Note:
(1) The answers above do not imply that the development referred to is necessarily permissible on the land to which this certificate applies. Refer to the relevant local environmental plan, deemed environmental planning instrument or draft local environmental plan applying to the land to confirm this.
(2) Council is not in a position to identify whether the information provided under section 9 relates to a current or future hazard as defined in Planning Circular PS 14-003.

(3) In this section—
***flood planning area* has the same meaning as in the Floodplain Development Manual.**
***Floodplain Development Manual* means the Floodplain Development Manual (ISBN 0 7347 5476 0) published by the NSW Government in April 2005.**
***probable maximum flood* has the same meaning as in the Floodplain Development Manual.**

10 Council and other public authority policies on hazard risk restrictions

(1) Whether any of the land is affected by an adopted policy that restricts the development of the land because of the likelihood of land slip, bush fire, tidal inundation, subsidence, acid sulfate soils, contamination, aircraft noise, salinity, coastal hazards, sea level rise or another risk, other than flooding.

(2) In this section—

***adopted policy* means a policy adopted—**
- **(a) by the council, or**
- **(b) by another public authority, if the public authority has notified the council that the policy will be included in a planning certificate issued by the council.**

Contaminated Land Policy
Former City of Rockdale Council adopted by resolution a policy on contaminated land that may restrict the development of the land. This policy does not specifically identify the subject land (or any other land) as contaminated. The policy does, however, apply to all land in the former City of Rockdale. This policy is implemented when zoning or land use changes are proposed on lands that have previously been used for certain purposes. Consideration of the Council's adopted policy and the application of provisions under relevant State legislation is warranted.

Clause 6.1 of the Bayside Local Environmental Plan 2021 - Acid Sulfate Soils

11 Bush fire prone land

(1) If any of the land is bush fire prone land, designated by the Commissioner of the NSW Rural Fire Service under the Act, section 10.3, a statement that all or some of the land is bush fire prone land.

(2) If none of the land is bush fire prone land, a statement to that effect.

The land **is not** bush fire prone land.

12 Loose-fill asbestos insulation

If the land includes residential premises, within the meaning of the *Home Building Act 1989*, Part 8, Division 1A, that are listed on the Register kept under that Division, a statement to that effect.

The land **is not** so listed.

13 Mine subsidence

Whether or not the land is proclaimed to be a mine subsidence district within the meaning *Coal Mine Subsidence Compensation Act 2017*.

The land **is not** so proclaimed.

14 Paper subdivision information

(1) The name of a development plan adopted by a relevant authority that or that –
- **(a) applies to the land, or**
- **(b) is proposed to be subject to a ballot.**

(2) The date of a subdivision order that applies to the land.

(3) Words and expressions used in this section have the same meaning as in this Regulation, Part 10 and the Act, Schedule 7.

The land **is not** so affected.

15 Property vegetation plans

If the land is land in relation to which a property vegetation plan is approved and in force under the *Native Vegetation Act 2003*, Part 4, a statement to that effect, but only if the council has been notified of the existence of the plan by the person or body that approved the plan under that Act.

The land **is not** land to which a property vegetation plan applies.

16 Biodiversity stewardship sites

If the land is a biodiversity stewardship site under a biodiversity stewardship agreement under the Biodiversity Conservation Act 2016, Part 5, a statement to that effect, but only if the council has been notified of the existence of the agreement by the Biodiversity Conservation Trust.

Note— *Biodiversity stewardship agreements include biobanking agreements under the Threatened Species Conservation Act 1995, Part 7A that are taken to be biodiversity stewardship agreements under the Biodiversity Conservation Act 2016, Part 5.*

The land **is not** subject to any such agreement.

17 Biodiversity certified land

If the land is biodiversity certified land under the Biodiversity Conservation Act 2016, Part 8, a statement to that effect.

Note— *Biodiversity certified land includes land certified under the Threatened Species Conservation Act 1995, Part 7AA that is taken to be certified under the Biodiversity Conservation Act 2016, Part 8..*

The land **is not** biodiversity certified land.

18 Orders under *Trees (Disputes Between Neighbours) Act 2006*

Whether an order has been made under the *Trees (Disputes Between Neighbours) Act 2006* to carry out work in relation to a tree on the land, but only if the council has been notified of the order.

The land **is not** subject to such an order.

19 Annual charges under *Local Government Act 1993* for coastal protection services that relate to existing coastal protection works

(1) **If the *Coastal Management Act 2016* applies to the council, whether the owner, or a previous owner, of the land has given written consent to the land being subject to annual charges under the Local Government Act 1993, section 496B, for coastal protection services that relate to existing coastal protection works.**

(2) **In this section—**
***existing coastal protection works* has the same meaning as in the *Local Government Act 1993*, section 553B.**

Note— Existing coastal protection works are works to reduce the impact of coastal hazards on land, such as seawalls, revetments, groynes and beach nourishment, that existed before 1 January 2011.

The land **is not** subject to annual charges.

20 State Environmental Planning Policy (Western Sydney Aerotropolis) 2020

Whether under *State Environmental Planning Policy (Western Sydney Aerotropolis) 2020* the land is—

(a) **in an ANEF or ANEC contour of 20 or greater, as referred to in that Policy, clause 19, or**
(b) **shown on the Lighting Intensity and Wind Shear Map, or**
(c) **shown on the Obstacle Limitation Surface Map, or**
(d) **in the "public safety area" on the Public Safety Area Map, or**
(e) **in the "3 kilometre wildlife buffer zone" or the "13 kilometre wildlife buffer zone" on the Wildlife Buffer Zone Map.**

The land **is not** subject to the *State Environmental Planning Policy (Western Sydney Aerotropolis) 2020*.

21 Development consent conditions for seniors housing

If *State Environmental Planning Policy (Housing) 2021*, Chapter 3, Part 5 applies to the land, any conditions of a development consent granted after 11 October 2007 in relation to the land that are of the kind set out in that Policy, clause 88(2).

The land **is not subject to** any such statement.

22 Site compatibility certificates and development consent conditions for affordable rental housing

(1) Whether there is a current site compatibility certificate under *State Environmental Planning Policy (Housing) 2021*, or a former site compatibility certificate, of which the council is aware, in relation to proposed development on the land and, if there is a certificate—

(a) the period for which the certificate is current, and

(b) that a copy may be obtained from the Department.

The land **is not subject to** any such certificate.

(2) If *State Environmental Planning Policy (Housing) 2021*, Chapter 2, Part 2, Division 1 or 5 applies to the land, any conditions of a development consent in relation to the land that are of a kind referred to in that Policy, clause 21(1) or 40(1).

The land **is not** subject to any such statement.

(3) Any conditions of a development consent in relation to land that are of a kind referred to in *State Environmental Planning Policy (Affordable Rental Housing) 2009*, clause 17(1) or 38(1).

The land **is not** subject to any such statement.

(4) In this section—
former site compatibility certificate* means a site compatibility certificate issued under *State Environmental Planning Policy (Affordable Rental Housing) 2009.

Section 59(2) Contaminated Land Management Act 1997

Note: The following matters are prescribed by section 59 (2) of *the Contaminated Land Management Act 1997* as additional matters to be specified in a planning certificate:

(a) that the land to which the certificate relates is significantly contaminated land within the meaning of that Act—if the land (or part of the land) is significantly contaminated land at the date when the certificate is issued;

Not applicable

(b) that the land to which the certificate relates is subject to a management order within the meaning of that Act—if it is subject to such an order at the date when the certificate is issued;

Not applicable

(c) that the land to which the certificate relates is the subject of an approved voluntary management proposal within the meaning of that Act—if it is the subject of such an approved proposal at the date when the certificate is issued;

Not applicable

(d) that the land to which the certificate relates is subject to an ongoing maintenance order within the meaning of that Act—if it is subject to such an order at the date when the certificate is issued; and

Not applicable

(e) that the land to which the certificate relates is the subject of a site audit statement within the meaning of that Act—if a copy of such a statement has been provided at any time to the local authority issuing the certificate.

Not applicable

[End of information under section 10.7 (2)]

ADVICE UNDER SECTION 10.7 (5)

Note: The Council is under no obligation to furnish any of the information supplied below. Equally, it may be that not every relevant matter relating to the land is provided below. The Council draws your attention to section 10.7 (6) which states that a council shall not incur any liability in respect of any advice provided in good faith under section 10.7 (5).

Further to your application for information under section 10.7 (5), the Council has resolved to supply answers to the following questions:

A Whether or not the Council has information that would indicate that the land is subject to the risk of flooding or tidal inundation for a 1% annual exceedance probability (AEP) (1 in 100 Year) event

The Council **is aware** of various information that suggests the land may be affected by the 1% AEP flood. The Council is unaware of the accuracy of this information, although further enquiries may be made with the Council's City Services Department in relation to this.

Note: Refer to Question 7A of the preceding certificate under section 10.7 (2) to ascertain whether or not development on the land may be subject to flood related development controls.

B Whether or not the Council has information that would indicate that the land is subject to slip or subsidence

The Council **is not aware** of any investigations that have been carried out.

C Whether or not the land is in the vicinity of a heritage item or heritage conservation area identified in an environmental planning instrument or a proposed heritage item or proposed heritage conservation area identified in a draft local environmental plan

A building, work, relic, tree or place located on land in the vicinity of this land **is identified as a heritage item** in schedule 5 to *Bayside Local Environmental Plan 2021*.

The special provisions of clause 5.10(5) of this plan apply to development on land in the vicinity of heritage items.

D Whether or not a planning agreement entered into under Subdivision 2 of Division 7.1 of Part 7 of the Environmental Planning and Assessment Act 1979 currently applies to the land (but only if, where the Council is not a party to the agreement, information about the agreement has been provided to the Council)

No planning agreement currently applies to the land.

E Details of the Annual Noise Exposure Forecast (ANEF) applying to the land

The ANEF affectation of the land is **less than 15**.

Note: The ANEF level may restrict the development of the land due to the risk of exposure to aircraft noise.

F Information that indicates whether or not any additional hazards exist for which no policy of council exists to restrict development

Not applicable

G Restrictions of the use of groundwater contained within the Botany Sands Aquifer

Not applicable

H The following policies may be applicable to the land:

Not applicable

[End of advice under Section 10.7 (5)]

ALTERATIONS AND ADDITIONS TO BUILDINGS

Purchasers are reminded that it is necessary to obtain development consent from the Council prior to carrying out any building alterations or additions, including brick reskinning, replacing windows or internal alterations, or for the demolition of any building, unless the proposed work is specifically exempted by *Bayside Local Environmental Plan 2021* or *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*. All other building work does require the Council's approval.

Should you require any information or advice for any building work that you propose to undertake please contact the Council's Customer Service Centre on 1300 581 299.

Site Photographs

Project Ref: E34871PT
Site Address: 277 The Grand Parade, Ramsgate, NSW
Selected Site Photos Dated: 2 May 2022

Photograph 1: Looking west across southern portion of paved carpark.

Photograph 2: Looking west across northern section of paved carpark.

Photographs 3: Example of minimal landscaped and garden bed areas in south-west corner of site.

Appendix C: Laboratory Results Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ABC:	Ambient Background Concentration
ACM:	Asbestos Containing Material
ADWG:	AustralianDrinking Water Guidelines
AF:	Asbestos Fines
ANZG	Australian and New Zealand Guidelines
B(a)P:	Benzo(a)pyrene
CEC:	Cation Exchange Capacity
CRC:	Cooperative Research Centre
CT:	Contaminant Threshold
EILs:	Ecological Investigation Levels
ESLs:	Ecological Screening Levels
FA:	Fibrous Asbestos
GIL:	Groundwater Investigation Levels
GSW:	General Solid Waste
HILs:	Health Investigation Levels
HSLs:	Health Screening Levels
HSL-SSA:	Health Screening Level-SiteSpecific Assessment
kg/L	kilograms per litre
NA:	Not Analysed
NC:	Not Calculated
NEPM:	National Environmental Protection Measure
NHMRC:	National Health and Medical Research Council
NL:	Not Limiting
NSL:	No Set Limit
OCP:	Organochlorine Pesticides
OPP:	Organophosphorus Pesticides
PAHs:	Polycyclic Aromatic Hydrocarbons
%w/w:	weight per weight
ppm:	Parts per million
PCBs:	Polychlorinated Biphenyls
PCE:	Perchloroethylene (Tetrachloroethylene or Teterachloroethene)
pH_{KCL} :	pH of filtered 1:20, 1M KCL extract, shaken overnight
pH_{ox} :	pH of filtered 1:20 1M KCl after peroxide digestion
PQL:	Practical Quantitation Limit
RS:	Rinsate Sample
RSL:	Regional Screening Levels
RSW:	Restricted Solid Waste
SAC:	Site Assessment Criteria
SCC:	Specific Contaminant Concentration
S_{Cr}:	Chromium reducible sulfur
S_{POS}:	Peroxide oxidisable Sulfur
SSA:	Site Specific Assessment
SSHSLs:	Site Specific Health Screening Levels
TAA:	Total Actual Acidity in 1M KCL extract titrated to pH6.5
TB:	Trip Blank
TCA:	1,1,1 Trichloroethane (methyl chloroform)
TCE:	Trichloroethylene (Trichloroethene)
TCLP:	Toxicity Characteristics Leaching Procedure
TPA:	Total Potential Acidity, 1M KCL peroxide digest
TS:	Trip Spike
TRH:	Total Recoverable Hydrocarbons
TSA:	Total Sulfide Acidity (TPA-TAA)
UCL:	Upper Level Confidence Limit on Mean Value
USEPA	United States Environmental Protection Agency
VOCC:	Volatile Organic Chlorinated Compounds
WHO:	World Health Organisation

Table Specific Explanations:

HIL Tables:

- The chromium results are for Total Chromium which includes Chromium III and VI. For initial screening purposes, we have assumed that the samples contain only Chromium VI unless demonstrated otherwise by additional analysis.
- Carcinogenic PAHs is a toxicity weighted sum of analyte concentrations for a specific list of PAH compounds relative to B(a)P. It is also refered to as the B(a)P Toxic Equivalence Quotient (TEQ).
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

EIL/ESL Table:

- ABC Values for selected metals have been adopted from the published background concentrations presented in Olszowy et. al., (1995), Trace Element Concentrations in Soils from Rural and Urban New South Wales (the 25th percentile values for old suburbs with high traffic have been quoted).

Waste Classification and TCLP Table:

- Data assessed using the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014).
- The assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion.
- Assessment of Total Scheduled pesticides include: HBC, alpha-BHC, gamma-BHC, beta-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, pp-DDE, Dieldrin, Endrin, pp-DDD, pp-DDT, Endrin Aldehyde.

QA/QC Table:

- Field blank, Inter and Intra laboratory duplicate results are reported in mg/kg.
- Trip spike results are reported as percentage recovery.
- Field rinsate results are reported in µg/L.

TABLE S1
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.
HIL-B: 'Residential with minimal opportunities for soil access; including dwellings with fully/permanently paved yards like high-rise buildings'

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100
Site Assessment Criteria (SAC)			500	150	500	30000	1200	120	1200	60000	400	4	15	400	500	10	90	600	10	340	1	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																				
BH1	0.15-0.25	F: Sand	<4	<0.4	**41**	**27**	**20**	<0.1	**37**	**65**	**0.1**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH1 - LAB DUP	0.15-0.25	F: Sand	<4	<0.4	**39**	**43**	**31**	<0.1	**38**	**91**	**0.1**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH1 - [TRIPLICATE]	0.15-0.25	F: Sand	<4	<0.4	**34**	**31**	**28**	<0.1	**31**	**74**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1	0.3-0.5	F: Sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH2	0.15-0.25	F: Sand	<4	<0.4	**14**	**26**	**36**	<0.1	**13**	**96**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH2	0.8-1.0	F: Sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
BH3	0.15-0.25	F: Sand	<4	<0.4	**21**	**20**	**21**	<0.1	**19**	**67**	**0.1**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH4	0.2-0.3	F: Sand	<4	<0.4	**71**	**30**	**5**	<0.1	**68**	**45**	**0.4**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH4	1.3-1.5	Fill	<4	<0.4	<1	**7**	**2**	<0.1	<1	**5**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH5	0.16-0.3	F: Sandy gravel	<4	<0.4	**40**	**25**	**15**	<0.1	**39**	**56**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH5	0.3-0.5	F: Sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH6	0.15-0.25	F: Silty Sand	<4	<0.4	**65**	**36**	**10**	<0.1	**61**	**53**	**0.2**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH6	0.3-0.5	F: Silty Sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
BH6	1.3-1.5	Fill	<4	<0.4	**2**	**2**	**5**	<0.1	**1**	**15**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH7	0.15-0.25	F: Sand	<4	<0.4	**7**	**27**	**50**	<0.1	**6**	**77**	**0.4**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH7 - (DUPLICATE)	0.15-0.25	F: Sand	<4	<0.4	**9**	**28**	**27**	<0.1	**8**	**59**	**0.1**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH7 - [TRIPLICATE]	0.15-0.25	F: Sand	<4	<0.4	**11**	**49**	**38**	<0.1	**9**	**78**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH7	0.3-0.5	Sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
SDUP1	-		<4	<0.4	**41**	**34**	**26**	<0.1	**38**	**81**	**1.4**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Total Number of Samples			14	14	14	14	14	14	14	14	12	12	10	10	10	10	10	10	10	10	10	7
Maximum Value			<PQL	<PQL	71	49	50	<PQL	68	96	1.4	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	Detected

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S2
SOIL LABORATORY RESULTS COMPARED TO HSLs
All data in mg/kg unless stated otherwise

					C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Category					**HSL-A/B: LOW/HIGH DENSITY RESIDENTIAL**							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
BH1	0.15-0.25	F: Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH1 - LAB DUP	0.15-0.25	F: Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH1	0.3-0.5	F: Sand	0m to <1m	Sand	NA	NA	NA	NA	NA	NA	NA	0
BH2	0.15-0.25	F: Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH3	0.15-0.25	F: Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH4	0.2-0.3	F: Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH4	1.3-1.5	Sand	1m to <2m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH5	0.16-0.3	F: Sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH6	0.15-0.25	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH6	1.3-1.5	Sand	1m to <2m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH7	0.15-0.25	F: Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH7 - (DUPLICATE)	0.15-0.25	F: Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH7 - [TRIPLICATE]	0.15-0.25	F: Sand	0m to <1m	Sand	NA	NA	NA	NA	NA	NA	NA	NA
SDUP1	-	F: Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
Total Number of Samples					12	12	12	12	12	12	12	12
Maximum Value					<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.1

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the concentration above the SAC is highlighted in grey in the Site Assessment Criteria Table below

HSL SOIL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**	C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
BH1	0.15-0.25	F: Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH1 - LAB DUP	0.15-0.25	F: Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH1	0.3-0.5	F: Sand	0m to <1m	Sand	NA	NA	NA	NA	NA	NA	NA
BH2	0.15-0.25	F: Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH3	0.15-0.25	F: Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH4	0.2-0.3	F: Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH4	1.3-1.5	Sand	1m to <2m	Sand	70	240	0.5	220	NL	60	NL
BH5	0.16-0.3	F: Sandy gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH6	0.15-0.25	F: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH6	1.3-1.5	Sand	1m to <2m	Sand	70	240	0.5	220	NL	60	NL
BH7	0.15-0.25	F: Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH7 - (DUPLICATE)	0.15-0.25	F: Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH7 - [TRIPLICATE]	0.15-0.25	F: Sand	0m to <1m	Sand	NA	NA	NA	NA	NA	NA	NA
SDUP1	-	F: Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3

TABLE S3
SOIL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS
All data in mg/kg unless stated otherwise

			C_6-C_{10} (F1) plus BTEX	$>C_{10}$-C_{16} (F2) plus napthalene	$>C_{16}$-C_{34} (F3)	$>C_{34}$-C_{40} (F4)
PQL - Envirolab Services			25	50	100	100
NEPM 2013 Land Use Category			**RESIDENTIAL, PARKLAND & PUBLIC OPEN SPACE**			
Sample Reference	**Sample Depth**	**Soil Texture**				
BH1	0.15-0.25	Coarse	<25	<50	<100	<100
BH1 - LAB DUP	0.15-0.25	Coarse	<25	<50	<100	<100
BH1	0.3-0.5	Coarse	NA	NA	NA	NA
BH2	0.15-0.25	Coarse	<25	<50	<100	<100
BH3	0.15-0.25	Coarse	<25	<50	<100	<100
BH4	0.2-0.3	Coarse	<25	<50	<100	<100
BH4	1.3-1.5	Coarse	<25	<50	<100	<100
BH5	0.16-0.3	Coarse	<25	<50	<100	<100
BH6	0.15-0.25	Coarse	<25	<50	<100	<100
BH6	1.3-1.5	Coarse	<25	<50	<100	<100
BH7	0.15-0.25	Coarse	<25	<50	<100	<100
BH7 - (DUPLICATE)	0.15-0.25	Coarse	<25	<50	<100	<100
BH7 - [TRIPLICATE]	0.15-0.25	Coarse	NA	NA	NA	NA
SDUP1	-	Coarse	<25	<50	<100	<100
Total Number of Samples			12	12	12	12
Maximum Value			<PQL	<PQL	<PQL	<PQL

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Soil Texture**	C_6-C_{10} (F1) plus BTEX	$>C_{10}$-C_{16} (F2) plus napthalene	$>C_{16}$-C_{34} (F3)	$>C_{34}$-C_{40} (F4)
BH1	0.15-0.25	Coarse	700	1000	2500	10000
BH1 - LAB DUP	0.15-0.25	Coarse	700	1000	2500	10000
BH1	0.3-0.5	Coarse	NA	NA	NA	NA
BH2	0.15-0.25	Coarse	700	1000	2500	10000
BH3	0.15-0.25	Coarse	700	1000	2500	10000
BH4	0.2-0.3	Coarse	700	1000	2500	10000
BH4	1.3-1.5	Coarse	700	1000	2500	10000
BH5	0.16-0.3	Coarse	700	1000	2500	10000
BH6	0.15-0.25	Coarse	700	1000	2500	10000
BH6	1.3-1.5	Coarse	700	1000	2500	10000
BH7	0.15-0.25	Coarse	700	1000	2500	10000
BH7 - (DUPLICATE)	0.15-0.25	Coarse	700	1000	2500	10000
BH7 - [TRIPLICATE]	0.15-0.25	Coarse	NA	NA	NA	NA
SDUP1	-	Coarse	700	1000	2500	10000

TABLE S4
SOIL LABORATORY RESULTS COMPARED T0 DIRECT CONTACT CRITERIA
All data in mg/kg unless stated otherwise

Analyte		C_6-C_{10}	>C_{10}-C_{16}	>C_{16}-C_{34}	>C_{34}-C_{40}	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 -Direct contact Criteria		5,600	4,200	5,800	8,100	140	21,000	5,900	17,000	2,200	
Site Use		**HIGH DENSITY RESIDENTIAL - DIRECT SOIL CONTACT**									
Sample Reference	**Sample Depth**										
BH1	0.15-0.25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH1 - LAB DUP	0.15-0.25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH1	0.3-0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
BH2	0.15-0.25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH3	0.15-0.25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH4	0.2-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
BH4	1.3-1.5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH5	0.16-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH6	0.15-0.25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH6	1.3-1.5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH7	0.15-0.25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH7 - (DUPLICATE)	0.15-0.25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH7 - [TRIPLICATE]	0.15-0.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NA
Total Number of Samples		12	12	12	12	12	12	12	12	12	12
Maximum Value		<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.1

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S5
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HSL-B: Residential with minimal opportunities for soil access

FIELD DATA															LABORATORY DATA											
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample reference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimation %(w/w)	FA and AF Estimation %(w/w)
SAC			**No**					**0.04**			**0.001**			**0.001**											**0.04**	**0.001**
2/05/2022	BH1	0.15-1.6	No	10	6,040	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	294592	BH1	0.3-0.5	378.17	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
2/05/2022	BH2	0.5-1.0	No	10	4,950	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	294592	BH2	0.8-1.0	463.08	Chrysotile asbestos detected:Amosite asbestos detected:Crocidolite asbestos detected:Organic Fibres detected	No asbestos detected	0.1846	No visible asbestos detected	0.0855	–	0.0185	<0.001
2/05/2022	BH3	0.15-0.6	No	10	4,490	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	294592	BH3	0.15-0.25	323.97	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
2/05/2022	BH4	0.2-0.5	No	10	2,280	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	294592	BH4	0.2-0.3	603.81	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
2/05/2022	BH4	0.5-1.2	No	10	6,530	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/05/2022	BH5	0.3-1.5	No	10	6,640	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	294592	BH5	0.3-0.5	440.59	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
2/05/2022	BH6	0.15-1.1	No	10	9,230	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	294592	BH6	0.3-0.5	526.25	Chrysotile asbestos detected:Organic Fibres detected	No asbestos detected	0.7923	No visible asbestos detected	0.417	–	0.0792	<0.001
2/05/2022	BH7	0.3-0.5	No	10	4,150	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	294592	BH7	0.3-0.5	753.53	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001

Concentration above the SAC **VALUE**

TABLE S6
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category				URBAN RESIDENTIAL AND PUBLIC OPEN SPACE																	
							AGED HEAVY METALS-EILs						EILs		ESLs							
				pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																				
BH1	0.15-0.25	F: Sand	Coarse	NA	NA	NA	<4	**41**	**27**	**20**	**37**	**65**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH1 - LAB DUP	0.15-0.25	F: Sand	Coarse	NA	NA	NA	<4	**39**	**43**	**31**	**38**	**91**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH1 - [TRIPLICATE]	0.15-0.25	F: Sand	Coarse	NA	NA	NA	<4	**34**	**31**	**28**	**31**	**74**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH2	0.15-0.25	F: Sand	Coarse	NA	NA	NA	<4	**14**	**26**	**36**	**13**	**96**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH3	0.15-0.25	F: Sand	Coarse	NA	NA	NA	<4	**21**	**20**	**21**	**19**	**67**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH4	0.2-0.3	F: Sand	Coarse	NA	NA	NA	<4	**71**	**30**	**5**	**68**	**45**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH4	1.3-1.5	Sand	Coarse	NA	NA	NA	<4	<1	**7**	**2**	<1	**5**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH5	0.16-0.3	F: Sandy gravel	Coarse	NA	NA	NA	<4	**40**	**25**	**15**	**39**	**56**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH6	0.15-0.25	F: Silty Sand	Coarse	NA	NA	NA	<4	**65**	**36**	**10**	**61**	**53**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH6	1.3-1.5	Sand	Coarse	NA	NA	NA	<4	**2**	**2**	**5**	**1**	**15**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH7	0.15-0.25	F: Sand	Coarse	NA	NA	NA	<4	**7**	**27**	**50**	**6**	**77**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH7 - (DUPLICATE)	0.15-0.25	F: Sand	Coarse	NA	NA	NA	<4	**9**	**28**	**27**	**8**	**59**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH7 - [TRIPLICATE]	0.15-0.25	F: Sand	Coarse	NA	NA	NA	<4	**11**	**49**	**38**	**9**	**78**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP1	-	F: Sand	Coarse	NA	NA	NA	<4	**41**	**34**	**26**	**38**	**81**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.1**
Total Number of Samples				0	0	0	14	14	14	14	14	14	12	10	12	12	12	12	12	12	12	12	12
Maximum Value				NA	NA	NA	<PQL	71	49	50	68	96	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.1

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the elevated value is highlighted in grey in the EIL and ESL Assessment Criteria Table below

EIL AND ESL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**	pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
BH1	0.15-0.25	F: Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH1 - LAB DUP	0.15-0.25	F: Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH1 - [TRIPLICATE]	0.15-0.25	F: Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	--	--	--	--	--	--	--	--	--	--	--
BH2	0.15-0.25	F: Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH3	0.15-0.25	F: Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH4	0.2-0.3	F: Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH4	1.3-1.5	Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	300	2800	50	85	70	105	20
BH5	0.16-0.3	F: Sandy gravel	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH6	0.15-0.25	F: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH6	1.3-1.5	Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	300	2800	50	85	70	105	20
BH7	0.15-0.25	F: Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH7 - (DUPLICATE)	0.15-0.25	F: Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH7 - [TRIPLICATE]	0.15-0.25	F: Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	--	--	--	--	--	--	--	--	--	--	--
SDUP1	-	F: Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20

TABLE S7
SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES
All data in mg/kg unless stated otherwise

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total PCBs	TRH					BTEX COMPOUNDS				ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful	Total Scheduled		C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	Total C_{10}-C_{36}	Benzene	Toluene	Ethyl benzene	Total Xylenes	
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	25	50	100	100	50	0.2	0.5	1	1	100
General Solid Waste CT1			100	20	100	NSL	100	4	40	NSL	200	0.8	60	4	250	50	50	650		NSL		10,000	10	288	600	1,000	-
General Solid Waste SCC1			500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	50	50	650		NSL		10,000	18	518	1,080	1,800	-
Restricted Solid Waste CT2			400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	50	50	2600		NSL		40,000	40	1,152	2,400	4,000	-
Restricted Solid Waste SCC2			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	2600		NSL		40,000	72	2,073	4,320	7,200	-
Sample Reference	**Sample Depth**	**Sample Description**																									
BH1	0.15-0.25	F: Sand	<4	<0.4	**41**	**27**	**20**	<0.1	**37**	**65**	**0.1**	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH1 - LAB DUP	0.15-0.25	F: Sand	<4	<0.4	**39**	**43**	**31**	<0.1	**38**	**91**	**0.1**	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH1 - [TRIPLICATE]	0.15-0.25	F: Sand	<4	<0.4	**34**	**31**	**28**	<0.1	**31**	**74**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1	0.3-0.5	F: Sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH2	0.15-0.25	F: Sand	<4	<0.4	**14**	**26**	**36**	<0.1	**13**	**96**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH2	0.8-1.0	F: Sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
BH3	0.15-0.25	F: Sand	<4	<0.4	**21**	**20**	**21**	<0.1	**19**	**67**	**0.1**	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH4	0.2-0.3	F: Sand	<4	<0.4	**71**	**30**	**5**	<0.1	68	**45**	**0.4**	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH4	1.3-1.5	Sand	<4	<0.4	<1	**7**	**2**	<0.1	<1	**5**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH5	0.16-0.3	F: Sandy gravel	<4	<0.4	**40**	**25**	**15**	<0.1	**39**	**56**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH5	0.3-0.5	F: Sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH6	0.15-0.25	F: Silty Sand	<4	<0.4	**65**	**36**	**10**	<0.1	61	**53**	**0.2**	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH6	0.3-0.5	F: Silty Sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
BH6	1.3-1.5	Sand	<4	<0.4	**2**	**2**	**5**	<0.1	**1**	**15**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH7	0.15-0.25	F: Sand	<4	<0.4	**7**	**27**	**50**	<0.1	**6**	**77**	**0.4**	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH7 - (DUPLICATE)	0.15-0.25	F: Sand	<4	<0.4	**9**	**28**	**27**	<0.1	**8**	**59**	**0.1**	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH7 - [TRIPLICATE]	0.15-0.25	F: Sand	<4	<0.4	**11**	**49**	**38**	<0.1	**9**	**78**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH7	0.3-0.5	Sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
SDUP1	-	F: Sand	<4	<0.4	**41**	**34**	**26**	<0.1	**38**	**81**	**1.4**	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
Total Number of Samples			14	14	14	14	14	14	14	14	12	12	10	10	10	10	10	12	12	12	12	12	12	12	12	12	7
Maximum Value			<PQL	<PQL	71	49	50	<PQL	68	96	1.4	0.1	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	Detected

Concentration above the CT1 — VALUE
Concentration above SCC1 — VALUE
Concentration above the SCC2 — VALUE
Concentration above PQL — **Bold**

TABLE S8
SOIL LABORATORY TCLP RESULTS
All data in mg/L unless stated otherwise

			Nickel
PQL - Envirolab Services			0.02
TCLP1 - General Solid Waste			2
TCLP2 - Restricted Solid Waste			8
TCLP3 - Hazardous Waste			>8
Sample Reference	**Sample Depth**	**Sample Description**	
BH4	0.2-0.3	F: Sand	**0.06**
BH6	0.15-0.25	F: Silty Sand	<0.02
Total Number of samples			2
Maximum Value			0.06

General Solid Waste	**VALUE**
Restricted Solid Waste	**VALUE**
Hazardous Waste	**VALUE**
Concentration above PQL	**Bold**

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TABLE Q1
SOIL QA/QC SUMMARY

			TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene
	PQL Envirolab SYD		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1*	*2*	*1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.05*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1.0*	*2.0*	*1.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*
Intra	BH1	0.15-0.25	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
laboratory	SDUP1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.4	0.3	0.2	0.2	<0.2	0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.15	nc	0.225	0.175	0.125	0.125	nc	0.0625	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	nc	156%	143%	120%	120%	nc	120%	nc	nc	nc
Field	TB	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
Blank	2/05/22																									
Field	FR	µg/L	62	<50	<100	<100	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1
Rinsate	2/05/22																									
Trip	TS		-	-	-	-	103%	103%	104%	103%	103%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	2/05/22																									

			HCB	alpha- BHC	gamma- BHC	beta- BHC	Heptachlor	delta- BHC	Aldrin	Heptachlor Epoxide	Gamma- Chlordane	alpha- chlordane	Endosulfan I	pp- DDE	Dieldrin	Endrin	pp- DDD	Endosulfan II	pp- DDT	Endrin Aldehyde	Endosulfan Sulphate	Methoxychlor
	PQL Envirolab SYD		*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*	*0.1*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*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*	*0.1*	*0.1*	*0.1*	*0.1*
Intra	BH1	0.15-0.25	<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	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP1	-	<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	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field	TB	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	2/05/22																					
Field	FR	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	2/05/22																					
Trip	TS		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	2/05/22																					

			Azinphos-methyl (Guthion)	Bromophos-ethyl	Chlorpyriphos	Chlorpyriphos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Total PCBS
	PQL Envirolab SYD		*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*
	PQL Envirolab VIC		*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*
Intra	BH1	0.15-0.25	<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
laboratory	SDUP1	-	<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
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field	TB	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	2/05/22														
Field	FR	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	2/05/22														
Trip	TS		-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	2/05/22														

			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD		*4*	*0.4*	*1*	*1*	*1*	*0.1*	*1*	*1*
	PQL Envirolab VIC		*4.0*	*0.4*	*1.0*	*1.0*	*1.0*	*0.1*	*1.0*	*1.0*
Intra	BH1	0.15-0.25	<4	<0.4	41	27	20	<0.1	37	65
laboratory	SDUP1	-	<4	<0.4	41	34	26	<0.1	38	81
duplicate	MEAN		nc	nc	41	30.5	23	nc	37.5	73
	RPD %		nc	nc	0%	23%	26%	nc	3%	22%
Field	TB	-	<4	<0.4	2	<1	3	<0.1	<1	2
Blank	2/05/22									
Field	FR	µg/L	<0.05	<0.01	<0.01	0.07	<0.03	<0.0005	<0.02	<0.02
Rinsate	2/05/22									
Trip	TS		-	-	-	-	-	-	-	-
Spike	2/05/22									

Result outside of QA/QC acceptance criteria (highlighted)

ABBREVIATIONS AND EXPLANATIONS FOR ACID SULFATE SOIL TABLE

Abbreviations used in the Tables:

ANC_{BT}	Acid Neutralising Capacity - Back Titration
ANCE	Excess Acid Neutralising Capacity
$CaCO_3$	Calcium Carbonate
kg	kilogram
mol H^+/t	moles hydrogen per tonne
pHF	Field pH
pHFOX	Field peroxide pH
pH_{KCl}	Pottasium chloride pH
S	Sulfur
SCr	The symbol given to the result from the Chromium Reducible Sulfur method
S_{NAS}	Net Acid Soluble Sulfur
% w/w	Percentage by mass

Results have been assessed against the criteria specified in Table 1.1 of National Acid sulfate Soil Guidance - National acid sulfate soil identification and laboratory method manual. Water Quality Australia. June 2018

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TABLE I
SUMMARY OF LABORATORY RESULTS - ACID SULFATE SOIL ANALYSIS

Soil Texture: Coarse		Analysis	pH_F and pH_{FOX}				pH_{KCL}	Actual Acidity (Titratable Actual Acidity - TAA)	Potential Sulfidic Acidity		Retained Acidity	Acid Neutralising Capacity (ANC_{BT})	a-Net Acidity without ANCE	s-Net Acidity without ANCE	Liming Rate - without ANCE
			pH_F	pH_{FOX}	Reaction	pH_F - pH_{FOX}		(mol H^+/t)	(% SCr)	(mol H^+/t)	(%S_{NAS})	(% $CaCO_3$)	(mol H^+/t)	(%w/w S)	(kg $CaCO_3$/tonne)
National Acid Sulfate Soils Guidance (2018)			-	-	-	-	-	-	-	-	-	-	18	0.03	-
Sample Reference	**Sample Depth (m)**	**Sample Description**													
BH1	0.3-0.5	F: Sand	10	8.2	High reaction	1.8	10.2	<5	<0.005	<3	[NT]	6.4	<5	<0.005	<0.75
BH1	0.3-0.5	F: Sand	9.9	8	High reaction	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1	1.3-1.5	Sand	10	7.2	Low reaction	2.8	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1	1.8-2.0	Sand	9.4	7.1	Low reaction	2.3	9.9	<5	<0.005	<3	[NT]	0.35	<5	<0.005	<0.75
BH1	2.9-3.0	Sand	8.9	7.1	Low reaction	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1	3.9-4.0	Sand	8.5	6.7	Low reaction	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1	4.9-5.0	Sand	8.8	6.7	Low reaction	2.1	9.9	<5	0.006	4	[NT]	0.9	<5	0.01	<0.75
BH1	5.9-6.0	Sand	8.6	6.8	Low reaction	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1	6.9-7.0	Sand	8.4	6.7	Low reaction	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH5	0.3-0.5	F: Sand	8.7	7.6	Low reaction	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH5	1.3-1.5	F: Sand	9	6.6	Low reaction	2.4	9.9	<5	0.007	4	[NT]	0.25	<5	0.01	<0.75
BH5	1.8-2.0	Sand	8.2	7.1	Low reaction	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH5	1.8-2.0	Sand	8.1	6.9	Low reaction	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH5	2.9-3.0	Sand	8.1	6	Low reaction	2.1	7.1	<5	0.007	4	[NT]	0.25	<5	0.01	<0.75
BH5	3.9-4.0	Sand	8.1	6.3	Low reaction	1.8	9.8	<5	0.005	3	[NT]	<0.05	<5	0.01	<0.75
BH5	4.9-5.0	Sand	8.4	6.5	Low reaction	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH5	5.9-6.0	Sand	8.1	6.6	Low reaction	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH5	6.9-7.0	Sand	8.4	6.4	Low reaction	2	9.9	<5	0.05	29	[NT]	1.6	29.0	0.05	2.2
Total Number of Samples			18	18	-	18	7	7	7	7	7	7	7	7	7
Minimum Value			8.1	6.0	-	1.1	7.1	<PQL	0.005	3	<PQL	0.25	29.0	0.005	2.2
Maximum Value			10.0	8.2	-	2.8	10.2	<PQL	0.05	29	<PQL	6.40	29.0	0.047	2.2

Values Exceeding Action Criteria

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ADWG: AustralianDrinking Water Guidelines
ANZG Australian and New Zealand Guidelines
B(a)P: Benzo(a)pyrene
CRC: Cooperative Research Centre
ESLs: Ecological Screening Levels
GIL: Groundwater Investigation Levels
HILs: Health Investigation Levels
HSLs: Health Screening Levels
HSL-SSA: Health Screening Level-SiteSpecific Assessment
NA: Not Analysed
NC: Not Calculated
NEPM: National Environmental Protection Measure
NHMRC: National Health and Medical Research Council
NL: Not Limiting
NSL: No Set Limit
OCP: Organochlorine Pesticides
OPP: Organophosphorus Pesticides
PAHs: Polycyclic Aromatic Hydrocarbons
ppm: Parts per million
PCBs: Polychlorinated Biphenyls
PCE: Perchloroethylene (Tetrachloroethylene or Tetrachloroethene)
PQL: Practical Quantitation Limit
RS: Rinsate Sample
RSL: Regional Screening Levels
SAC: Site Assessment Criteria
SSA: Site Specific Assessment
SSHSLs Site Specific Health Screening Levels
TB: Trip Blank
TCA: 1,1,1 Trichloroethane (methyl chloroform)
TCE: Trichloroethylene (Trichloroethene)
TS: Trip Spike
TRH: Total Recoverable Hydrocarbons
UCL: Upper Level Confidence Limit on Mean Value
USEPA United States Environmental Protection Agency
VOCC: Volatile Organic Chlorinated Compounds
WHO: World Health Organisation

TABLE G1
SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO ECOLOGICAL GILs SAC
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	ANZG 2018 Marine Waters	SAMPLES			
			MW1	MW1 LAB DUP	MW5	WDUP1
Inorganic Compounds and Parameters						
pH		7 - 8.5	7.6	NA	7.4	NA
Electrical Conductivity (µS/cm)	1	NSL	**380**	NA	**500**	NA
Metals and Metalloids						
Arsenic (As III)	1	2.3	**6**	NA	**4**	**6**
Cadmium	0.1	0.7	<0.1	NA	<0.1	<0.1
Chromium (SAC for Cr III adopted)	1	27	**1**	NA	**16**	**1**
Copper	1	1.3	**1**	NA	**35**	**2**
Lead	1	4.4	<1	NA	<1	<1
Total Mercury (inorganic)	0.05	0.1	<0.05	NA	<0.05	<0.05
Nickel	1	7	<1	NA	<1	<1
Zinc	1	15	**6**	NA	**26**	**7**
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)						
Benzene	1	500	<1	<1	<1	<1
Toluene	1	180	<1	<1	<1	<1
Ethylbenzene	1	5	<1	<1	<1	<1
m+p-xylene	2	75	<2	<2	<2	<2
o-xylene	1	350	<1	<1	<1	<1
Total xylenes	2	NSL	<2	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs						
Dichlorodifluoromethane	10	NSL	<10	<10	<10	NA
Chloromethane	10	NSL	<10	<10	<10	NA
Vinyl Chloride	10	100	<10	<10	<10	NA
Bromomethane	10	NSL	<10	<10	<10	NA
Chloroethane	10	NSL	<10	<10	<10	NA
Trichlorofluoromethane	10	NSL	<10	<10	<10	NA
1,1-Dichloroethene	1	700	<1	<1	<1	NA
Trans-1,2-dichloroethene	1	NSL	<1	<1	<1	NA
1,1-dichloroethane	1	250	<1	<1	<1	NA
Cis-1,2-dichloroethene	1	NSL	<1	<1	<1	NA
Bromochloromethane	1	NSL	<1	<1	<1	NA
Chloroform	1	370	<1	<1	<1	NA
2,2-dichloropropane	1	NSL	<1	<1	<1	NA
1,2-dichloroethane	1	1900	<1	<1	<1	NA
1,1,1-trichloroethane	1	270	<1	<1	<1	NA
1,1-dichloropropene	1	NSL	<1	<1	<1	NA
Cyclohexane	1	NSL	<1	<1	<1	NA
Carbon tetrachloride	1	240	<1	<1	<1	NA
Benzene	1	500	<1	<1	<1	NA
Dibromomethane	1	NSL	<1	<1	<1	NA
1,2-dichloropropane	1	900	<1	<1	<1	NA
Trichloroethene	1	330	<1	<1	<1	NA
Bromodichloromethane	1	NSL	<1	<1	<1	NA
trans-1,3-dichloropropene	1	NSL	<1	<1	<1	NA
cis-1,3-dichloropropene	1	NSL	<1	<1	<1	NA
1,1,2-trichloroethane	1	1900	<1	<1	<1	NA
Toluene	1	180	<1	<1	<1	NA
1,3-dichloropropane	1	1100	<1	<1	<1	NA
Dibromochloromethane	1	NSL	<1	<1	<1	NA
1,2-dibromoethane	1	NSL	<1	<1	<1	NA
Tetrachloroethene	1	70	<1	<1	<1	NA
1,1,1,2-tetrachloroethane	1	NSL	<1	<1	<1	NA
Chlorobenzene	1	55	<1	<1	<1	NA
Ethylbenzene	1	5	<1	<1	<1	NA
Bromoform	1	NSL	<1	<1	<1	NA
m+p-xylene	2	75	<2	<2	<2	NA
Styrene	1	NSL	<1	<1	<1	NA
1,1,2,2-tetrachloroethane	1	400	<1	<1	<1	NA
o-xylene	1	350	<1	<1	<1	NA
1,2,3-trichloropropane	1	NSL	<1	<1	<1	NA
Isopropylbenzene	1	30	<1	<1	<1	NA
Bromobenzene	1	NSL	<1	<1	<1	NA
n-propyl benzene	1	NSL	<1	<1	<1	NA
2-chlorotoluene	1	NSL	<1	<1	<1	NA
4-chlorotoluene	1	NSL	<1	<1	<1	NA
1,3,5-trimethyl benzene	1	NSL	<1	<1	<1	NA
Tert-butyl benzene	1	NSL	<1	<1	<1	NA
1,2,4-trimethyl benzene	1	NSL	<1	<1	<1	NA
1,3-dichlorobenzene	1	260	<1	<1	<1	NA
Sec-butyl benzene	1	NSL	<1	<1	<1	NA
1,4-dichlorobenzene	1	60	<1	<1	<1	NA
4-isopropyl toluene	1	NSL	<1	<1	<1	NA
1,2-dichlorobenzene	1	160	<1	<1	<1	NA
n-butyl benzene	1	NSL	<1	<1	<1	NA
1,2-dibromo-3-chloropropane	1	NSL	<1	<1	<1	NA
1,2,4-trichlorobenzene	1	20	<1	<1	<1	NA
Hexachlorobutadiene	1	NSL	<1	<1	<1	NA
1,2,3-trichlorobenzene	1	3	<1	<1	<1	NA
Polycyclic Aromatic Hydrocarbons (PAHs)						
Naphthalene	0.2	50	<0.2	NA	<0.2	<0.2
Acenaphthylene	0.1	NSL	<0.1	NA	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	NA	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	NA	<0.1	<0.1
Phenanthrene	0.1	0.6	<0.1	NA	<0.1	<0.1
Anthracene	0.1	0.01	<0.1	NA	<0.1	<0.1
Fluoranthene	0.1	1	<0.1	NA	<0.1	<0.1
Pyrene	0.1	NSL	<0.1	NA	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	NA	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	NA	<0.2	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1	NA	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	NA	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	NA	<0.1	<0.1

Concentration above the SAC	**VALUE**
Concentration above the PQL	**Bold**
GIL >PQL	Red

TABLE G2
SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO HUMAN CONTACT GILs
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	Recreational (10 x NHMRC ADWG)	SAMPLES			
			MW1	MW1 LAB DUP	MW5	WDUP1
Inorganic Compounds and Parameters						
pH		6.5 - 8.5	7.6	NA	7.4	NA
Electrical Conductivity (µS/cm)	1	NSL	380	NA	500	NA
Metals and Metalloids						
Arsenic (As III)	1	100	6	NA	4	6
Cadmium	0.1	20	<0.1	NA	<0.1	<0.1
Chromium (total)	1	500	1	NA	16	1
Copper	1	20000	1	NA	35	2
Lead	1	100	<1	NA	<1	<1
Total Mercury (inorganic)	0.05	10	<0.05	NA	<0.05	<0.05
Nickel	1	200	<1	NA	<1	<1
Zinc	1	30000	6	NA	26	7
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)						
Benzene	1	10	<1	<1	<1	<1
Toluene	1	8000	<1	<1	<1	<1
Ethylbenzene	1	3000	<1	<1	<1	<1
m+p-xylene	2	NSL	<2	<2	<2	<2
o-xylene	1	NSL	<1	<1	<1	<1
Total xylenes	2	6000	<2	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs						
Dichlorodifluoromethane	10	NSL	<10	<10	<10	NA
Chloromethane	10	NSL	<10	<10	<10	NA
Vinyl Chloride	10	3	<10	<10	<10	NA
Bromomethane	10	NSL	<10	<10	<10	NA
Chloroethane	10	NSL	<10	<10	<10	NA
Trichlorofluoromethane	10	NSL	<10	<10	<10	NA
1,1-Dichloroethene	1	300	<1	<1	<1	NA
Trans-1,2-dichloroethene	1	600	<1	<1	<1	NA
1,1-dichloroethane	1	NSL	<1	<1	<1	NA
Cis-1,2-dichloroethene	1	600	<1	<1	<1	NA
Bromochloromethane	1	2500	<1	<1	<1	NA
Chloroform	1		<1	<1	<1	NA
2,2-dichloropropane	1	NSL	<1	<1	<1	NA
1,2-dichloroethane	1	30	<1	<1	<1	NA
1,1,1-trichloroethane	1	NSL	<1	<1	<1	NA
1,1-dichloropropene	1	NSL	<1	<1	<1	NA
Cyclohexane	1	NSL	<1	<1	<1	NA
Carbon tetrachloride	1	30	<1	<1	<1	NA
Benzene	1	10	<1	<1	<1	NA
Dibromomethane	1	NSL	<1	<1	<1	NA
1,2-dichloropropane	1	NSL	<1	<1	<1	NA
Trichloroethene	1	NSL	<1	<1	<1	NA
Bromodichloromethane	1	NSL	<1	<1	<1	NA
trans-1,3-dichloropropene	1	1000	<1	<1	<1	NA
cis-1,3-dichloropropene	1	1000	<1	<1	<1	NA
1,1,2-trichloroethane	1	NSL	<1	<1	<1	NA
Toluene	1	8000	<1	<1	<1	NA
1,3-dichloropropane	1	NSL	<1	<1	<1	NA
Dibromochloromethane	1	NSL	<1	<1	<1	NA
1,2-dibromoethane	1	NSL	<1	<1	<1	NA
Tetrachloroethene	1	500	<1	<1	<1	NA
1,1,1,2-tetrachloroethane	1	NSL	<1	<1	<1	NA
Chlorobenzene	1	3000	<1	<1	<1	NA
Ethylbenzene	1	3000	<1	<1	<1	NA
Bromoform	1	NSL	<1	<1	<1	NA
m+p-xylene	2	NSL	<2	<2	<2	NA
Styrene	1	300	<1	<1	<1	NA
1,1,2,2-tetrachloroethane	1	NSL	<1	<1	<1	NA
o-xylene	1	NSL	<1	<1	<1	NA
1,2,3-trichloropropane	1	NSL	<1	<1	<1	NA
Isopropylbenzene	1	NSL	<1	<1	<1	NA
Bromobenzene	1	NSL	<1	<1	<1	NA
n-propyl benzene	1	NSL	<1	<1	<1	NA
2-chlorotoluene	1	NSL	<1	<1	<1	NA
4-chlorotoluene	1	NSL	<1	<1	<1	NA
1,3,5-trimethyl benzene	1	NSL	<1	<1	<1	NA
Tert-butyl benzene	1	NSL	<1	<1	<1	NA
1,2,4-trimethyl benzene	1	NSL	<1	<1	<1	NA
1,3-dichlorobenzene	1	200	<1	<1	<1	NA
Sec-butyl benzene	1	NSL	<1	<1	<1	NA
1,4-dichlorobenzene	1	400	<1	<1	<1	NA
4-isopropyl toluene	1	NSL	<1	<1	<1	NA
1,2-dichlorobenzene	1	15000	<1	<1	<1	NA
n-butyl benzene	1	NSL	<1	<1	<1	NA
1,2-dibromo-3-chloropropane	1	NSL	<1	<1	<1	NA
1,2,4-trichlorobenzene	1	300	<1	<1	<1	NA
1,2,3-trichlorobenzene	1		<1	<1	<1	NA
Hexachlorobutadiene	1	7	<1	<1	<1	NA
Polycyclic Aromatic Hydrocarbons (PAHs)						
Naphthalene	0.2	NSL	<0.2	NA	<0.2	<0.2
Acenaphthylene	0.1	NSL	<0.1	NA	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	NA	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	NA	<0.1	<0.1
Phenanthrene	0.1	NSL	<0.1	NA	<0.1	<0.1
Anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1
Fluoranthene	0.1	NSL	<0.1	NA	<0.1	<0.1
Pyrene	0.1	NSL	<0.1	NA	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	NA	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	NA	<0.2	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1	NA	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	NA	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	NA	<0.1	<0.1

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
GIL >PQL — Red

TABLE G3
SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO DRINKING WATER GILs
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NHMRC ADWG 2011	SAMPLES			
			MW1	MW1 LAB DUP	MW5	WDUP1
Inorganic Compounds and Parameters						
pH		6.5 - 8.5	7.6	NA	7.4	NA
Electrical Conductivity (µS/cm)	1	NSL	380	NA	500	NA
Metals and Metalloids						
Arsenic (As III)	1	10	6	NA	4	6
Cadmium	0.1	2	<0.1	NA	<0.1	<0.1
Chromium (total)	1	50	1	NA	16	1
Copper	1	2000	1	NA	35	2
Lead	1	10	<1	NA	<1	<1
Total Mercury (inorganic)	0.05	1	<0.05	NA	<0.05	<0.05
Nickel	1	20	<1	NA	<1	<1
Zinc	1	3000	6	NA	26	7
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)						
Benzene	1	1	<1	<1	<1	<1
Toluene	1	800	<1	<1	<1	<1
Ethylbenzene	1	300	<1	<1	<1	<1
m+p-xylene	2	NSL	<2	<2	<2	<2
o-xylene	1	NSL	<1	<1	<1	<1
Total xylenes	2	600	<2	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs						
Dichlorodifluoromethane	10	NSL	<10	<10	<10	NA
Chloromethane	10	NSL	<10	<10	<10	NA
Vinyl Chloride	10	0.3	<10	<10	<10	NA
Bromomethane	10	NSL	<10	<10	<10	NA
Chloroethane	10	NSL	<10	<10	<10	NA
Trichlorofluoromethane	10	NSL	<10	<10	<10	NA
1,1-Dichloroethene	1	30	<1	<1	<1	NA
Trans-1,2-dichloroethene	1	60	<1	<1	<1	NA
1,1-dichloroethane	1	NSL	<1	<1	<1	NA
Cis-1,2-dichloroethene	1	60	<1	<1	<1	NA
Bromochloromethane	1	250	<1	<1	<1	NA
Chloroform	1		<1	<1	<1	NA
2,2-dichloropropane	1	NSL	<1	<1	<1	NA
1,2-dichloroethane	1	3	<1	<1	<1	NA
1,1,1-trichloroethane	1	NSL	<1	<1	<1	NA
1,1-dichloropropene	1	NSL	<1	<1	<1	NA
Cyclohexane	1	NSL	<1	<1	<1	NA
Carbon tetrachloride	1	3	<1	<1	<1	NA
Benzene	1	1	<1	<1	<1	NA
Dibromomethane	1	NSL	<1	<1	<1	NA
1,2-dichloropropane	1	NSL	<1	<1	<1	NA
Trichloroethene	1	NSL	<1	<1	<1	NA
Bromodichloromethane	1	NSL	<1	<1	<1	NA
trans-1,3-dichloropropene	1	100	<1	<1	<1	NA
cis-1,3-dichloropropene	1	100	<1	<1	<1	NA
1,1,2-trichloroethane	1	NSL	<1	<1	<1	NA
Toluene	1	800	<1	<1	<1	NA
1,3-dichloropropane	1	NSL	<1	<1	<1	NA
Dibromochloromethane	1	NSL	<1	<1	<1	NA
1,2-dibromoethane	1	NSL	<1	<1	<1	NA
Tetrachloroethene	1	50	<1	<1	<1	NA
1,1,1,2-tetrachloroethane	1	NSL	<1	<1	<1	NA
Chlorobenzene	1	300	<1	<1	<1	NA
Ethylbenzene	1	300	<1	<1	<1	NA
Bromoform	1	NSL	<1	<1	<1	NA
m+p-xylene	2	NSL	<2	<2	<2	NA
Styrene	1	30	<1	<1	<1	NA
1,1,2,2-tetrachloroethane	1	NSL	<1	<1	<1	NA
o-xylene	1	NSL	<1	<1	<1	NA
1,2,3-trichloropropane	1	NSL	<1	<1	<1	NA
Isopropylbenzene	1	NSL	<1	<1	<1	NA
Bromobenzene	1	NSL	<1	<1	<1	NA
n-propyl benzene	1	NSL	<1	<1	<1	NA
2-chlorotoluene	1	NSL	<1	<1	<1	NA
4-chlorotoluene	1	NSL	<1	<1	<1	NA
1,3,5-trimethyl benzene	1	NSL	<1	<1	<1	NA
Tert-butyl benzene	1	NSL	<1	<1	<1	NA
1,2,4-trimethyl benzene	1	NSL	<1	<1	<1	NA
1,3-dichlorobenzene	1	20	<1	<1	<1	NA
Sec-butyl benzene	1	NSL	<1	<1	<1	NA
1,4-dichlorobenzene	1	40	<1	<1	<1	NA
4-isopropyl toluene	1	NSL	<1	<1	<1	NA
1,2-dichlorobenzene	1	1500	<1	<1	<1	NA
n-butyl benzene	1	NSL	<1	<1	<1	NA
1,2-dibromo-3-chloropropane	1	NSL	<1	<1	<1	NA
1,2,4-trichlorobenzene	1	30	<1	<1	<1	NA
1,2,3-trichlorobenzene	1		<1	<1	<1	NA
Hexachlorobutadiene	1	0.7	<1	<1	<1	NA
Polycyclic Aromatic Hydrocarbons (PAHs)						
Naphthalene	0.2	NSL	<0.2	NA	<0.2	<0.2
Acenaphthylene	0.1	NSL	<0.1	NA	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	NA	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	NA	<0.1	<0.1
Phenanthrene	0.1	NSL	<0.1	NA	<0.1	<0.1
Anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1
Fluoranthene	0.1	NSL	<0.1	NA	<0.1	<0.1
Pyrene	0.1	NSL	<0.1	NA	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	NA	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	NA	<0.2	<0.2
Benzo(a)pyrene	0.1	0.01	<0.1	NA	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	NA	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	NA	<0.1	<0.1

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
GIL >PQL — Red

TABLE G5
GROUNDWATER LABORATORY RESULTS COMPARED TO SITE SPECIFIC HSLs - RISK ASSESSMENT
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NHMRC ADWG 2011	WHO 2008	USEPA RSL Tapwater 2017	SAMPLES MW1	MW1 LAB DUP	MW5	WDUP1
Total Recoverable Hydrocarbons (TRH)								
C_6-C_9 Aliphatics (assessed using F1)	10	-	15000	-	<10	<10	<10	<10
>C_9-C_{14} Aliphatics (assessed using F2)	50	-	100	-	<50	NA	<50	<50
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)								
Benzene	1	1	-	-	<1	<1	<1	<1
Toluene	1	800	-	-	<1	<1	<1	<1
Ethylbenzene	1	300	-	-	<1	<1	<1	<1
Total xylenes	2	600	-	-	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons (PAHs)								
Naphthalene	1	-	-	6.1	<1	<1	<1	<1
Volatile Organic Compounds (VOCs), including chlorinated VOCs								
Dichlorodifluoromethane	10	-	-	-	<10	<10	<10	NA
Chloromethane	10	-	-	-	<10	<10	<10	NA
Vinyl Chloride	10	0.3	-	-	<10	<10	<10	NA
Bromomethane	10	-	-	-	<10	<10	<10	NA
Chloroethane	10	-	-	-	<10	<10	<10	NA
Trichlorofluoromethane	10	-	-	-	<10	<10	<10	NA
1,1-Dichloroethene	1	30	-	-	<1	<1	<1	NA
Trans-1,2-dichloroethene	1	60	-	-	<1	<1	<1	NA
1,1-dichloroethane	1	-	-	-	<1	<1	<1	NA
Cis-1,2-dichloroethene	1	60	-	-	<1	<1	<1	NA
Bromochloromethane	1	250	-	-	<1	<1	<1	NA
Chloroform	1		-	-	<1	<1	<1	NA
2,2-dichloropropane	1	-	-	-	<1	<1	<1	NA
1,2-dichloroethane	1	3	-	-	<1	<1	<1	NA
1,1,1-trichloroethane	1	-	-	-	<1	<1	<1	NA
1,1-dichloropropene	1	-	-	-	<1	<1	<1	NA
Cyclohexane	1	-	-	-	<1	<1	<1	NA
Carbon tetrachloride	1	3	-	-	<1	<1	<1	NA
Benzene	1	1	-	-	<1	<1	<1	NA
Dibromomethane	1	-	-	-	<1	<1	<1	NA
1,2-dichloropropane	1	-	-	-	<1	<1	<1	NA
Trichloroethene	1	-	-	-	<1	<1	<1	NA
Bromodichloromethane	1	-	-	-	<1	<1	<1	NA
trans-1,3-dichloropropene	1	100	-	-	<1	<1	<1	NA
cis-1,3-dichloropropene	1	100	-	-	<1	<1	<1	NA
1,1,2-trichloroethane	1	-	-	-	<1	<1	<1	NA
Toluene	1	800	-	-	<1	<1	<1	NA
1,3-dichloropropane	1	-	-	-	<1	<1	<1	NA
Dibromochloromethane	1	-	-	-	<1	<1	<1	NA
1,2-dibromoethane	1	-	-	-	<1	<1	<1	NA
Tetrachloroethene	1	50	-	-	<1	<1	<1	NA
1,1,1,2-tetrachloroethane	1	-	-	-	<1	<1	<1	NA
Chlorobenzene	1	300	-	-	<1	<1	<1	NA
Ethylbenzene	1	300	-	-	<1	<1	<1	NA
Bromoform	1	-	-	-	<1	<1	<1	NA
m+p-xylene	2	-	-	-	<2	<2	<2	NA
Styrene	1	30	-	-	<1	<1	<1	NA
1,1,2,2-tetrachloroethane	1	-	-	-	<1	<1	<1	NA
o-xylene	1	-	-	-	<1	<1	<1	NA
1,2,3-trichloropropane	1	-	-	-	<1	<1	<1	NA
Isopropylbenzene	1	-	-	-	<1	<1	<1	NA
Bromobenzene	1	-	-	-	<1	<1	<1	NA
n-propyl benzene	1	-	-	-	<1	<1	<1	NA
2-chlorotoluene	1	-	-	-	<1	<1	<1	NA
4-chlorotoluene	1	-	-	-	<1	<1	<1	NA
1,3,5-trimethyl benzene	1	-	-	-	<1	<1	<1	NA
Tert-butyl benzene	1	-	-	-	<1	<1	<1	NA
1,2,4-trimethyl benzene	1	-	-	-	<1	<1	<1	NA
1,3-dichlorobenzene	1	20	-	-	<1	<1	<1	NA
Sec-butyl benzene	1	-	-	-	<1	<1	<1	NA
1,4-dichlorobenzene	1	40	-	-	<1	<1	<1	NA
4-isopropyl toluene	1	-	-	-	<1	<1	<1	NA
1,2-dichlorobenzene	1	1500	-	-	<1	<1	<1	NA
n-butyl benzene	1	-	-	-	<1	<1	<1	NA
1,2-dibromo-3-chloropropane	1	-	-	-	<1	<1	<1	NA
1,2,4-trichlorobenzene	1	30	-	-	<1	<1	<1	NA
1,2,3-trichlorobenzene	1		-	-	<1	<1	<1	NA
Hexachlorobutadiene	1	7	-	-	<1	<1	<1	NA

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
GIL >PQL — Red

TABLE Q2
GROUNDWATER QA/QC SUMMARY

		TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene	Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD	*10*	*50*	*100*	*100*	*1*	*1*	*1*	*2*	*1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*
	PQL Envirolab VIC	*10*	*50*	*100*	*100*	*1.0*	*1.0*	*1.0*	*2.0*	*1.0*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*
Intra	MW1	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	6	<0.1	1	1	<1	<0.05	<1	6
laboratory	WDUP1	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	6	<0.1	1	2	<1	<0.05	<1	7
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	6	nc	1	1.5	nc	nc	nc	6.5
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	nc	0%	67%	nc	nc	nc	15%
Field	TB-W1	NA	NA	NA	NA	<1	<1	<1	<2	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	5/05/2022																																
Trip	TS-W1	-	-	-	-	73%	80%	99%	95%	98%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Spike	5/05/2022																																

Result outside of QA/QC acceptance criteria Value

Appendix D: Borehole Logs

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BOREHOLE LOG

Borehole No. 1

1 / 1

Client: GOOD TIME HOLDINGS NSW

Project: PROPOSE MIXED USE DEVELOPMENT

Location: 277 GRAND PARADE, RAMSGATE, NSW

Job No.: 34871PH **Method:** SPIRAL AUGER **R.L. Surface:** ~2.9 m

Date: 2/5/22 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** T.F./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
									-	ASPHALTIC CONCRETE: 30mm.t FILL: Sandy gravel, fine to medium grained, igneous, grey, with silt.	D			SCREEN: 6.04kg 0.15-1.6m, NO FCF
					N = 22 6,14,8	2	1			FILL: Sand, fine to medium grained, grey, trace of fine to medium grained igneous gravel, silt, and concrete fragments.				APPEARS WELL COMPACTED
ON COMPLETION AND AFTER 6 HOURS					N = 6 5,3,3	1	2		SP	SAND: fine to medium grained, grey brown, trace of silt.	M	L		MARINE
ON 22/12/23										SAND: fine to medium grained, light grey, trace of shell fragments.	W	MD		
					N = 18 5,6,12	0	3					D		
					N = 38 9,16,22	-1	4					MD		GROUNDWATER MONITORING WELL INSTALLED TO 6.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 3.0m TO 6.0m. CASING 0m TO 3.0m. 2mm SAND FILTER PACK 0.7m TO 6.0m. BENTONITE SEAL 0.1m TO 0.7m. COMPLETED WITH A CONCRETED GATIC COVER.
					N = 21 5,10,11	-2	5							
						-3	6							
						-4				END OF BOREHOLE AT 7.00 m				

JKGeotechnics

BOREHOLE LOG

Borehole No. 2

1 / 1

Client: GOOD TIME HOLDINGS NSW

Project: PROPOSE MIXED USE DEVELOPMENT

Location: 277 GRAND PARADE, RAMSGATE, NSW

Job No.: 34871PH **Method:** SPIRAL AUGER **R.L. Surface:** ~3.1 m

Date: 2/5/22 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** T.F./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
ON COMPLETION						3			-	ASPHALTIC CONCRETE: 30mm.t	D			
										FILL: Sandy gravel, fine to medium grained, igneous, grey, with silt.				
										FILL: Sand, fine to medium grained, grey, trace of fine grained igneous gravel, silt, and concrete fragments.				
						2	1			FILL: Sand, fine to medium grained, grey and orange brown, trace of fine to medium grained igneous gravel and terracotta fragments.				
									SP	FILL: Sand, fine to medium grained, grey, trace of silt and fine grained igneous gravel.	M			MARINE
										SAND: fine to medium grained, light grey.				
						1	2			END OF BOREHOLE AT 2.00 m				
						0	3							
						-1	4							
						-2	5							
						-3	6							

JK 9.02.4 LIB:GLB Log JK AUGERHOLE - MASTER 34871PH RAMSGATE.GPJ <<DrawingFile>> 04/01/2024 13:15 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

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BOREHOLE LOG

Borehole No. 3
1 / 1

Client: GOOD TIME HOLDINGS NSW
Project: PROPOSE MIXED USE DEVELOPMENT
Location: 277 GRAND PARADE, RAMSGATE, NSW

Job No.: 34871PH **Method:** SPIRAL AUGER **R.L. Surface:** ~2.7 m
Date: 2/5/22 **Datum:** AHD
Plant Type: JK400 **Logged/Checked By:** T.F./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						2	0		-	ASPHALTIC CONCRETE: 30mm.t FILL: Sandy gravel, fine to medium grained, igneous, grey.	D			
										FILL: Sand, fine to medium grained, grey, trace of fine to medium grained igneous gravel, and silt.				
						1	1		SP	SAND: fine to medium grained, light grey.	M			MARINE
										END OF BOREHOLE AT 1.20 m				
						1	2							
						0	3							
						-1	4							
						-2	5							
						-3	6							
						-4								

JKGeotechnics

BOREHOLE LOG

Borehole No. 4

1 / 1

Client: GOOD TIME HOLDINGS NSW

Project: PROPOSE MIXED USE DEVELOPMENT

Location: 277 GRAND PARADE, RAMSGATE, NSW

Job No.: 34871PH **Method:** SPIRAL AUGER **R.L. Surface:** ~2.6 m

Date: 2/5/22 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** T.F./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
ON COMPLETION						2	1		-	ASPHALTIC CONCRETE: 30mm.t FILL: Sandy gravel, fine to medium grained, igneous, grey. FILL: Sand, fine to medium grained, grey, with silt, trace of fine to medium grained igneous gravel. FILL: Sand, fine to medium grained, light grey brown, trace of fine to medium grained igneous gravel, and silt.	M			
						1			SP	SAND: fine to medium grained, light grey.	M			MARINE
											W			
						0	2			END OF BOREHOLE AT 1.70 m				
						-1	3							
						-2	4							
						-3	5							
						-4	6							

JKGeotechnics

BOREHOLE LOG

Borehole No. 5

1 / 1

Client: GOOD TIME HOLDINGS NSW

Project: PROPOSE MIXED USE DEVELOPMENT

Location: 277 GRAND PARADE, RAMSGATE, NSW

Job No.: 34871PH **Method:** SPIRAL AUGER **R.L. Surface:** ~3.0 m

Date: 2/5/22 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** T.F./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
										CONCRETE: 160mm.t				7mm DIA. STEEL REINFORCEMENT, 72mm & 89mm TOP COVER
									-	FILL: Sandy gravel, fine to medium grained, igneous, grey, with silt.	M			
					N = 9 2,5,4	2	1			FILL: Sand, fine to medium grained, grey and light brown, trace of fine to medium grained igneous gravel, silt, and concrete fragments.				APPEARS MODERATELY COMPACTED
									SP	SAND: fine to medium grained, light grey, trace of shell fragments.	M	L		MARINE
▼ ON COMPLETION 22/12/23						1	2				W			
												MD		
					N = 20 6,9,11	0	3							
						-1	4					(D)		
						-2	5					(MD)		GROUNDWATER MONITORING WELL INSTALLED TO 6.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 3.0m TO 6.0m. CASING 0m TO 3.0m. 2mm SAND FILTER PACK 1.8m TO 6.0m. BENTONITE SEAL 0.1m TO 1.8m. COMPLETED WITH A CONCRETED GATIC COVER.
						-3	6			SAND: fine to medium grained, grey and dark grey, trace of silt and shell fragments.		(L)		
										END OF BOREHOLE AT 7.00 m				

JKGeotechnics

BOREHOLE LOG

Borehole No. 6

1 / 1

Client: GOOD TIME HOLDINGS NSW

Project: PROPOSE MIXED USE DEVELOPMENT

Location: 277 GRAND PARADE, RAMSGATE, NSW

Job No.: 34871PH **Method:** SPIRAL AUGER **R.L. Surface:** ~3.2 m

Date: 2/5/22 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** T.F./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
ON COMPLETION						3			-	ASPHALTIC CONCRETE: 30mm.t FILL: Silty gravel. fine to medium grained, igneous, grey. FILL: Silty sand, fine to medium grained, dark grey, with fine to medium grained igneous gravel, trace of ash.	D			
						2	1		SP	SAND: fine to medium grained, light grey brown, trace of silt.	M W			MARINE
						1	2			END OF BOREHOLE AT 2.00 m				
						0	3							
						-1	4							
						-2	5							
						-3	6							

JK 9.02.4 LIB:GLB Log JK AUGERHOLE - MASTER 34871PH RAMSGATE.GPJ <<DrawingFile>> 04/01/2024 13:15 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0.2018-03-20

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BOREHOLE LOG

Borehole No. 7

Client: GOOD TIME HOLDINGS NSW

Project: PROPOSE MIXED USE DEVELOPMENT

Location: 277 GRAND PARADE, RAMSGATE, NSW

Job No.: 34871PH **Method:** SPIRAL AUGER **R.L. Surface:** ~2.7 m

Date: 2/5/22 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** T.F./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
ON COMPLETION						2	0		-	ASPHALTIC CONCRETE: 30mm.t	D			
										FILL: Sandy gravel, fine to medium grained, igneous, grey.				
									SP	FILL: Sand, fine to medium grained, grey brown, with silt, trace of fine to medium grained igneous gravel.	M			MARINE
						1	1			SAND: fine to medium grained, light grey and grey brown, trace of silt.				
											W			
						1	2			END OF BOREHOLE AT 2.00 m				
						0	3							
						-1	4							
						-2	5							
						-3	6							
						-4								

ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. Not all notes are necessarily relevant to all reports.

Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies include gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 *'Geotechnical Site Investigations'*. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geoenvironmental practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the

structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289.6.3.1–2004 (R2016) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'*.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N > 30
  15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as 'N_c' on the borehole logs, together with the number of blows per 150mm penetration.

LOGS

The borehole or test pit logs presented herein are an interpretation of the subsurface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will enable the most reliable assessment, but is not always practicable or possible to justify on economic grounds. In any case, the boreholes or test pits represent only a very small sample of the total subsurface conditions.

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than 'straight line' variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

Where groundwater levels are measured in boreholes, there are several potential problems:

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse environmental characteristics or behaviour. If the volume and nature of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classification and rock strengths indicated on the environmental logs unless noted in the report.

SYMBOL LEGENDS

SOIL


FILL


TOPSOIL


CLAY (CL, CI, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CI, CH)


SILTY CLAY (CL, CI, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CI, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML, MH)


PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK


CONGLOMERATE


SANDSTONE


SHALE/MUDSTONE


SILTSTONE


CLAYSTONE


COAL


LAMINITE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

OTHER MATERIALS


BRICKS OR PAVERS


CONCRETE


ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	% < 0.075mm
ine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	–	–	–	–

Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity $Cu > 4$ and the coefficient of curvature $1 < C_c < 3$. Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_U = \frac{D_{60}}{D_{10}} \qquad and \qquad C_C = \frac{(D_{30})^2}{D_{10}\, D_{60}}$$

Where D_{10}, D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

NOTES:

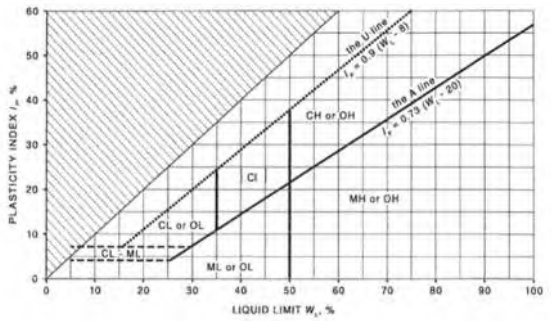
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

2 Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.

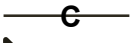
3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.

4 The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Modified Casagrande Chart for Classifying Silts and Clays according to their Behaviour



LOG SYMBOLS

Log Column	Symbol	Definition
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.
		Extent of borehole/test pit collapse shortly after drilling/excavation.
		Groundwater seepage into borehole or test pit noted during drilling or excavation.
Samples	ES	Sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos analysis.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
	PFAS	Soil sample taken over depth indicated, for analysis of Per- and Polyfluoroalkyl Substances.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25	Vane shear reading in kPa of undrained shear strength.
	PID = 100	Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	w > PL	Moisture content estimated to be greater than plastic limit.
	$w \approx$ PL	Moisture content estimated to be approximately equal to plastic limit.
	w < PL	Moisture content estimated to be less than plastic limit.
	$w \approx$ LL	Moisture content estimated to be near liquid limit.
	w > LL	Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D	DRY – runs freely through fingers.
	M	MOIST – does not run freely but no free water visible on soil surface.
	W	WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS	VERY SOFT – unconfined compressive strength ≤ 25kPa.
	S	SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa.
	F	FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa.
	St	STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa.
	VSt	VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa.
	Hd	HARD – unconfined compressive strength > 400kPa.
	Fr	FRIABLE – strength not attainable, soil crumbles.
	( )	Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)		**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)** VERY LOOSE: ≤ 15 / 0 – 4 LOOSE: > 15 and ≤ 35 / 4 – 10 MEDIUM DENSE: > 35 and ≤ 65 / 10 – 30 DENSE: > 65 and ≤ 85 / 30 – 50 VERY DENSE: > 85 / > 50
	VL	
	L	
	MD	
	D	
	VD	
	( )	Bracketed symbol indicates estimated density based on ease of drilling or other assessment.

Log Column	Symbol	Definition
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Twin pronged tungsten carbide bit.
	T_{60}	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.
	Soil Origin	The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.

Classification of Material Weathering

Term		Abbreviation		Definition
Residual Soil		RS		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered		XW		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	Distinctly Weathered (Note 1)	HW	DW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered		MW		The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly Weathered		SW		Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh		FR		Rock shows no sign of decomposition of individual minerals or colour changes.

NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: *'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'*. There is some change in rock strength.

Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $Is_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Appendix E: Laboratory Report(s) & COC Documents

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CERTIFICATE OF ANALYSIS 294592

Client Details

Client	JK Environments
Attention	Katrina Taylor
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E34871PT, Ramsgate**
Number of Samples	28 Soil, 1 Water
Date samples received	03/05/2022
Date completed instructions received	03/05/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	10/05/2022
Date of Issue	10/05/2022

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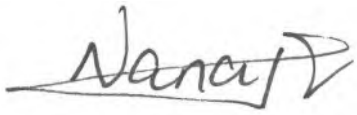
Asbestos Approved By
Analysed by Asbestos Approved Analyst: Panika Wongchanda
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Josh Williams, Organics and LC Supervisor
Lucy Zhu, Asbestos Supervisor
Steven Luong, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		294592-1	294592-5	294592-9	294592-12	294592-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.15-0.25	0.15-0.25	0.15-0.25	0.2-0.3	0.16-0.3
Date Sampled		02/05/2022	2/05/2022	2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	06/05/2022	06/05/2022	06/05/2022	06/05/2022	06/05/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	81	75	74	86	72

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		294592-18	294592-23	294592-26	294592-27	294592-28
Your Reference	UNITS	BH6	BH7	SDUP1	TB	TS
Depth		0.15-0.25	0.15-0.25	-	-	-
Date Sampled		2/05/2022	2/05/2022	2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	06/05/2022	06/05/2022	06/05/2022	05/05/2022	06/05/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	[NA]
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	[NA]
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	[NA]
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	103%
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	103%
Ethylbenzene	mg/kg	<1	<1	<1	<1	104%
m+p-xylene	mg/kg	<2	<2	<2	<2	103%
o-Xylene	mg/kg	<1	<1	<1	<1	103%
Naphthalene	mg/kg	<1	<1	<1	<1	[NA]
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	[NA]
Surrogate aaa-Trifluorotoluene	%	77	81	82	79	112

svTRH (C10-C40) in Soil						
Our Reference		294592-1	294592-5	294592-9	294592-12	294592-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.15-0.25	0.15-0.25	0.15-0.25	0.2-0.3	0.16-0.3
Date Sampled		02/05/2022	2/05/2022	2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	5/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	06/05/2022	06/05/2022	06/05/2022	06/05/2022	06/05/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	85	86	85	94	85

svTRH (C10-C40) in Soil					
Our Reference		294592-18	294592-23	294592-26	294592-27
Your Reference	UNITS	BH6	BH7	SDUP1	TB
Depth		0.15-0.25	0.15-0.25	-	-
Date Sampled		2/05/2022	2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	05/05/2022	05/05/2022	5/05/2022	05/05/2022
Date analysed	-	06/05/2022	06/05/2022	06/05/2022	06/05/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50
Surrogate o-Terphenyl	%	89	89	85	88

PAHs in Soil						
Our Reference		294592-1	294592-5	294592-9	294592-12	294592-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.15-0.25	0.15-0.25	0.15-0.25	0.2-0.3	0.16-0.3
Date Sampled		02/05/2022	2/05/2022	2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	08/05/2022	08/05/2022	08/05/2022	08/05/2022	08/05/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	0.1	0.3	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	0.1	<0.05	0.1	0.4	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	118	128	111	126	120

PAHs in Soil					
Our Reference		294592-18	294592-23	294592-26	294592-27
Your Reference	UNITS	BH6	BH7	SDUP1	TB
Depth		0.15-0.25	0.15-0.25	-	-
Date Sampled		2/05/2022	2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	08/05/2022	08/05/2022	08/05/2022	06/05/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.2	0.2	0.2	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.1	0.4	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.3	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.1	0.2	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.2	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.1	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	0.2	0.4	1.4	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	119	119	131	103

Organochlorine Pesticides in soil						
Our Reference		294592-1	294592-5	294592-9	294592-12	294592-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.15-0.25	0.15-0.25	0.15-0.25	0.2-0.3	0.16-0.3
Date Sampled		02/05/2022	2/05/2022	2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	08/05/2022	08/05/2022	08/05/2022	08/05/2022	08/05/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	111	111	106	110	109

Organochlorine Pesticides in soil				
Our Reference		294592-18	294592-23	294592-26
Your Reference	UNITS	BH6	BH7	SDUP1
Depth		0.15-0.25	0.15-0.25	-
Date Sampled		2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	08/05/2022	08/05/2022	08/05/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	105	115

Organophosphorus Pesticides in Soil						
Our Reference		294592-1	294592-5	294592-9	294592-12	294592-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.15-0.25	0.15-0.25	0.15-0.25	0.2-0.3	0.16-0.3
Date Sampled		02/05/2022	2/05/2022	2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	08/05/2022	08/05/2022	08/05/2022	08/05/2022	08/05/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	111	111	106	110	109

Organophosphorus Pesticides in Soil				
Our Reference		294592-18	294592-23	294592-26
Your Reference	UNITS	BH6	BH7	SDUP1
Depth		0.15-0.25	0.15-0.25	-
Date Sampled		2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	08/05/2022	08/05/2022	08/05/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	105	115

PCBs in Soil						
Our Reference		294592-1	294592-5	294592-9	294592-12	294592-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.15-0.25	0.15-0.25	0.15-0.25	0.2-0.3	0.16-0.3
Date Sampled		02/05/2022	2/05/2022	2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	08/05/2022	08/05/2022	08/05/2022	08/05/2022	08/05/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	111	111	106	110	109

PCBs in Soil				
Our Reference		294592-18	294592-23	294592-26
Your Reference	UNITS	BH6	BH7	SDUP1
Depth		0.15-0.25	0.15-0.25	-
Date Sampled		2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	08/05/2022	08/05/2022	08/05/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	105	115

Acid Extractable metals in soil						
Our Reference		294592-1	294592-5	294592-9	294592-12	294592-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.15-0.25	0.15-0.25	0.15-0.25	0.2-0.3	0.16-0.3
Date Sampled		02/05/2022	2/05/2022	2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	41	14	21	71	40
Copper	mg/kg	27	26	20	30	25
Lead	mg/kg	20	36	21	5	15
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	37	13	19	68	39
Zinc	mg/kg	65	96	67	45	56

Acid Extractable metals in soil						
Our Reference		294592-18	294592-23	294592-26	294592-27	294592-30
Your Reference	UNITS	BH6	BH7	SDUP1	TB	BH1 - [TRIPLICATE]
Depth		0.15-0.25	0.15-0.25	-	-	0.15-0.25
Date Sampled		2/05/2022	2/05/2022	2/05/2022	2/05/2022	02/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	65	7	41	2	34
Copper	mg/kg	36	27	34	<1	31
Lead	mg/kg	10	50	26	3	28
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	61	6	38	<1	31
Zinc	mg/kg	53	77	81	2	74

Acid Extractable metals in soil		
Our Reference		294592-31
Your Reference	UNITS	BH7 - [TRIPLICATE]
Depth		0.15-0.25
Date Sampled		2/05/2022
Type of sample		Soil
Date prepared	-	05/05/2022
Date analysed	-	05/05/2022
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	11
Copper	mg/kg	49
Lead	mg/kg	38
Mercury	mg/kg	<0.1
Nickel	mg/kg	9
Zinc	mg/kg	78

Moisture						
Our Reference		294592-1	294592-5	294592-9	294592-12	294592-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.15-0.25	0.15-0.25	0.15-0.25	0.2-0.3	0.16-0.3
Date Sampled		02/05/2022	2/05/2022	2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	06/05/2022	06/05/2022	06/05/2022	06/05/2022	06/05/2022
Moisture	%	3.2	3.8	5.9	5.7	13

Moisture					
Our Reference		294592-18	294592-23	294592-26	294592-27
Your Reference	UNITS	BH6	BH7	SDUP1	TB
Depth		0.15-0.25	0.15-0.25	-	-
Date Sampled		2/05/2022	2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	06/05/2022	06/05/2022	06/05/2022	06/05/2022
Moisture	%	8.0	11	3.6	0.3

Asbestos ID - soils NEPM - ASB-001						
Our Reference		294592-2	294592-6	294592-9	294592-12	294592-16
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.3-0.5	0.8-1.0	0.15-0.25	0.2-0.3	0.3-0.5
Date Sampled		2/05/2022	2/05/2022	2/05/2022	2/05/2022	2/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	10/05/2022	10/05/2022	10/05/2022	10/05/2022	10/05/2022
Sample mass tested	g	378.17	463.08	323.97	603.81	440.59
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Grey fine-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected Organic Fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	0.1846	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	See Above	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	0.0855	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	0.0185	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001			
Our Reference		294592-19	294592-24
Your Reference	UNITS	BH6	BH7
Depth		0.3-0.5	0.3-0.5
Date Sampled		2/05/2022	2/05/2022
Type of sample		Soil	Soil
Date analysed	-	10/05/2022	10/05/2022
Sample mass tested	g	526.25	735.53
Sample Description	-	Grey fine-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	Chrysotile asbestos detected Organic Fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	0.7923	<0.1
Asbestos ID in soil <0.1g/kg*	-	See Above	No visible asbestos detected
ACM >7mm Estimation*	g	0.4170	–
FA and AF Estimation*	g	–	–
ACM >7mm Estimation*	%(w/w)	0.0792	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001

vTRH(C6-C10)/BTEXN in Water		
Our Reference		294592-29
Your Reference	UNITS	FR
Depth		-
Date Sampled		2/05/2022
Type of sample		Water
Date extracted	-	04/05/2022
Date analysed	-	05/05/2022
TRH C_6 - C_9	µg/L	62
TRH C_6 - C_{10}	µg/L	62
TRH C_6 - C_{10} less BTEX (F1)	µg/L	62
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	97
Surrogate toluene-d8	%	98
Surrogate 4-BFB	%	100

svTRH (C10-C40) in Water		
Our Reference		294592-29
Your Reference	UNITS	FR
Depth		-
Date Sampled		2/05/2022
Type of sample		Water
Date extracted	-	05/05/2022
Date analysed	-	06/05/2022
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
Total +ve TRH (C10-C36)	µg/L	<50
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	<100
TRH >C_{34} - C_{40}	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	<50
Surrogate o-Terphenyl	%	79

PAHs in Water		
Our Reference		294592-29
Your Reference	UNITS	FR
Depth		-
Date Sampled		2/05/2022
Type of sample		Water
Date extracted	-	05/05/2022
Date analysed	-	05/05/2022
Naphthalene	µg/L	<1
Acenaphthylene	µg/L	<1
Acenaphthene	µg/L	<1
Fluorene	µg/L	<1
Phenanthrene	µg/L	<1
Anthracene	µg/L	<1
Fluoranthene	µg/L	<1
Pyrene	µg/L	<1
Benzo(a)anthracene	µg/L	<1
Chrysene	µg/L	<1
Benzo(b,j+k)fluoranthene	µg/L	<2
Benzo(a)pyrene	µg/L	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1
Dibenzo(a,h)anthracene	µg/L	<1
Benzo(g,h,i)perylene	µg/L	<1
Benzo(a)pyrene TEQ	µg/L	<5
Total +ve PAH's	µg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	82

Metals in Water - Dissolved		
Our Reference		294592-29
Your Reference	UNITS	FR
Depth		-
Date Sampled		2/05/2022
Type of sample		Water
Date digested	-	05/05/2022
Date analysed	-	06/05/2022
Arsenic - Dissolved	mg/L	<0.05
Cadmium - Dissolved	mg/L	<0.01
Chromium - Dissolved	mg/L	<0.01
Copper - Dissolved	mg/L	0.07
Lead - Dissolved	mg/L	<0.03
Mercury - Dissolved	mg/L	<0.0005
Nickel - Dissolved	mg/L	<0.02
Zinc - Dissolved	mg/L	<0.02

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	294592-5
Date extracted	-			05/05/2022	1	05/05/2022	05/05/2022		05/05/2022	05/05/2022
Date analysed	-			06/05/2022	1	06/05/2022	06/05/2022		06/05/2022	06/05/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	90	88
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	90	88
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	72	72
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	81	80
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	95	92
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	100	98
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	97	94
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	130	1	81	78	4	82	80

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	23	05/05/2022	05/05/2022		[NT]	[NT]
Date analysed	-			[NT]	23	06/05/2022	06/05/2022		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	23	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	23	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	23	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	23	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	23	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	23	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	23	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	23	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	23	81	77	5	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	294592-5
Date extracted	-			05/05/2022	1	5/05/2022	5/05/2022		05/05/2022	05/05/2022
Date analysed	-			05/05/2022	1	06/05/2022	06/05/2022		06/05/2022	06/05/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	107	83
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	117	67
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	70	117
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	107	83
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	117	67
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	70	117
Surrogate o-Terphenyl	%		Org-020	97	1	85	83	2	123	86

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	23	05/05/2022	05/05/2022		[NT]	[NT]
Date analysed	-			[NT]	23	06/05/2022	06/05/2022		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	23	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	23	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	23	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	23	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	23	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	23	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	23	89	85	5	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	294592-5
Date extracted	-			05/05/2022	1	05/05/2022	05/05/2022		05/05/2022	05/05/2022
Date analysed	-			08/05/2022	1	08/05/2022	08/05/2022		08/05/2022	08/05/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	95	92
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	89
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	93
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.1	0	100	97
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	118	112
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	125	117
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	85	79
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	112	94
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	123	1	118	125	6	121	113

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	23	05/05/2022	05/05/2022		[NT]	[NT]
Date analysed	-			[NT]	23	08/05/2022	08/05/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	23	0.2	<0.1	67	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	23	0.1	0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	23	0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	23	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	23	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	23	119	125	5	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	294592-5
Date extracted	-			05/05/2022	1	05/05/2022	05/05/2022		05/05/2022	05/05/2022
Date analysed	-			08/05/2022	1	08/05/2022	08/05/2022		08/05/2022	08/05/2022
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	82	76
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	96
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	81	81
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	101
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	102
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	115	109
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	107
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	86
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	94
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	86
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	106	1	111	108	3	107	104

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	23	05/05/2022	05/05/2022		[NT]	[NT]
Date analysed	-			[NT]	23	08/05/2022	08/05/2022		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	23	105	112	6	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	294592-5
Date extracted	-			05/05/2022	1	05/05/2022	05/05/2022		05/05/2022	05/05/2022
Date analysed	-			08/05/2022	1	08/05/2022	08/05/2022		08/05/2022	08/05/2022
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	80
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	81	69
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	87	63
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	79	67
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	78
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	82
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	75
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	106	1	111	108	3	107	104

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	23	05/05/2022	05/05/2022		[NT]	[NT]
Date analysed	-			[NT]	23	08/05/2022	08/05/2022		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	23	105	112	6	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	294592-5
Date extracted	-			05/05/2022	1	05/05/2022	05/05/2022		05/05/2022	05/05/2022
Date analysed	-			08/05/2022	1	08/05/2022	08/05/2022		08/05/2022	08/05/2022
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	104	100
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	106	1	111	108	3	107	104

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	23	05/05/2022	05/05/2022		[NT]	[NT]
Date analysed	-			[NT]	23	08/05/2022	08/05/2022		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	23	105	112	6	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	294592-5
Date prepared	-			05/05/2022	1	05/05/2022	05/05/2022		05/05/2022	05/05/2022
Date analysed	-			05/05/2022	1	05/05/2022	05/05/2022		05/05/2022	05/05/2022
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	92	114
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	88	88
Chromium	mg/kg	1	Metals-020	<1	1	41	39	5	84	96
Copper	mg/kg	1	Metals-020	<1	1	27	43	46	86	126
Lead	mg/kg	1	Metals-020	<1	1	20	31	43	86	112
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	106	119
Nickel	mg/kg	1	Metals-020	<1	1	37	38	3	87	90
Zinc	mg/kg	1	Metals-020	<1	1	65	91	33	92	116

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	23	05/05/2022	05/05/2022		[NT]	[NT]
Date analysed	-			[NT]	23	05/05/2022	05/05/2022		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	23	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	23	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	23	7	9	25	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	23	27	28	4	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	23	50	27	60	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	23	6	8	29	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	23	77	59	26	[NT]	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			05/05/2022	29	04/05/2022	05/05/2022		04/05/2022	[NT]
Date analysed	-			06/05/2022	29	05/05/2022	06/05/2022		05/05/2022	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	29	62	60	3	117	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	29	62	70	12	117	[NT]
Benzene	µg/L	1	Org-023	<1	29	<1	<1	0	122	[NT]
Toluene	µg/L	1	Org-023	<1	29	<1	<1	0	113	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	29	<1	<1	0	117	[NT]
m+p-xylene	µg/L	2	Org-023	<2	29	<2	<2	0	117	[NT]
o-xylene	µg/L	1	Org-023	<1	29	<1	<1	0	113	[NT]
Naphthalene	µg/L	1	Org-023	<1	29	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	96	29	97	99	2	100	[NT]
Surrogate toluene-d8	%		Org-023	97	29	98	97	1	100	[NT]
Surrogate 4-BFB	%		Org-023	101	29	100	103	3	98	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			05/05/2022	[NT]	[NT]	[NT]	[NT]	05/05/2022	[NT]
Date analysed	-			05/05/2022	[NT]	[NT]	[NT]	[NT]	05/05/2022	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	100	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	90	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	94	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	100	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	90	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	94	[NT]
Surrogate o-Terphenyl	%		Org-020	114	[NT]	[NT]	[NT]	[NT]	99	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	294592-29
Date extracted	-			05/05/2022	[NT]	[NT]	[NT]	[NT]	05/05/2022	05/05/2022
Date analysed	-			05/05/2022	[NT]	[NT]	[NT]	[NT]	05/05/2022	05/05/2022
Naphthalene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	94	78
Acenaphthylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	89	77
Fluorene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	88	74
Phenanthrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	102	88
Anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	88	76
Pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	95	81
Benzo(a)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	77	67
Benzo(b,j+k)fluoranthene	µg/L	2	Org-022/025	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	74	76
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	78	[NT]	[NT]	[NT]	[NT]	84	74

QUALITY CONTROL: Metals in Water - Dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date digested	-			05/05/2022	[NT]	[NT]	[NT]	[NT]	05/05/2022	[NT]
Date analysed	-			06/05/2022	[NT]	[NT]	[NT]	[NT]	06/05/2022	[NT]
Arsenic - Dissolved	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	104	[NT]
Cadmium - Dissolved	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	101	[NT]
Chromium - Dissolved	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	100	[NT]
Copper - Dissolved	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	99	[NT]
Lead - Dissolved	mg/L	0.03	Metals-020	<0.03	[NT]	[NT]	[NT]	[NT]	101	[NT]
Mercury - Dissolved	mg/L	0.0005	Metals-021	<0.0005	[NT]	[NT]	[NT]	[NT]	106	[NT]
Nickel - Dissolved	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	102	[NT]
Zinc - Dissolved	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	107	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Acid Extractable Metals in Soil:
- The laboratory RPD acceptance criteria has been exceeded for 294592-1 for Cu and Pb. Therefore a triplicate result has been issued as laboratory sample number 294592-30.
- The laboratory RPD acceptance criteria has been exceeded for 294592-23 for Pb. Therefore a triplicate result has been issued as laboratory sample number 294592-31.

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Factual description of asbestos identified in the soil samples: NEPM
Sample 294592-6; Chrysotile, Amosite and Crocidolite asbestos identified in 0.5699g of fibre cement material >7mm

Sample 294592-19; Chrysotile asbestos identified in 2.7797g of fibre cement material >7mm

Note: All samples analysed as received. However, samples 294592-2,9 are below the minimum recommended 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Katrina Taylor

Sample Login Details

Your reference	E34871PT, Ramsgate
Envirolab Reference	294592
Date Sample Received	03/05/2022
Date Instructions Received	03/05/2022
Date Results Expected to be Reported	10/05/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	28 Soil, 1 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	1
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHsin Water	Metals in Water - Dissolved	On Hold
BH1-0.15-0.25	✓	✓	✓	✓	✓	✓	✓						
BH1-0.3-0.5								✓					
BH1-1.3-1.5													✓
BH1-1.8-2.0													✓
BH2-0.15-0.25	✓	✓	✓	✓	✓	✓	✓						
BH2-0.8-1.0								✓					
BH2-1.3-1.5													✓
BH2-1.8-2.0													✓
BH3-0.15-0.25	✓	✓	✓	✓	✓	✓	✓	✓					
BH3-0.3-0.5													✓
BH3-0.8-1.0													✓
BH4-0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓					
BH4-0.5-0.8													✓
BH4-1.3-1.5													✓
BH5-0.16-0.3	✓	✓	✓	✓	✓	✓	✓						
BH5-0.3-0.5								✓					
BH5-1.8-2.0													✓
BH6-0.15-0.25	✓	✓	✓	✓	✓	✓	✓						
BH6-0.3-0.5								✓					
BH6-0.8-1.0													✓
BH6-1.3-1.5													✓
BH6-1.8-2.0													✓
BH7-0.15-0.25	✓	✓	✓	✓	✓	✓	✓						
BH7-0.3-0.5								✓					
BH7-0.8-1.0													✓
SDUP1	✓	✓	✓	✓	✓	✓	✓						
TB	✓	✓	✓				✓						
TS	✓												
FR									✓	✓	✓	✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

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Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

upacked COC

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E34871PT Date Results Required: STANDARD Page: 1 of 2	FROM: JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: ktaylor@jkenvironments.com.au

Location:	Ramsgate						Sample Preserved in Esky on Ice											
Sampler:	AD						Tests Required											
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 3	Asbestos (WA 500mL)	BTEX								
2/05/2022	1	BH1	0.15-0.25	G, A	0	F: Sand	X											
2/05/2022	2	BH1	0.3-0.5	G, A	0	F: Sand			X									
2/05/2022	3	BH1	1.3-1.5	G, A	0	Sand												
2/05/2022	4	BH1	1.8-2.0	G, A	0	Sand												
2/05/2022	5	BH2	0.15-0.25	G, A	0	F: Sand	X											
2/05/2022	6	BH2	0.8-1.0	G, A	0	F: Sand			X									
2/05/2022	7	BH2	1.3-1.5	G, A	0	Sand												
2/05/2022	8	BH2	1.8-2.0	G, A	0	Sand												
2/05/2022	9	BH3	0.15-0.25	G, A	0	F: Sand	X		X									
2/05/2022	10	BH3	0.3-0.5	G, A	0	F: Sand												
2/05/2022	11	BH3	0.8-1.0	G, A	0	Sand												
2/05/2022	12	BH4	0.2-0.3	G, A	0.1	F: Sand	X		X									
2/05/2022	13	BH4	0.5-0.8	G, A	0	F: Sand												
2/05/2022	14	BH4	1.3-1.5	G, A	0	Sand												
2/05/2022	15	BH5	0.16-0.3	G, A	0	F: Sandy Gravel	X											
2/05/2022	16	BH5	0.3-0.5	G, A	0	F: Sand			X									
2/05/2022	17	BH5	1.8-2.0	G, A	0	Sand												
2/05/2022	18	BH6	0.15-0.25	G, A	0	F: Silty Sand	X											
2/05/2022	19	BH6	0.3-0.5	G, A	0	F: Silty Sand			X									
2/05/2022	20	BH6	0.8-1.0	G, A	0	F: Silty Sand												
2/05/2022	21	BH6	1.3-1.5	G, A	0	Sand												
2/05/2022	22	BH6	1.8-2.0	G, A	0	Sand												
2/05/2022	23	BH7	0.15-0.25	G, A	0	F: Sand	X											
2/05/2022	24	BH7	0.3-0.5	G, A	0	Sand			X									
2/05/2022	25	BH7	0.8-1.0	G, A	0	Sand												

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 294592
Date Received: 3/5/22
Time Received: 1315
Received By: CR
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag			
Relinquished By:	Date:	Time: 1315	Received By:	Date: 3/5/22

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD	JKE Job Number: E34871PT	JKEnvironments
12 ASHLEY STREET		REAR OF 115 WICKS ROAD
CHATSWOOD NSW 2067		MACQUARIE PARK, NSW 2113
P: (02) 99106200	Date Results Required: STANDARD	P: 02-9888 5000 F: 02-9888 5001
F: (02) 99106201		Attention: ktaylor@jkenvironments.com.au
Attention: Aileen	Page: 2 of 2	

Location:	Ramsgate	Sample Preserved in Esky on Ice
Sampler:	AD	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 3	Asbestos (WA 500mL)	BTEX	SCr extended	pH field test (pHF apHFOX)						
2/05/2022	26	SDUP1	–	G, A	–	Soil Duplicate	X											
2/05/2022	27	TB	–	G	–	Trip Blank		X										
2/05/2022	28	TS	–	V	–	Trip Spike				X								
2/05/2022	29	FR	–	#	–	Field Rinsate		X										
2/05/2022	NR	BH1	0.3-0.5	P		F: Sand						X						
2/05/2022	NR	BH1	1.3-1.5	P		F: Sand						X						
2/05/2022	NR	BH1	1.8-2.0	P		Sand						X						
2/05/2022	NR	BH1	2.9-3.0	P		Sand						X						
2/05/2022	NR	BH1	3.9-4.0	P		Sand						X						
2/05/2022	NR	BH1	4.9-5.0	P		Sand						X						
2/05/2022	NR	BH1	5.9-6.0	P		Sand						X						
2/05/2022	NR	BH1	6.9-7.0	P		Sand						X						
2/05/2022	NR	BH5	0.3-0.5	P		F: Sand						X						
2/05/2022	NR	BH5	1.3-1.5	P		F: Sand						X						
2/05/2022	NR	BH5	1.8-2.0	P		Sand						X						
2/05/2022	NR	BH5	2.9-3.0	P		Sand						X						
2/05/2022	NR	BH5	3.9-4.0	P		Sand						X						
2/05/2022	NR	BH5	4.9-5.0	P		Sand						X						
2/05/2022	NR	BH5	5.9-6.0	P		Sand						X						
2/05/2022	NR	BH5	6.9-7.0	P		Sand						X						

Remarks (comments/detection limits required):	Sample Containers:
	G - 250mg Glass Jar A - Ziplock Asbestos Bag V- Glass Vial # 2x 500mL Amber glass bottles, 2x BTEX vials, 1x HNO3 bottle

Relinquished By:	Date:	Time:	Received By:	Date:

244592

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CERTIFICATE OF ANALYSIS 294592-A

Client Details

Client	JK Environments
Attention	Katrina Taylor
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E34871PT, Ramsgate**
Number of Samples	additional analysis
Date samples received	03/05/2022
Date completed instructions received	18/05/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	25/05/2022
Date of Issue	25/05/2022

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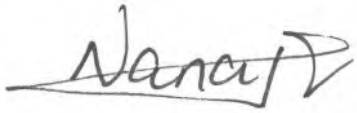
Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Hannah Nguyen, Metals Supervisor
Loren Bardwell, Development Chemist

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		294592-A-14	294592-A-21
Your Reference	UNITS	BH4	BH6
Depth		1.3-1.5	1.3-1.5
Date Sampled		2/05/2022	2/05/2022
Type of sample		Soil	Soil
Date extracted	-	19/05/2022	19/05/2022
Date analysed	-	20/05/2022	20/05/2022
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
Naphthalene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	98	79

svTRH (C10-C40) in Soil			
Our Reference		294592-A-14	294592-A-21
Your Reference	UNITS	BH4	BH6
Depth		1.3-1.5	1.3-1.5
Date Sampled		2/05/2022	2/05/2022
Type of sample		Soil	Soil
Date extracted	-	19/05/2022	19/05/2022
Date analysed	-	19/05/2022	19/05/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	87	83

PAHs in Soil			
Our Reference		294592-A-14	294592-A-21
Your Reference	UNITS	BH4	BH6
Depth		1.3-1.5	1.3-1.5
Date Sampled		2/05/2022	2/05/2022
Type of sample		Soil	Soil
Date extracted	-	19/05/2022	19/05/2022
Date analysed	-	19/05/2022	19/05/2022
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	101	103

Acid Extractable metals in soil			
Our Reference		294592-A-14	294592-A-21
Your Reference	UNITS	BH4	BH6
Depth		1.3-1.5	1.3-1.5
Date Sampled		2/05/2022	2/05/2022
Type of sample		Soil	Soil
Date prepared	-	19/05/2022	19/05/2022
Date analysed	-	20/05/2022	20/05/2022
Arsenic	mg/kg	<4	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	<1	2
Copper	mg/kg	7	2
Lead	mg/kg	2	5
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	<1	1
Zinc	mg/kg	5	15

Moisture			
Our Reference		294592-A-14	294592-A-21
Your Reference	UNITS	BH4	BH6
Depth		1.3-1.5	1.3-1.5
Date Sampled		2/05/2022	2/05/2022
Type of sample		Soil	Soil
Date prepared	-	19/05/2022	19/05/2022
Date analysed	-	20/05/2022	20/05/2022
Moisture	%	17	4.1

Metals from Leaching Fluid pH 2.9 or 5			
Our Reference		294592-A-12	294592-A-18
Your Reference	UNITS	BH4	BH6
Depth		0.2-0.3	0.15-0.25
Date Sampled		2/05/2022	2/05/2022
Type of sample		Soil	Soil
Date extracted	-	24/05/2022	24/05/2022
Date analysed	-	24/05/2022	24/05/2022
pH of soil for fluid# determ.	pH units	9.8	9.6
pH of soil TCLP (after HCl)	pH units	1.7	1.7
Extraction fluid used		1	1
pH of final Leachate	pH units	5.0	6.5
Nickel	mg/L	0.06	<0.02

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311. Please note that the mass used may be scaled down from default based on sample mass available. Samples are stored at 2-6oC before and after leachate preparation.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of various metals by ICP-AES following buffer determination as per USEPA 1311 and hence AS 4439.3. Extraction Fluid 1 refers to the pH 5.0 buffer and Extraction Fluid 2 is the pH 2.9 buffer.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			19/05/2022	[NT]	[NT]	[NT]	[NT]	19/05/2022	[NT]
Date analysed	-			20/05/2022	[NT]	[NT]	[NT]	[NT]	20/05/2022	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	108	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	108	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	102	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	108	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	110	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	83	[NT]	[NT]	[NT]	[NT]	92	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			19/05/2022	[NT]	[NT]	[NT]	[NT]	19/05/2022	[NT]
Date analysed	-			19/05/2022	[NT]	[NT]	[NT]	[NT]	19/05/2022	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	107	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	96	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	117	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	107	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	96	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	117	[NT]
Surrogate o-Terphenyl	%		Org-020	83	[NT]	[NT]	[NT]	[NT]	82	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			19/05/2022	[NT]	[NT]	[NT]	[NT]	19/05/2022	[NT]
Date analysed	-			19/05/2022	[NT]	[NT]	[NT]	[NT]	19/05/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	116	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	108	[NT]	[NT]	[NT]	[NT]	105	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date prepared	-			19/05/2022	[NT]	[NT]	[NT]	[NT]	19/05/2022	[NT]
Date analysed	-			20/05/2022	[NT]	[NT]	[NT]	[NT]	20/05/2022	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	85	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	83	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	83	[NT]

QUALITY CONTROL: Metals from Leaching Fluid pH 2.9 or 5					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			24/05/2022	[NT]	[NT]	[NT]	[NT]	24/05/2022	[NT]
Date analysed	-			24/05/2022	[NT]	[NT]	[NT]	[NT]	24/05/2022	[NT]
Nickel	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	104	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Samples received in good order: Holding time exceedance

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Katrina Taylor

Sample Login Details

Your reference	E34871PT, Ramsgate
Envirolab Reference	294592-A
Date Sample Received	03/05/2022
Date Instructions Received	18/05/2022
Date Results Expected to be Reported	25/05/2022

Sample Condition

Samples received in appropriate condition for analysis	Holding time exceedance
No. of Samples Provided	additional analysis
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	1
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Organics - out of recommended holding time

Please contact the laboratory within 24 hours if you wish to cancel the aformentioned testing. Otherwise testing will proceed as per the COC and hence invoiced accordingly.

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil	pH of soil for fluid#determ.	pH of soil TCLP (after HCl)	Extraction fluid used	pH of final Leachate	Nickel	On Hold
BH1-0.15-0.25										✓
BH1-0.3-0.5										✓
BH1-1.3-1.5										✓
BH1-1.8-2.0										✓
BH2-0.15-0.25										✓
BH2-0.8-1.0										✓
BH2-1.3-1.5										✓
BH2-1.8-2.0										✓
BH3-0.15-0.25										✓
BH3-0.3-0.5										✓
BH3-0.8-1.0										✓
BH4-0.2-0.3					✓	✓	✓	✓	✓	
BH4-0.5-0.8										✓
BH4-1.3-1.5	✓	✓	✓	✓						
BH5-0.16-0.3										✓
BH5-0.3-0.5										✓
BH5-1.8-2.0										✓
BH6-0.15-0.25					✓	✓	✓	✓	✓	
BH6-0.3-0.5										✓
BH6-0.8-1.0										✓
BH6-1.3-1.5	✓	✓	✓	✓						
BH6-1.8-2.0										✓
BH7-0.15-0.25										✓
BH7-0.3-0.5										✓
BH7-0.8-1.0										✓
SDUP1										✓
TB										✓
TS										✓
FR										✓
BH1 - [TRIPLICATE]-0.15-0.25										✓
BH7 - [TRIPLICATE]-0.15-0.25										✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

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Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Ming To

Subject: FW: Results for Registration 294592 E34871PT, Ramsgate
Attachments: 294592-[R00].pdf; 294592-COC.pdf; JK Environment Soil for Envirolab 294592.xlsx; 294592.Excel.xlsx

Ref: 294592-A
TAT: Standard
Due: 25/05/2022
MT

294592-A

From: Katrina Taylor <KTaylor@jkenvironments.com.au>
Sent: Wednesday, 18 May 2022 2:47 PM
To: Samplereceipt <Samplereceipt@envirolab.com.au>
Subject: FW: Results for Registration 294592 E34871PT, Ramsgate

Afternoon,

Please analyse the following samples on standard TA:

TCLP Nickel
12 BH4 (0.2-0.3)
18 BH6 (0.15-0.25)

#3
14 BH4 (1.3-1.5)
21 BH6 (1.3-1.5)

Thank you.

Regards
Katrina Taylor
Associate | Environmental Scientist
NSW Licensed Asbestos Assessor

T: +612 9888 5000
D: 0418 481 628
E: KTaylor@jkenvironments.com.au
www.jkenvironments.com.au

PO Box 976
NORTH RYDE BC NSW 1670
115 Wicks Road
MACQUARIE PARK NSW 2113

JKEnvironments

From: Jeremy Faircloth <JFaircloth@envirolab.com.au>
Sent: Tuesday, 10 May 2022 6:58 PM

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 294586

Client Details

Client	JK Environments
Attention	Katrina Taylor
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E34871PT, Ramsgate**
Number of Samples	16 Soil
Date samples received	03/05/2022
Date completed instructions received	03/05/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	10/05/2022
Date of Issue	10/05/2022

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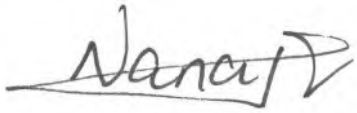
Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Jenny He, Chemist

Authorised By



Nancy Zhang, Laboratory Manager

sPOCAS field test						
Our Reference		294586-1	294586-2	294586-3	294586-4	294586-5
Your Reference	UNITS	BH1	BH1	BH1	BH1	BH1
Depth		0.3-0.5	1.3-1.5	1.8-2.0	2.9-3.0	3.9-4.0
Date Sampled		02/05/2022	02/05/2022	02/05/2022	02/05/2022	02/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	10/05/2022	10/05/2022	10/05/2022	10/05/2022	10/05/2022
Date analysed	-	10/05/2022	10/05/2022	10/05/2022	10/05/2022	10/05/2022
pH_F (field pH test)*	pH Units	10.0	10.0	9.4	8.9	8.5
pH_{FOX} (field peroxide test)*	pH Units	8.2	7.2	7.1	7.1	6.7
Reaction Rate*	-	High reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test						
Our Reference		294586-6	294586-7	294586-8	294586-9	294586-10
Your Reference	UNITS	BH1	BH1	BH1	BH5	BH5
Depth		4.9-5.0	5.9-6.0	6.9-7.0	0.3-0.5	1.3-1.5
Date Sampled		02/05/2022	02/05/2022	02/05/2022	02/05/2022	02/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	10/05/2022	10/05/2022	10/05/2022	10/05/2022	10/05/2022
Date analysed	-	10/05/2022	10/05/2022	10/05/2022	10/05/2022	10/05/2022
pH_F (field pH test)*	pH Units	8.8	8.6	8.4	8.7	9.0
pH_{FOX} (field peroxide test)*	pH Units	6.7	6.8	6.7	7.6	6.6
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test						
Our Reference		294586-11	294586-12	294586-13	294586-14	294586-15
Your Reference	UNITS	BH5	BH5	BH5	BH5	BH5
Depth		1.8-2.0	2.9-3.0	3.9-4.0	4.9-5.0	5.9-6.0
Date Sampled		02/05/2022	02/05/2022	02/05/2022	02/05/2022	02/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	10/05/2022	10/05/2022	10/05/2022	10/05/2022	10/05/2022
Date analysed	-	10/05/2022	10/05/2022	10/05/2022	10/05/2022	10/05/2022
pH_F (field pH test)*	pH Units	8.2	8.1	8.1	8.4	8.1
pH_{FOX} (field peroxide test)*	pH Units	7.1	6.0	6.3	6.5	6.6
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test		
Our Reference		294586-16
Your Reference	UNITS	BH5
Depth		6.9-7.0
Date Sampled		02/05/2022
Type of sample		Soil
Date prepared	-	10/05/2022
Date analysed	-	10/05/2022
pH_F (field pH test)*	pH Units	8.4
pH_{FOX} (field peroxide test)*	pH Units	6.4
Reaction Rate*	-	Low reaction

Method ID	Methodology Summary
Inorg-063	pH- measured using pH meter and electrode. Soil is oxidised with Hydrogen Peroxide or extracted with water. Based on section H, Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004. To ensure accurate results these tests are recommended to be done in the field as pH may change with time thus these results may not be representative of true field conditions.

QUALITY CONTROL: sPOCAS field test						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			[NT]	1	10/05/2022	10/05/2022		10/05/2022	[NT]
Date analysed	-			[NT]	1	10/05/2022	10/05/2022		10/05/2022	[NT]
pH_F (field pH test)*	pH Units		Inorg-063	[NT]	1	10.0	9.9	1	98	[NT]
pH_{FOX} (field peroxide test)*	pH Units		Inorg-063	[NT]	1	8.2	8.0	2	98	[NT]

QUALITY CONTROL: sPOCAS field test						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	10/05/2022	10/05/2022		[NT]	[NT]
Date analysed	-			[NT]	11	10/05/2022	10/05/2022		[NT]	[NT]
pH_F (field pH test)*	pH Units		Inorg-063	[NT]	11	8.2	8.1	1	[NT]	[NT]
pH_{FOX} (field peroxide test)*	pH Units		Inorg-063	[NT]	11	7.1	6.9	3	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
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Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

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Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Services Pty Ltd
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customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Katrina Taylor

Sample Login Details

Your reference	E34871PT, Ramsgate
Envirolab Reference	294586
Date Sample Received	03/05/2022
Date Instructions Received	03/05/2022
Date Results Expected to be Reported	On Hold

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	16 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	1
Cooling Method	Ice Pack, ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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Sample ID	sPOCAS field test	On Hold
BH1-0.3-0.5		✓
BH1-1.3-1.5		✓
BH1-1.8-2.0		✓
BH1-2.9-3.0		✓
BH1-3.9-4.0		✓
BH1-4.9-5.0		✓
BH1-5.9-6.0		✓
BH1-6.9-7.0		✓
BH5-0.3-0.5		✓
BH5-1.3-1.5		✓
BH5-1.8-2.0		✓
BH5-2.9-3.0		✓
BH5-3.9-4.0		✓
BH5-4.9-5.0		✓
BH5-5.9-6.0		✓
BH5-6.9-7.0		✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Updated
294586

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E34871PT Date Results Required: STANDARD Page: 2 of 2	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: ktaylor@jkenvironments.com.au

Location: Ramsgate
Sampler: AD

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 3	Asbestos (WA 500mL)	BTEX	SCr extended	pH field test (pHF apHFOX)
2/05/2022		SDUP1	–	G, A	–	Soil Duplicate	X					
2/05/2022		TB	–	G	–	Trip Blank		X				
2/05/2022		TS	–	V	–	Trip Spike				X		
2/05/2022		FR	–	#	–	Field Rinsate		X				
2/05/2022	1	BH1	0.3-0.5	P		F: Sand						X
2/05/2022	2	BH1	1.3-1.5	P		F: Sand						X
2/05/2022	3	BH1	1.8-2.0	P		Sand						X
2/05/2022	4	BH1	2.9-3.0	P		Sand						X
2/05/2022	5	BH1	3.9-4.0	P		Sand						X
2/05/2022	6	BH1	4.9-5.0	P		Sand						X
2/05/2022	7	BH1	5.9-6.0	P		Sand						X
2/05/2022	8	BH1	6.9-7.0	P		Sand						X
2/05/2022	9	BH5	0.3-0.5	P		F: Sand						X
2/05/2022	10	BH5	1.3-1.5	P		F: Sand						X
2/05/2022	11	BH5	1.8-2.0	P		Sand						X
2/05/2022	12	BH5	2.9-3.0	P		Sand						X
2/05/2022	13	BH5	3.9-4.0	P		Sand						X
2/05/2022	14	BH5	4.9-5.0	P		Sand						X
2/05/2022	15	BH5	5.9-6.0	P		Sand						X
2/05/2022	16	BH5	6.9-7.0	P		Sand						X

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar A - Ziplock Asbestos Bag V- Glass Vial
2x 500mL Amber glass bottles, 2x BTEX vials, 1x HNO3 bottle

Relinquished By:	Date:	Time:	Received By:	Date:

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CERTIFICATE OF ANALYSIS 294586-A

Client Details

Client	JK Environments
Attention	Alexis Diodati
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E34871PT, Ramsgate**
Number of Samples	additional analysis
Date samples received	03/05/2022
Date completed instructions received	18/05/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	26/05/2022
Date of Issue	26/05/2022

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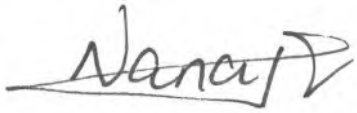
Results Approved By
Priya Samarawickrama, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

Chromium Suite						
Our Reference		294586-A-1	294586-A-3	294586-A-6	294586-A-10	294586-A-12
Your Reference	UNITS	BH1	BH1	BH1	BH5	BH5
Depth		0.3-0.5	1.8-2.0	4.9-5.0	1.3-1.5	2.9-3.0
Date Sampled		02/05/2022	02/05/2022	02/05/2022	02/05/2022	02/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/05/2022	25/05/2022	25/05/2022	25/05/2022	26/05/2022
Date analysed	-	25/05/2022	25/05/2022	25/05/2022	25/05/2022	26/05/2022
pH $_{kcl}$	pH units	10.2	9.9	9.9	9.9	7.1
s-TAA pH 6.5	%w/w S	<0.01	<0.01	<0.01	<0.01	<0.01
TAA pH 6.5	moles H^+ /t	<5	<5	<5	<5	<5
Chromium Reducible Sulfur	%w/w	<0.005	<0.005	0.006	0.007	0.007
a-Chromium Reducible Sulfur	moles H^+ /t	<3	<3	4	4	4
S_{HCl}	%w/w S	[NT]	[NT]	[NT]	[NT]	[NT]
S_{KCl}	%w/w S	[NT]	[NT]	[NT]	[NT]	[NT]
S_{NAS}	%w/w S	[NT]	[NT]	[NT]	[NT]	[NT]
ANC_{BT}	% $CaCO_3$	6.4	0.35	0.90	0.25	0.25
s-ANC_{BT}	%w/w S	2.1	0.11	0.29	0.08	0.08
s-Net Acidity	%w/w S	<0.005	<0.005	<0.005	<0.005	<0.005
a-Net Acidity	moles H^+ /t	<5	<5	<5	<5	<5
Liming rate	kg $CaCO_3$ /t	<0.75	<0.75	<0.75	<0.75	<0.75
a-Net Acidity without ANCE	moles H^+ /t	<5	<5	<5	<5	<5
Liming rate without ANCE	kg $CaCO_3$ /t	<0.75	<0.75	<0.75	<0.75	<0.75
s-Net Acidity without ANCE	%w/w S	<0.005	<0.005	0.0060	0.0070	0.0070

Chromium Suite			
Our Reference		294586-A-13	294586-A-16
Your Reference	UNITS	BH5	BH5
Depth		3.9-4.0	6.9-7.0
Date Sampled		02/05/2022	02/05/2022
Type of sample		Soil	Soil
Date prepared	-	25/05/2022	25/05/2022
Date analysed	-	25/05/2022	25/05/2022
pH $_{kcl}$	pH units	9.8	9.9
s-TAA pH 6.5	%w/w S	<0.01	<0.01
TAA pH 6.5	moles H^+ /t	<5	<5
Chromium Reducible Sulfur	%w/w	0.005	0.05
a-Chromium Reducible Sulfur	moles H^+ /t	3	29
S_{HCl}	%w/w S	[NT]	[NT]
S_{KCl}	%w/w S	[NT]	[NT]
S_{NAS}	%w/w S	[NT]	[NT]
ANC_{BT}	% $CaCO_3$	<0.05	1.6
s-ANC_{BT}	%w/w S	<0.05	0.50
s-Net Acidity	%w/w S	0.0050	<0.005
a-Net Acidity	moles H^+ /t	<5	<5
Liming rate	kg $CaCO_3$ /t	<0.75	<0.75
a-Net Acidity without ANCE	moles H^+ /t	<5	29
Liming rate without ANCE	kg $CaCO_3$ /t	<0.75	2.2
s-Net Acidity without ANCE	%w/w S	0.0050	0.047

Method ID	Methodology Summary
Inorg-068	Chromium Reducible Sulfur - Hydrogen Sulfide is quantified by iodometric titration after distillation to determine potential acidity. Net acidity including ANC has a safety factor of 1.5 applied. Neutralising value (NV) of 100% is assumed for liming rate. Based on National acid sulfate soils identification and laboratory methods manual June 2018. The recommendation that the SHCL concentration be multiplied by a factor of 2 to ensure retained acidity is not underestimated, has not been applied in the SHCL results reported.

QUALITY CONTROL: Chromium Suite						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			25/05/2022	[NT]	[NT]	[NT]	[NT]	25/05/2022	[NT]
Date analysed	-			25/05/2022	[NT]	[NT]	[NT]	[NT]	25/05/2022	[NT]
pH $_{kcl}$	pH units		Inorg-068	[NT]	[NT]	[NT]	[NT]	[NT]	97	[NT]
s-TAA pH 6.5	%w/w S	0.01	Inorg-068	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
TAA pH 6.5	moles H^+ /t	5	Inorg-068	<5	[NT]	[NT]	[NT]	[NT]	99	[NT]
Chromium Reducible Sulfur	%w/w	0.005	Inorg-068	<0.005	[NT]	[NT]	[NT]	[NT]	117	[NT]
a-Chromium Reducible Sulfur	moles H^+ /t	3	Inorg-068	<3	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
S_{HCl}	%w/w S	0.005	Inorg-068	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
S_{KCl}	%w/w S	0.005	Inorg-068	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
S_{NAS}	%w/w S	0.005	Inorg-068	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
ANC_{BT}	% $CaCO_3$	0.05	Inorg-068	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
s-ANC_{BT}	%w/w S	0.05	Inorg-068	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
s-Net Acidity	%w/w S	0.005	Inorg-068	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
a-Net Acidity	moles H^+ /t	5	Inorg-068	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Liming rate	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
a-Net Acidity without ANCE	moles H^+ /t	5	Inorg-068	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Liming rate without ANCE	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
s-Net Acidity without ANCE	%w/w S	0.005	Inorg-068	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

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SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Alexis Diodati

Sample Login Details

Your reference	E34871PT, Ramsgate
Envirolab Reference	294586-A
Date Sample Received	03/05/2022
Date Instructions Received	18/05/2022
Date Results Expected to be Reported	25/05/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	additional analysis
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	1
Cooling Method	Ice Pack, ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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ABN 37 112 535 645
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www.envirolab.com.au

Sample ID	Chromium Suite	On Hold
BH1-0.3-0.5	✓	
BH1-1.3-1.5		✓
BH1-1.8-2.0	✓	
BH1-2.9-3.0		✓
BH1-3.9-4.0		✓
BH1-4.9-5.0	✓	
BH1-5.9-6.0		✓
BH1-6.9-7.0		✓
BH5-0.3-0.5		✓
BH5-1.3-1.5	✓	
BH5-1.8-2.0		✓
BH5-2.9-3.0	✓	
BH5-3.9-4.0	✓	
BH5-4.9-5.0		✓
BH5-5.9-6.0		✓
BH5-6.9-7.0	✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Ming To

Subject: FW: Ramsgate Additional Analysis

Ref: 294586-A
TAT: Standard
Due: 25/05/2022
MT.

294586-A

From: Alexis Diodati <ADiodati@jkenvironments.com.au>
Sent: Wednesday, 18 May 2022 3:04 PM
To: Samplereceipt <Samplereceipt@envirolab.com.au>
Cc: Katrina Taylor <KTaylor@jkenvironments.com.au>
Subject: Ramsgate Additional Analysis

Hi team,

Can I please schedule the following samples for further analysis (standard turnaround):

	Sample Number and Depth	Lab Report/Ref	Analysis Required
1.	BH1 (0.3-0.5)	294586	Chromium reducible sulfur (Scr) suite
3.	BH1 (1.8-2.0)	294586	Chromium reducible sulfur (Scr) suite
6.	BH1 (4.9-5.0)	294586	Chromium reducible sulfur (Scr) suite
10	BH5 (1.3-1.5)	294586	Chromium reducible sulfur (Scr) suite
12	BH5 (2.9-3.0)	294586	Chromium reducible sulfur (Scr) suite
13	BH5 (3.9-4.0)	294586	Chromium reducible sulfur (Scr) suite
16.	BH5 (6.9-7.0)	294586	Chromium reducible sulfur (Scr) suite

Thank you!

Regards
Alexis Diodati
Environmental Scientist

T: +612 9888 5000
D: 0424 578 006
E: ADiodati@jkenvironments.com.au
www.jkenvironments.com.au

PO Box 976
NORTH RYDE BC NSW 1670
115 Wicks Road
MACQUARIE PARK NSW 2113

JKEnvironments

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customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 294828

Client Details

Client	JK Environments
Attention	Katrina Taylor
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E34871PT, Ramsgate**
Number of Samples	5 Water
Date samples received	05/05/2022
Date completed instructions received	05/05/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	12/05/2022
Date of Issue	12/05/2022

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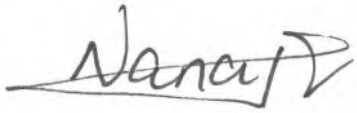
Results Approved By
Diego Bigolin, Inorganics Supervisor
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Josh Williams, Organics and LC Supervisor
Kyle Gavrily, Chemist

Authorised By



Nancy Zhang, Laboratory Manager

VOCs in water			
Our Reference		294828-1	294828-2
Your Reference	UNITS	MW1	MW5
Date Sampled		05/05/2022	05/05/2022
Type of sample		Water	Water
Depth		0.2	0.4
Date extracted	-	06/05/2022	06/05/2022
Date analysed	-	09/05/2022	09/05/2022
Dichlorodifluoromethane	µg/L	<10	<10
Chloromethane	µg/L	<10	<10
Vinyl Chloride	µg/L	<10	<10
Bromomethane	µg/L	<10	<10
Chloroethane	µg/L	<10	<10
Trichlorofluoromethane	µg/L	<10	<10
1,1-Dichloroethene	µg/L	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1
1,1-dichloroethane	µg/L	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1
Bromochloromethane	µg/L	<1	<1
Chloroform	µg/L	<1	<1
2,2-dichloropropane	µg/L	<1	<1
1,2-dichloroethane	µg/L	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1
1,1-dichloropropene	µg/L	<1	<1
Cyclohexane	µg/L	<1	<1
Carbon tetrachloride	µg/L	<1	<1
Benzene	µg/L	<1	<1
Dibromomethane	µg/L	<1	<1
1,2-dichloropropane	µg/L	<1	<1
Trichloroethene	µg/L	<1	<1
Bromodichloromethane	µg/L	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1
Toluene	µg/L	<1	<1
1,3-dichloropropane	µg/L	<1	<1
Dibromochloromethane	µg/L	<1	<1
1,2-dibromoethane	µg/L	<1	<1
Tetrachloroethene	µg/L	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1
Chlorobenzene	µg/L	<1	<1

VOCs in water			
Our Reference		294828-1	294828-2
Your Reference	UNITS	MW1	MW5
Date Sampled		05/05/2022	05/05/2022
Type of sample		Water	Water
Depth		0.2	0.4
Ethylbenzene	µg/L	<1	<1
Bromoform	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
Styrene	µg/L	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1
o-xylene	µg/L	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1
Isopropylbenzene	µg/L	<1	<1
Bromobenzene	µg/L	<1	<1
n-propyl benzene	µg/L	<1	<1
2-chlorotoluene	µg/L	<1	<1
4-chlorotoluene	µg/L	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1
Tert-butyl benzene	µg/L	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1
Sec-butyl benzene	µg/L	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1
4-isopropyl toluene	µg/L	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1
n-butyl benzene	µg/L	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1
Hexachlorobutadiene	µg/L	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	96	96
Surrogate toluene-d8	%	96	97
Surrogate 4-BFB	%	105	101

vTRH(C6-C10)/BTEXN in Water						
Our Reference		294828-1	294828-2	294828-3	294828-4	294828-5
Your Reference	UNITS	MW1	MW5	WDUP1	TS-W1	TB-w1
Date Sampled		05/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Type of sample		Water	Water	Water	Water	Water
Depth		0.2	0.4	NA	NA	NA
Date extracted	-	06/05/2022	06/05/2022	06/05/2022	06/05/2022	06/05/2022
Date analysed	-	09/05/2022	09/05/2022	09/05/2022	09/05/2022	09/05/2022
TRH C_6 - C_9	µg/L	<10	<10	<10	[NA]	[NA]
TRH C_6 - C_{10}	µg/L	<10	<10	<10	[NA]	[NA]
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	<10	[NA]	[NA]
Benzene	µg/L	<1	<1	<1	73%	<1
Toluene	µg/L	<1	<1	<1	80%	<1
Ethylbenzene	µg/L	<1	<1	<1	99%	<1
m+p-xylene	µg/L	<2	<2	<2	95%	<2
o-xylene	µg/L	<1	<1	<1	98%	<1
Naphthalene	µg/L	<1	<1	<1	[NA]	<1
Surrogate Dibromofluoromethane	%	96	96	97	99	96
Surrogate toluene-d8	%	96	97	97	100	96
Surrogate 4-BFB	%	105	101	102	101	102

svTRH (C10-C40) in Water				
Our Reference		294828-1	294828-2	294828-3
Your Reference	UNITS	MW1	MW5	WDUP1
Date Sampled		05/05/2022	05/05/2022	05/05/2022
Type of sample		Water	Water	Water
Depth		0.2	0.4	NA
Date extracted	-	11/05/2022	11/05/2022	11/05/2022
Date analysed	-	12/05/2022	12/05/2022	12/05/2022
TRH C_{10} - C_{14}	µg/L	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	<50	<50
TRH >C_{10} - C_{16}	µg/L	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	<50	<50	<50
Surrogate o-Terphenyl	%	96	95	89

PAHs in Water - Low Level				
Our Reference	UNITS	294828-1	294828-2	294828-3
Your Reference		MW1	MW5	WDUP1
Date Sampled		05/05/2022	05/05/2022	05/05/2022
Type of sample		Water	Water	Water
Depth		0.2	0.4	NA
Date extracted	-	11/05/2022	11/05/2022	11/05/2022
Date analysed	-	11/05/2022	11/05/2022	11/05/2022
Naphthalene	µg/L	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	82	81	78

HM in water - dissolved				
Our Reference		294828-1	294828-2	294828-3
Your Reference	UNITS	MW1	MW5	WDUP1
Date Sampled		05/05/2022	05/05/2022	05/05/2022
Type of sample		Water	Water	Water
Depth		0.2	0.4	NA
Date prepared	-	06/05/2022	06/05/2022	06/05/2022
Date analysed	-	06/05/2022	06/05/2022	06/05/2022
Arsenic-Dissolved	µg/L	6	4	6
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	1	16	1
Copper-Dissolved	µg/L	1	35	2
Lead-Dissolved	µg/L	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	<1	<1	<1
Zinc-Dissolved	µg/L	6	26	7

Miscellaneous Inorganics			
Our Reference		294828-1	294828-2
Your Reference	UNITS	MW1	MW5
Date Sampled		05/05/2022	05/05/2022
Type of sample		Water	Water
Depth		0.2	0.4
Date prepared	-	05/05/2022	05/05/2022
Date analysed	-	05/05/2022	05/05/2022
pH	pH Units	7.6	7.4
Electrical Conductivity	µS/cm	380	500

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			06/05/2022	1	06/05/2022	09/05/2022		06/05/2022	[NT]
Date analysed	-			09/05/2022	1	09/05/2022	10/05/2022		09/05/2022	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	102	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	1	<1	<1	0	104	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	106	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	103	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	82	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	100	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	87	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	106	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	98	1	96	98	2	102	[NT]
Surrogate toluene-d8	%		Org-023	98	1	96	98	2	100	[NT]
Surrogate 4-BFB	%		Org-023	103	1	105	102	3	101	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			06/05/2022	1	06/05/2022	09/05/2022		06/05/2022	[NT]
Date analysed	-			09/05/2022	1	09/05/2022	10/05/2022		09/05/2022	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	1	<10	<10	0	111	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	1	<10	<10	0	111	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	105	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	106	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	114	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	115	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	111	[NT]
Naphthalene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	98	1	96	98	2	102	[NT]
Surrogate toluene-d8	%		Org-023	98	1	96	98	2	100	[NT]
Surrogate 4-BFB	%		Org-023	103	1	105	102	3	101	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	294828-1
Date extracted	-			11/05/2022	[NT]	[NT]	[NT]	[NT]	11/05/2022	11/05/2022
Date analysed	-			12/05/2022	[NT]	[NT]	[NT]	[NT]	12/05/2022	12/05/2022
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	95	106
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	89	98
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	109	107
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	95	106
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	89	98
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	109	107
Surrogate o-Terphenyl	%		Org-020	92	[NT]	[NT]	[NT]	[NT]	95	95

QUALITY CONTROL: PAHs in Water - Low Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			11/05/2022	[NT]	[NT]	[NT]	[NT]	11/05/2022	[NT]
Date analysed	-			11/05/2022	[NT]	[NT]	[NT]	[NT]	11/05/2022	[NT]
Naphthalene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	82	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	79	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	74	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	86	[NT]	[NT]	[NT]	[NT]	84	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			06/05/2022	[NT]	[NT]	[NT]	[NT]	06/05/2022	[NT]
Date analysed	-			06/05/2022	[NT]	[NT]	[NT]	[NT]	06/05/2022	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	108	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			05/05/2022	[NT]	[NT]	[NT]	[NT]	05/05/2022	[NT]
Date analysed	-			05/05/2022	[NT]	[NT]	[NT]	[NT]	05/05/2022	[NT]
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Katrina Taylor

Sample Login Details

Your reference	E34871PT, Ramsgate
Envirolab Reference	294828
Date Sample Received	05/05/2022
Date Instructions Received	05/05/2022
Date Results Expected to be Reported	12/05/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	5 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	12
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	VOCs in water	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water - Low Level	HM in water - dissolved	pH	Electrical Conductivity
MW1-0.2	✓	✓	✓	✓	✓	✓	✓
MW5-0.4	✓	✓	✓	✓	✓	✓	✓
WDUP1-NA		✓	✓	✓	✓		
TS-W1-NA		✓					
TB-w1-NA		✓					

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E34871PT Date Results Required: STANDARD Page: 1 OF 1	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: K. TAYLOR

Location:	RAMSGATE	Sample Preserved in Esky on Ice
Sampler:	HW	Tests Required

Date Sampled	Lab Ref:	Sample Number	Sample Containers	PID	Sample Description	Combo 3L	VOCs	pH / EC	BTEX								
5/05/2022	1	MW1	G1, V, H, PVC	0.2	Water	X	X	X									
5/05/2022	2	MW5	G1, V, H, PVC	0.4	Water	X	X	X		/							
5/05/2022	3	WDUP1	G1, V, H, PVC	NA	Water	X											
5/05/2022	4	TS-W1	V	NA	Water				X								
5/05/2022	5	TB-W1	V	NA	Water				X								

ENVIROLAB

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 294828
Date Received: 5/5/22
Time Received: 14:50
Received by: KW
Temp: Cool/Ambient 12°C
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):	Sample Containers:
All analysis PQLs to ANZECC (2000) Detection Limits Please	G1 - ~~500~~ 250mL Amber Glass Bottle ~~G2 - 1L Amber Glass Bottle~~ V - BTEX Vial H - HNO3 Wash PVC PVC - HDPE Plastic Bottles

Relinquished By:	Date:	Time:	Received By:	Date:
HW	5/5/22	11:52am	KW	5/5/22 1450

Appendix F: Report Explanatory Notes

QA/QC Definitions

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)[21] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)[22]. The NEPM (2013) is consistent with these documents.

A. Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection Limit for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations: *"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit*" (Keith, 1991).

B. Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD).

C. Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes. Accuracy is typically reported as percent recovery.

D. Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

E. Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;
- All blank data reported;

[21] US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)

[22] Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide*

- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

F. Comparability

Comparability is the evaluation of the similarity of conditions (e.g. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

G. Blanks

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling, transport and analysis.

H. Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{\text{(Spike Sample Result – Sample Result) x 100}}{\text{Concentration of Spike Added}}$$

I. Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

J. Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$

Appendix G: Data (QA/QC) Evaluation

Data (QA/QC) Evaluation

A. INTRODUCTION

This Data (QA/QC) Evaluation forms part of the validation process for the DQOs documented in Section 6.1 of this report. Checks were made to assess the data in terms of precision, accuracy, representativeness, comparability and completeness. These 'PARCC' parameters are referred to collectively as DQIs and are defined in the Report Explanatory Notes attached in the report appendices.

1. Field and Laboratory Considerations

The quality of the analytical data produced for this project has been considered in relation to the following:

- Sample collection, storage, transport and analysis;
- Laboratory PQLs;
- Field QA/QC results; and
- Laboratory QA/QC results.

2. Field QA/QC Samples and Analysis

A summary of the field QA/QC samples collected and analysed for this investigation is provided in the following table:

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	SDUP1 (primary sample BH1 0.15-0.25m)	Approximately 11% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs and PCBs
Intra-laboratory duplicate (water)	WDUP1 (primary sample MW1)	Approximately 50% of primary samples	Heavy metals, TRH/BTEX, and PAHs
Trip spike (soil)	TS (2 May 2022)	One for the investigation to demonstrate adequacy of preservation, storage and transport methods	BTEX
Trip blank (soil)	TB (2 May 2022)	One for the investigation to demonstrate adequacy of storage and transport methods	Heavy metals, TRH/BTEX and PAHs
Rinsate (soil SPT)	FR1 (2 May 2022)	One for the investigation to demonstrate adequacy of decontamination methods	Heavy metals, TRH/BTEX and PAHs
Trip spike (water)	TS1 (5 May 2022)	One for the investigation to demonstrate adequacy of preservation, storage and transport methods	BTEX
Trip blank (water)	TB1 (5 May 2022)	One for the investigation to demonstrate adequacy of storage and transport methods	BTEX

The results for the field QA/QC samples are detailed in the laboratory summary tables (Table Q1 and Table Q2 inclusive) attached to the investigation report and are discussed in the subsequent sections of this Data (QA/QC) Evaluation report.

3. Data Assessment Criteria

JKE adopted the following criteria for assessing the field and laboratory QA/QC analytical results:

Field Duplicates

Acceptable targets for precision of field duplicates in this report will be 30% or less, consistent with NEPM (2013). RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the concentrations used to calculate the RPD (i.e. RPD exceedance where concentrations are close to the PQL are typically not as significant as those where concentrations are reported at least five or 10 times the PQL), sample type, collection methods and the specific analyte where the RPD exceedance was reported.

Field/Trip Blanks and Rinsates

Acceptable targets for field blank and rinsate samples in this report will be less than the PQL for organic analytes. Metals will be considered on a case-by-case basis with regards to typical background concentrations in soils and published drinking water guidelines for waters.

Trip Spikes

Acceptable targets for trip spike samples in this report will be 70% to 130%.

Laboratory QA/QC

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the laboratory reports. These criteria were developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the acceptable limits adopted by the primary laboratory (Envirolab) is provided below:

RPDs

- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics;
- 60-140% recovery acceptable for organics; and
- 10-140% recovery acceptable for VOCs.

Surrogate Spikes

- 60-140% recovery acceptable for general organics; and
- 10-140% recovery acceptable for VOCs.

Method Blanks

- All results less than PQL.

B. DATA EVALUATION

1. Sample Collection, Storage, Transport and Analysis

Samples were collected by trained field staff in accordance. Field sampling procedures were designed to be consistent with relevant guidelines, including NEPM (2013) and other guidelines made under the CLM Act 1997.

Appropriate sample preservation, handling and storage procedures were adopted. Laboratory analysis was undertaken within specified holding times generally in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies. Envirolab noted that the asbestos results were reported to be consistent with the recommendations in NEPM (2013), however this level of reporting is outside the scope of their NATA accreditation. In the absence of other available analytical methods for asbestos, this was found to be acceptable for the purpose of this investigation.

Review of the project data also indicated that:

- COC documentation was adequately maintained;
- Sample receipt advice documentation was provided for all sample batches;
- All analytical results were reported; and
- Consistent units were used to report the analysis results.

2. Laboratory PQLs

Appropriate PQLs were adopted for the analysis and all PQLs were below the SAC, with the exception of the groundwater anthracene PQL which was 10 times greater than the ecological SAC and the vinyl chloride PQL which was 3.3 times greater than the adopted recreational SAC and 33.3 times greater than the health-based SAC. In light of the PAH and VOC concentrations reported for soil and groundwater, JKE is of the opinion that this is not significant, and it does not affect the quality of the dataset as a whole or the outcome of the investigation.

3. Field QA/QC Sample Results

Field Duplicates

The results indicated that field precision was acceptable. RPD non-conformances were reported for some analytes as discussed below:

- Elevated RPDs were reported for several PAH compounds in SDUP1/BH1 (0.15-0.25m); and
- An elevated RPD was reported for copper in WDUP1/MW1.

Values outside the acceptable limits have been attributed to sample heterogeneity and the difficulties associated with obtaining homogenous duplicate samples of heterogeneous matrices. As both the primary and duplicate sample results were less than the SAC, the exceedances are not considered to have had an adverse impact on the data set as a whole.

Trip Blanks

During the investigation, one soil trip blank and one water trip blank was placed in the esky during sampling and transported back to the laboratory.

The soil trip blank analysis results were all less than the PQLs with the exception of chromium, lead and zinc, with reported concentrations of between 2mg/kg and 3mg/kg. Low level metals concentrations are typical in washed sand which is utilised as blank material. In JKE's experience, the concentrations reported were consistent with background concentrations in a sand matrix and were not indicative of cross-contamination. On this basis, cross contamination between samples that may have significance for data validity did not occur.

The water field blank results were all less than the PQLs, therefore cross contamination between samples that may have significance for data validity did not occur.

Rinsates

Trace concentrations of TRHs and copper were detected in the rinsate sample. The detectable concentration of light fraction TRH is most likely attributed to trihalomthanes. These compounds are breakdown products from the chlorination process and are common in potable water at the concentration reported (the Australian drinking water guideline for total trihalomethanes is 250µg/L). Similarly low level metals concentrations (namely copper) are also typical in potable water which is utilised in the rinsing process.

Trip Spikes

The soil trip spike results ranged from 103% to 104% and indicated that field preservation methods were appropriate.

The water trip spike results ranged from 73% to 99% and indicated that field preservation methods were appropriate.

4. Laboratory QA/QC

The analytical methods implemented by the laboratory were performed in accordance with their NATA accreditation and were consistent with Schedule B(3) of NEPM (2013). The frequency of data reported for the laboratory QA/QC (i.e. duplicates, spikes, blanks, LCS) was considered to be acceptable for the purpose of this investigation. A review of the laboratory QA/QC data identified the following minor non-conformances:

Envirolab report 294592

- The laboratory RPD acceptance criteria were exceeded for 294592-1 for copper and lead. Therefore, a triplicate result was issued as laboratory sample number 294592-30; and
- The laboratory RPD acceptance criteria was exceeded for 294592-23 for lead. Therefore, a triplicate result was issued as laboratory sample number 294592-31.

Envirolab report 294592-A

The laboratory notes indicated *Samples received in good order: Holding time exceedance*. No specific details relating to which samples/analysis were out of holding time and therefore this/these non-conformances are not considered to have adversely impacted the report findings.

C. DATA QUALITY SUMMARY

JKE is of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

Non-conformances were reported for some field QA/QC samples and laboratory QA/QC analysis. These non-conformances were considered to be sporadic and minor, and were not considered to be indicative of systematic sampling or analytical errors. On this basis, these non-conformances are not considered to materially impact the report findings.

There was only one groundwater monitoring event undertaken for the investigation. On this basis there is some uncertainty around the representativeness of the groundwater data, particularly during different climatic conditions and after wet/dry periods. However, given the low contaminant concentrations reported, the site history and the surrounding land uses, this is not considered to alter the conclusions of the investigation. It is noted that a DSI has been recommended and this is to include further characterisation of the groundwater.

Appendix H: Field Work Documents

JKEnvironments

Client:	Good Time Holdings NSW	**Job No.:**	E34871PT
Project:	Proposed Mixed Use Development	**Well No.:**	MW1
Location:	Coles Ramsgate, 277 Grand Parade, RAMSGATE, NSW	**Depth (m):**	6.0

WELL FINISH

✓	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Low flow Peristaltic pump	**SWL – Before:**	1.72
Date:	5/5/22	**Time – Before:**	7:55am
Undertaken By:	HW	**Total Vol Removed:**	~3.1L
Pump Program No:	–	**PID (ppm):**	0.2

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
4	1.72	0.5	clear	21.8	2.6	277.1	7.29	172.4
8	1.72	0.8	"	21.7	1.2	268.7	7.38	135.9
12	1.72	1.0	"	21.6	1.0	268.7	7.35	131.5
16	1.72	1.3	"	21.6	0.9	265.9	7.33	127.0
20	1.72	1.5	"	21.6	0.8	263.6	7.32	122.4
24	1.72	1.8	"	21.6	0.7	261.5	7.30	116.1
30	1.72	2.1	"	21.6	0.7	261.0	7.29	115.2
34	1.72	2.5	"	21.6	0.7	260.7	7.29	113.9
38	1.72	2.8	"	21.7	0.6	259.5	7.30	110.6
42	1.72	3.1		21.7	1.0	258.5	7.30	108.8
			Start sampling					

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved ((YES) / NO)

NO LNAPL observed in bailer. Fast-moderate well recharge.

Sampling Containers Used: 4 x glass amber, 8 x BTEX vials, 2 x HNO3 plastic, – x H2SO4 plastic, / x unpreserved plastic

YSI used: 4 Field QA: WDUP1

Tested By: ~~Katrina Taylor~~ HW	**Remarks:**
Date Tested: 5/5/22	- Steady state conditions
Checked By: KR	- difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown
Date: 5.5.22	

JKEnvironments

Client:	Good Time Holdings NSW	Job No.:	E34871PT
Project:	Proposed Mixed Use Development	Well No.:	MW5
Location:	Coles Ramsgate, 277 Grand Parade, RAMSGATE, NSW	Depth (m):	6.0

WELL FINISH

✓	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	low flow Peristaltic pump	SWL – Before:	1.93
Date:	5/5/22	Time – Before:	9:21am
Undertaken By:	HW	Total Vol Removed:	~3.1L
Pump Program No:	–	PID (ppm):	0.4

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
5	1.93	0.5	clear	21.4	2.7	389.0	7.38	114.3
9	1.93	0.7	"	21.3	2.2	391.4	7.39	109.0
13	1.93	1.0	"	21.3	1.8	395.7	7.37	104.3
17	1.93	1.3	"	21.3	1.0	398.0	7.34	101.7
21	1.93	1.5	"	21.4	0.7	399.8	7.31	97.6
25	1.93	1.8	"	21.4	0.5	400.6	7.29	94.8
29	1.93	2.1	"	21.5	0.5	401.0	7.28	93.8
33	1.93	2.5	"	21.6	0.5	403.2	7.27	92.5
37	1.93	2.8	"	21.8	0.4	405.9	7.27	91.0
41	1.93	3.1	"	22.0	0.4	407.8	7.26	89.5
			start sampling					

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved ((YES) / NO)

No LNAPL observed in bailer. moderate to high recharge during sampling.

Sampling Containers Used: 2x glass amber, 4x BTEX vials, 1x HNO3 plastic, –x H2SO4 plastic, 1x unpreserved plastic

YSI used: 4

Tested By: ~~Katrina Taylor~~ HW	**Remarks:**
Date Tested: 5/5/22	- Steady state conditions
Checked By: KLS	- difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown
Date: 5.5.22	

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Client:	Good Time Holdings NSW	Job No.:	E34871PT
Project:	Proposed Mixed Use Development	Well No.:	MW1
Location:	Coles Ramsgate, 277 Grand Parade, RAMSGATE, NSW	Depth (m):	6.0

WELL FINISH DETAILS

	Gatic Cover ☑	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Development pump	SWL – Before (m):	1.72
Date:	2/5/22	Time – Before:	3:20pm
Undertaken By:	HW	SWL – After (m):	1.73
Total Vol. Removed:	~60L	Time – After:	3:47pm
PID Reading (ppm):	0.5		

Comments:

1.93

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
2	23.0	5.5	372.6	6.70	49.9
4	23.1	3.5	366.0	6.71	48.1
6	23.1	1.9	344.7	6.72	45.2
8	23.1	0.7	319.5	6.75	41.6
10	23.1	0.4	301.8	6.76	38.9
12	23.1	0.3	291.6	6.78	36.5
14	23.1	0.3	285.8	6.78	35.5
16	23.1	0.2	281.2	6.80	33.2
18	23.1	3.5	272.9	6.69	35.9
20	23.1	1.6	272.0	6.71	32.7
22	23.1	0.7	270.2	6.73	30.2
24	23.1	0.4	268.1	6.74	29.2
26	23.1	0.3	266.2	6.74	27.7
28	23.1	0.3	264.7	6.74	26.9
30	23.1	0.3	263.8	6.75	24.6
32	23.1	0.3	261.4	6.77	21.1
34	23.1	3.0	263.4	6.70	21.8
36	23.1	2.3	265.1	6.71	20.8
38	23.1	1.5	265.3	6.72	19.5
40	23.1	1.1	265.2	6.72	18.3
42	23.1	0.7	265.1	6.74	17.5
50	23.1	0.3	263.7	6.75	15.5
60	23.1	0.2	262.7	6.75	12.9

Comments:Odours (YES / NO) NAPL/PSH (YES / NO) Sheen (YES / NO) Steady State Achieved (YES / NO)

YSI Used: 5

Tested By:	HW	**Remarks:**
Date Tested:	2/5/22	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Checked By:	KLK	
Date:	5.5.22	

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Client:	Good Time Holdings NSW	Job No.:	E34871PT
Project:	Proposed Mixed Use Development	Well No.:	MW5
Location:	Coles Ramsgate, 277 Grand Parade, RAMSGATE, NSW	Depth (m):	6.0

WELL FINISH DETAILS

	Gatic Cover ☑	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Peristaltic pump	SWL – Before (m):	1.93
Date:	2/5/22	Time – Before:	4:00pm
Undertaken By:	HW	SWL – After (m):	1.93
Total Vol. Removed:	~60L	Time – After:	4:24pm
PID Reading (ppm):	0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
2	21.5	9.6	409.9	6.45	13.1
4	21.5	1.3	410.8	6.51	7.5
6	21.6	0.5	405.8	6.53	3.3
8	21.6	0.4	403.5	6.54	-0.1
10	21.6	0.3	402.7	6.55	-4.1
12	21.6	0.3	402.2	6.56	-6.1
14	21.6	0.3	401.5	6.56	-8.1
16	21.6	0.3	401.6	6.57	-9.9
18	21.6	0.3	401.3	6.57	-12.0
20	21.6	1.5	400.6	6.57	-10.1
22	21.6	0.5	401.1	6.57	-10.6
25	21.6	0.3	401.6	6.57	-12.0
28	21.6	0.3	402.7	6.57	-13.9
30	21.6	0.2	402.4	6.57	-15.4
34	21.6	0.2	401.8	6.57	-16.8
40	21.6	0.2	401.9	6.57	-17.7
43	21.6	0.5	399.4	6.56	-18.8
46	21.6	0.2	400.2	6.56	-20.0
50	21.6	0.2	401.1	6.56	-21.7
55	21.6	0.2	400.8	6.55	-22.5
60	21.6	0.2	400.3	6.55	-22.8

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / NO)

YSI Used: 5

Tested By:	HW
Date Tested:	2/5/22
Checked By:	KH
Date:	5-5-22

Remarks:

- Steady state conditions
- Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown
- Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry

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WATER QUALITY METER CALIBRATION FORM

Client:	Good Time Holdings NSW		
Project:	Proposed Mixed Use Development		
Location:	Coles Ramsgate, 277 Grand Parade, RAMSGATE, NSW		
Job Number:	E34871PT		
DISSOLVED OXYGEN			
Make: YSI	Model: Professional plus		
Date of calibration: 2/5/22	Name of Calibrator: HW		
Span value: 70% to 130%			
Measured value: 104%			
Measured reading Acceptable (Yes/No):			
pH			
Make: YSI	Model: Professional plus		
Date of calibration: 2/5/22	Name of Calibrator: HW		
Buffer 1: Theoretical pH = 7.01± 0.01	Expiry date: 11/22	Lot No: 373135	
Buffer 2: Theoretical pH = 4.01± 0.01	Expiry date: 04/23	Lot No: 380832	
Measured reading of Buffer 1: 6.00			
Measured reading of Buffer 2: 6.66			
Slope: —	Measured reading Acceptable (Yes/No):		
EC			
Make: YSI	Model: Professional plus		
Date: 2/5/22	Name of Calibrator: HW	Temperature: 20.7 °C	
Calibration solution: Conductivity Standard	Expiry date: 11/22	Lot No: 373623	
Theoretical conductivity at temperature (see solution container): 1305 µS/cm			
Measured conductivity: 1292 µS/cm	Measured reading Acceptable (Yes/No):		
REDOX			
Make: YSI	Model: Professional plus		
Date of calibration: 2/5/22	Name of Calibrator: HW		
Calibration solution: ORP Test solution	Expiry date: 11/26	Lot No: 7221	
Theoretical redox value: 240mV			
Measured redox reading: 239.8 mV	Measured reading Acceptable (Yes/No):		

191.0

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WATER QUALITY METER CALIBRATION FORM

Client:	Good Time Holdings NSW		
Project:	Proposed Mixed Use Development		
Location:	Coles Ramsgate, 277 Grand Parade, RAMSGATE, NSW		
Job Number:	E34871PT		
DISSOLVED OXYGEN			
Make: YSI	Model: Professional plus		
Date of calibration: 5/5/22	Name of Calibrator: HW		
Span value: 70% to 130%			
Measured value: 96%			
Measured reading Acceptable (Yes/No):			
pH			
Make: YSI	Model: Professional plus		
Date of calibration: 5/5/22	Name of Calibrator: HW		
Buffer 1: Theoretical pH = 7.01± 0.01	Expiry date: 11/22	Lot No: 373135	
Buffer 2: Theoretical pH = 4.01± 0.01	Expiry date: 04/23	Lot No: 380832	
Measured reading of Buffer 1: 7.96			
Measured reading of Buffer 2: 5.15			
Slope: —	Measured reading Acceptable (Yes/No):		
EC			
Make: YSI	Model: Professional plus		
Date: 5/5/22	Name of Calibrator: HW	Temperature: 17.8 °C	
Calibration solution: Conductivity standard	Expiry date: 11/22	Lot No: 375623	
Theoretical conductivity at temperature (see solution container): 1305 µS/cm			
Measured conductivity: 1292 µS/cm	Measured reading Acceptable (Yes/No):		
REDOX			
Make: YSI	Model: Professional plus		
Date of calibration: 5/5/22	Name of Calibrator: HW		
Calibration solution: ORP Test Solution	Expiry date: 11/26	Lot No: 7221	
Theoretical redox value: 240mV			
Measured redox reading: 191.0 mV	Measured reading Acceptable (Yes/No):		

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PID FIELD CALIBRATION FORM

Client:	Good Time Holdings NSW
Project:	Proposed Mixed Use Development
Location:	Coles Ramsgate, 277 Grand Parade, RAMSGATE, NSW
Job Number:	E34871PT

PID

Make: HoneyWell	Model: mini RAE	Unit: Green	Date of last factory calibration:
Date of calibration: 29/5/22		Name of Calibrator: HW	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: 100.2 ppm		Error in measured reading: ± 0.2 ppm	
Measured reading Acceptable (Yes/No): Yes (circled)			

PID

Make: HoneyWell	Model: mini RAE	Unit: Green	Date of last factory calibration:
Date of calibration: 9/5/22		Name of Calibrator: HW	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: 100.3 ppm		Error in measured reading: ± 0.3 ppm	
Measured reading Acceptable (Yes/No): Yes (circled)			

PID

Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

PID

Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

PID

Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

Appendix I: Guidelines and Reference Documents

Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). Acid Sulfate Soils Manual

Australian and New Zealand Environment Conservation Council (ANZECC), (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality

Canadian Council of Ministers of the Environment, (1999). Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)

CRC Care, (2011). Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document

Contaminated Land Management Act 1997 (NSW)

Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map Series

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

National Health and Medical Research Council (NHMRC), (2021). National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011

NSW Department of Environment and Conservation, (2007). Guidelines for the Assessment and Management of Groundwater Contamination

NSW EPA, (1995). Contaminated Sites Sampling Design Guidelines

NSW EPA, (2014). Waste Classification Guidelines - Part 1: Classifying Waste

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

NSW EPA, (2020). Consultants Reporting on Contaminated Land, Contaminated Land Guidelines

National Environment Protection Council (NEPC), (2013). National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)

Olszowy, H., Torr, P., and Imray, P., (1995). Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

Protection of the Environment Operations Act 1997 (NSW)

State Environmental Planning Policy (Resilience and Hazards) 2021 (NSW)

World Health Organisation (WHO), (2008). Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality

Western Australia Department of Health, (2021). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia