CEC Geotechnical

PRELIMINARY ACID SULPHATE SOIL (ASS) INVESTIGATION REPORT

Client – Jonathan Odisho
Project Title – 1 & 3 Careel Head Road, Avalon Beach
Project Type – Mixed-Use Development
Project No. – ER24020A
Date Issued – 10/07/2024
Description of Services – Preliminary Acid Sulphate Soil (ASS) Investigation Report

Document Control

Report Title: Acid Sulphate Soil (ASS) Investigation Report

Report No: ER24020A

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Revision	Details	Date	Amended By
	Original	10.07.2024	

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1. Introduction

1.1 Background

CEC (Geotechnical) has undertaken an Acid Sulphate Soils Assessment and Management Plan for the proposed mixed-use development, including a 1-level basement to be constructed at 1 & 3 Careel Head Road, AVALON BEACH. Acid Sulphate Soil (ASS) investigation is required where soil types contain iron sulphides and/or their oxidation by-product (Sulphuric acid). Acid Sulphate waters can corrode engineering works and infrastructure such as culverts, bridges and weirs, which are in contact with these waters/soil. The precipitation of iron hydroxide/oxide flocs from acidic, iron-rich waters can cause the blocking of drains, and wells and the reduction of aquifer recharge.

1.2 Proposed Development

Information provided by the client indicates the proposed development comprises the construction of a mixed-use development, including 1-level basement and childcare centre.

As there was no information provided in the architectural drawings related to the type of foundation. And for this type of development, screw pile is commonly practised, which disturbs very less soil.

1.3 Scope of Works

The geotechnical site investigation for Acid Sulphate Soils (ASS) was carried out on 19/06/2024 and included the drilling of four boreholes and Soil sampling in accordance with Australian Standards AS 1289, 'Methods of Testing Soil for Engineering Purposes'. The soil encountered during drilling was classified according to Australian Standards AS 1726-2017. The soil sampling was carried out as per the Acid Sulphate Soil Manual, August 1998, NSW.

- A site walk-over inspection by a Geotechnical Engineer in order to determine the overall surface conditions and to identify relevant site features.
- A review of DBYD plans and service locations carried out on the site using a specialised subcontractor to ensure that the investigation area is free from underground services.
- Machine Drilling of four boreholes BH1-BH4 to a maximum depth of 4.0m below the ground.
- Soil samples collected from the boreholes were tested by Eurofins, a NATA-accredited laboratory for Acid Sulphate Tests.

This report is based only on the information provided prior to the preparation of this report and may not be valid if the site conditions change and/or after earthworks are undertaken.

2. Desktop Assessment

This spatial dataset identifies areas of land showing the extent of acid sulphate soils. Acid Sulphate soils have been classified into five classes based on the likelihood of the acid sulphate soils being present in particular areas and at specific depths.

- Class 1: Acid Sulphate soils in a class 1 area are likely to be found on and below the natural ground surface.
- Class 2: Acid Sulphate soils in a class 2 area are likely to be found below the natural ground surface.
- Class 3: Acid Sulphate soils in a class 3 area are likely to be found beyond 1 metre below the natural ground surface.
- Class 4: Acid Sulphate soils in a class 4 area are likely to be found beyond 2 metres below the natural ground surface.
- Class 5: Acid Sulphate soils are not typically found in Class 5 areas. Areas classified as Class 5 are located within 500 metres on adjacent Class 1, 2, 3, or 4 land.

Reference made to the NSW Planning Portal indicates the site is situated within an area of general ASS occurrences, identified as a Class 2 and 5 region, as shown in **Figure 1 in Appendix A**.

It is noted that the NSW Planning Portal classifies ASS into five (5) different classes based on the likelihood of the ASS being present in particular areas and at specific depths. Where ASS is not typically found in Class 5 regions and is likely to be found 1-3m below the natural ground surface in Class 5 regions.

The pointed location in **Figure 2 in Appendix A** shows the construction location is likely to be found below the natural soil, and the western end of the site is located within X2 (Disturbed terrain, elevation 2-4 m AHD).

ASSMAC recommends the following geomorphic or site criteria be used to determine if acid Sulphate soils (ASS) are likely to be present:

a) Sediments of recent geological age (Holocene).
b) Soil horizons less than 5m AHD.
c) Marine or estuarine sediments and tidal lakes.
d) In coastal wetlands or back swamp areas; waterlogged or scalded areas; interdunal swales or coastal sand dunes (if deep excavation or drainage is proposed).
e) In areas where the dominant vegetation is mangroves, reeds, rushes and other swamp-tolerant or marine vegetation.
f) In areas identified in geological descriptions or in maps as bearing acid sulphide minerals, coal deposits or former marine shales/sediments.
g) Deep older estuarine sediments >10 metres below the ground surface, Holocene, or Pleistocene age (only an issue if deep drainage is proposed).

As mentioned above, the Acid Sulphate soil map included in the Site Contamination Assessment indicates that the development area is within Class 2 and 5 Land, **Figure 1 in Appendix A**. Therefore, it is considered that there is a likely risk of ASS being present within the proposed development area.

3. Investigation of Acid Sulphate Soils

3.1 Assessment Criteria for Acid Sulphate Soil

The assessment criteria normally applied to assist in the preliminary identification of Actual Acid Sulphate Soils (AASS) and Potential Acid Sulphate Soils (PASS), in accordance with Acid Sulphate Soils Planning Guidelines (AASMAC), are as follows:

- pHF < 4 shows the occurrence of oxidation in the past and that AASS is likely to be present.
- pHFOX <3, plus a pHFOX reading at least one pH unit below the corresponding pHF, plus a strong reaction with peroxide, strongly indicates the presence of PASS.

3.2 Methodology and Preliminary Laboratory Analyses

A preliminary soil sampling programme was undertaken following the Acid Sulphate Soil Guidelines. Four (4) boreholes (BH1, BH2, BH3 and BH4) were drilled utilising a truck mount solid flight auger drill rig in the area of the proposed development (**Figure 3, Appendix A** – for the borehole locations).

The samples were submitted to the laboratory (Eurofins Laboratories) for the recommended preliminary testing. The detailed laboratory analysis results are presented in **Appendix C** – Laboratory Reports. The Table below summarises laboratory testing results to determine the pH for the tests mentioned above as carried out by NATA accredited laboratory on the recovered samples from boreholes (BH1, BH2, BH3 and BH4) inclusive, with laboratory testing results certificates presented in **Appendix C**.

3.3 Results

3.3.1 Preliminary Laboratory Results

The field pHF and pHFOX results obtained from Eurofins Environment Testing (1110580-S) are summarised in **Table 1**. Following ASSMAC (1998), the results indicate that Field pH (pH-F) readings are greater than 4, therefore actual ASS is not present. Furthermore, only one condition after monitoring the Field pH peroxide test (pH-FOX) is verified (lowering of the soil pH by at least one unit). The reaction rate generally indicates the level of RIS present but also depends on the texture and other soil constituents. From **Table 1**, sample BH4-0.3 was the only one with pHFOX <3 and pH drop of 3.2. However, the reaction rate was observed as moderate. Therefore, soil testing indicated the potential presence of acid sulphate soil (PASS) for the sample BH4-0.3. For verification, 4 samples (BH1-0.5m BH2-1.0, BH2-2.0 and BH1-3.0) were selected and tested for detailed laboratory analyses. The results are pending and once the laboratory results are completed, detailed laboratory results will be discussed. Conclusion and Acid Sulfate Management Plan (if required) will be provided.

Table 1: Summary of Preliminary Laboratory Results

Location	Field Test				
	Field pH (pHf)	Actual ASS	pH FOX	pH Drop	Reaction Rate
BH1-0.5	In Progress				
BH1-3.0	6.3	No	5.1	1.2	1 (Slight reaction)
BH-2-1.0	In Progress				
BH2-2.0	6.5	No	4.5	2	4 (Extreme reaction)
BH2-3.0	6.3	No	4	2.3	1 (Slight reaction)
BH3-0.4	6.4	No	3.2	3.2	2 (Moderate reaction)
BH3-4.0	6.1	No	3.9	2.2	1 (Slight reaction)
BH4-0.3	6.1	No	2.9	3.2	2 (Moderate reaction)
BH4-1.5	6.2	No	3	3.2	1 (Slight reaction)

4. Preliminary Conclusion

The above discussion provides a preliminary of the potential for ASS across the site area and addresses the Department of Planning, Industry and Environment requirements. Soil samples tested did not indicate the presence of ASS to a maximum depth of 4.0m. However, potential acid sulphate soils (PASS) were identified for BH4-0.3. Upon completion of our onsite investigation and laboratory analysis, the following conclusions/discussions are made:

- For verification, 4 samples (BH1-0.5m BH2-1.0, BH2-2.0 and BH1-3.0) were selected and tested for detailed laboratory analyses. The results are pending and once the laboratory results are completed, detailed laboratory results will be discussed.
- Conclusion and Acid Sulfate Management Plan (if required) will be provided after the detailed analysis is completed. Should a positive confirmation of the presence of ASS from the detailed investigation, an ASS management plan is required in accordance with the ASSMAC guidelines (1998).

5. Limitations

This report and its associated recommendations have been prepared exclusively for our client, who is named on the front page of this report and is the only intended entity to benefit from this report. CEC Geotechnical notes that any reliance on the information provided in this report by any third party will be at their own risk. It should be noted that the analysis and conclusions made in this report are based on documents and investigations prepared by other consultants and entities, and hence, should these documents and investigations be incorrect, CEC Geotechnical must be made aware, and the results of this report may be void.

For and on behalf of CEC Geotechnical Pty Ltd.

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B.E (Chemical), M.E. (Environmental)

Zuhaib Siddiqui

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References

- AS 1726-2017 Geotechnical Site Investigation. Standards Australia.
- NSW Department of Mineral Resources (1983) Sydney 1:100,000 Geological Series Sheet 9130 (Edition 1)
- Geological Survey of New South Wales. Department of Mineral Resources.
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- Acid Sulphate Soils Assessment Guidelines - Acid Sulphate Soils Management Advisory Committee (ASSMAC) (1998).
- National Acid Sulphate Soils Guidance – National Acid Sulphate Soils Sampling and Identification
  Methods Manual. Department of Agriculture and Water Resources (2018).
- NSW Planning Portal.
- https://www.planningportal.nsw.gov.au/spatialviewer
- Geocortex Viewer for HTML5 (nsw.gov.au), https://geo.seed.nsw.gov.au
  Methods Manual. Department of Agriculture and Water Resources (2018).
- NSW Planning Portal.
- https://www.planningportal.nsw.gov.au/spatialviewer
- Geocortex Viewer for HTML5 (nsw.gov.au), https://geo.seed.nsw.gov.au

APPENDIX A – Figures

Figure 1: NSW Planning portal, Site is subject to ASS Class 2 and 5

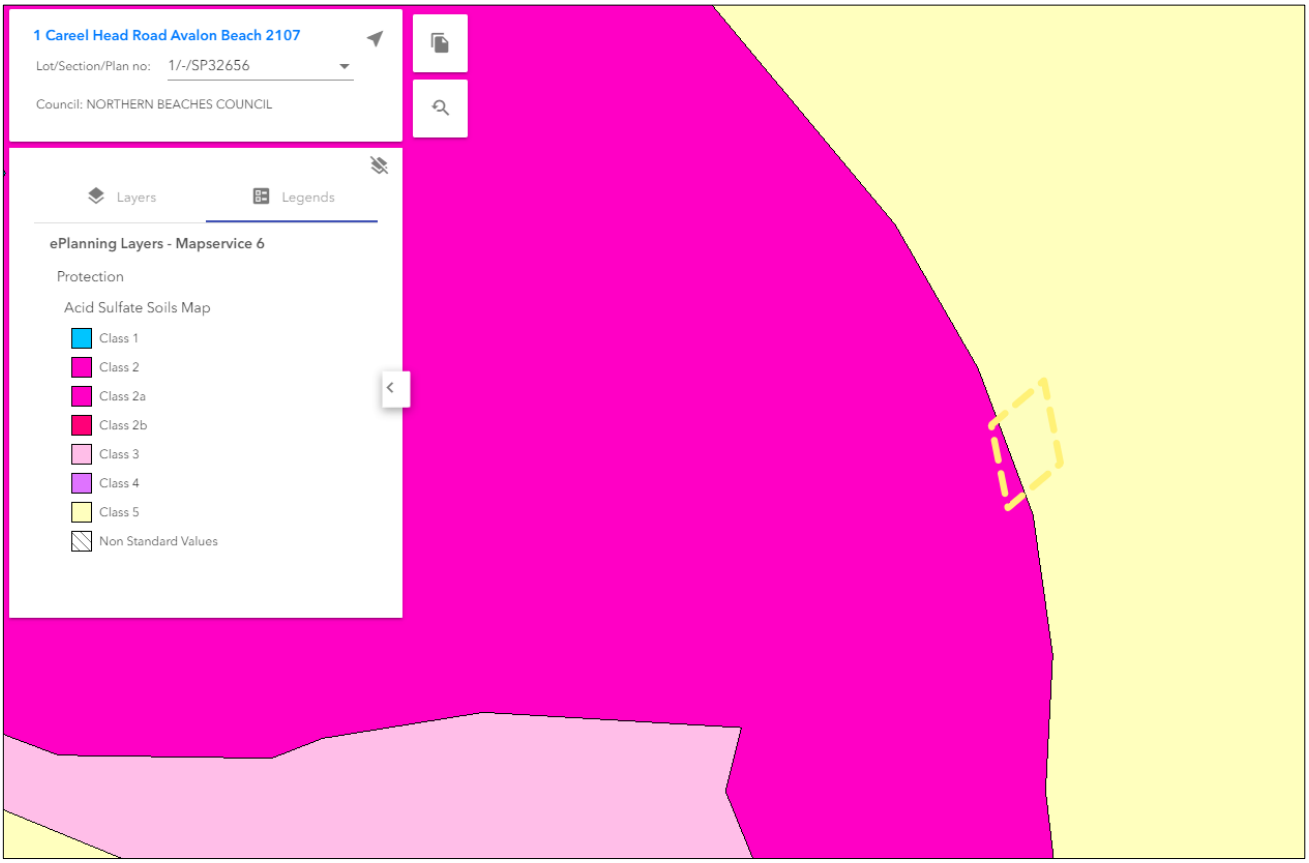


Figure 2: ASS potential for the Site Location

Figure 3: Site Plan

APPENDIX B – Architectural Drawings

DRAWING LIST

	DRAWING No.	DRAWING NAME	REVISION
DA	1001	DRAWING LIST	P2
DA	1002	COMPLIANCE TABLE	
DA	1005	SITE PLAN	
DA	1006	DEMOLITION PLAN	
DA	1100	BASEMENT 1 FLOOR PLAN	P3
DA	1101	GROUND FLOOR PLAN	P3
DA	1102	LEVEL 01 FLOOR PLAN	P3
DA	1103	ROOF PLAN	P3
DA	2001	BUILDING ELEVATION NORTH, EAST	P1
DA	2002	BUILDING ELEVATION - SOUTH, WEST	P1
DA	2003	BUILDING ELEVATION SOUTH, EAST	P1
DA	3001	SECTION A	P1
DA	3002	SECTION B	P1
DA	4001	RAMP SECTION	
DA	6001	SHADOW DIAGRAMS	
DA	6011	SOLAR ACCESS STUDY	
DA	6028	SOLAR SCHEDULE	
DA	7001	GFA CALCULATION	
DA	7011	SOLAR ACCESS PLAN	
DA	7021	VENTILATION DIAGRAMS	
DA	7031	3D VIEW 1	
DA	7032	3D VIEW 2	
DA	7033	3D VIEW 3 - CAREEL HEAD ROAD	
DA	7041	FINISHES SCHEDULE	
DA	7042	SCHEMATIC	
DA	7043	WINDOW SCHEDULE	
DA	7051	DEEP SOIL ZONE	
DA	7061	COMMUNUAL OPEN SPACE DIAGRAM	
DA	7062	EVACUATION DIAGRAM	P1
DA	7071	INTERNAL UNIT STORAGE	
DA	7081	CUT & FILL DIAGRAM	
DA	7091	LEP HEIGHT BLANKET	
DA	8001	DETAIL SECTION - SETBACK	
DA	8003	DETAIL SECTION - FIRE STAIRS	
DA	x5001	PRE + POST ADAPTABLE UNIT LAYOUT	

DESIGN INTENT STATEMENT

Situated in the picturesque locale of Avalon Beach, our mixed-use development endeavors to redefine coastal living by seamlessly integrating community-centric amenities with modern design sensibilities. At its heart, the project features a dynamic blend of outdoor and indoor childcare facilities, alongside retail spaces and Dan Murphy's occupying the ground floor.

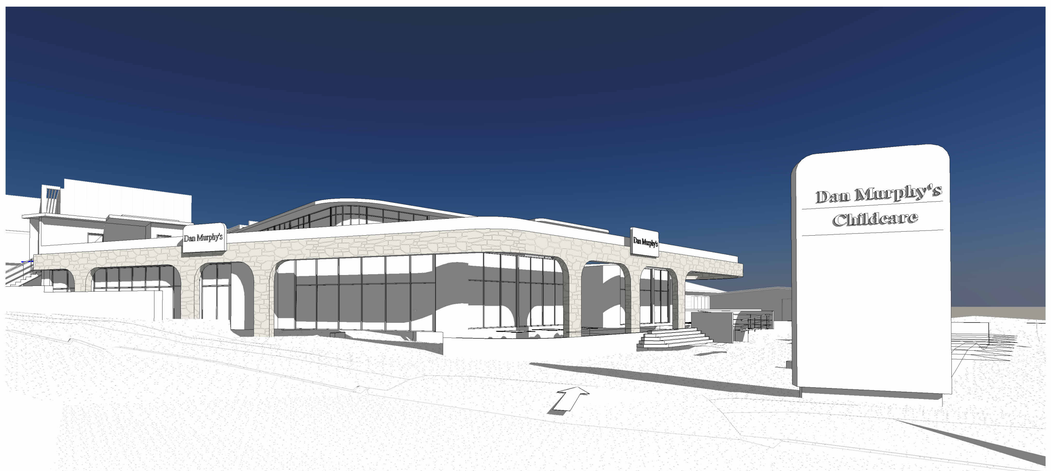
To address parking needs efficiently, the development encompasses both basement and ground-level parking facilities, ensuring convenience for residents and visitors alike.

Architecturally, the project embraces a distinctive aesthetic characterized by a harmonious blend of curved facades, sweeping arches, and angular features. Contemporary tones and carefully curated color palettes imbue the structure with a sense of sophistication, while materials such as white brick and concrete contribute to its timeless appeal.

The design ethos of the development extends beyond mere aesthetics to prioritize functionality and sustainability. Each aspect of the design is meticulously crafted to optimize natural light, ventilation, and spatial efficiency, enhancing the overall living experience for residents.

Landscaping elements play a pivotal role in softening the built environment and fostering a connection with nature. Green spaces are strategically integrated throughout the development, providing residents with serene outdoor retreats and contributing to the overall ecological sensitivity of the project.

Our vision for the Avalon Beach Mixed-Use Development is to create a vibrant and inclusive community hub that not only meets the needs of its residents but also enriches the fabric of the surrounding neighborhood. By blending innovative design with a commitment to sustainability, we aim to set a new benchmark for contemporary coastal living in this idyllic setting.



References

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Drawings to be read in conjunction with, but not limited to, all structural engineers, stormwater engineers, landscape architects, fire protection, essential electrical services and mechanical services plans & other associated plans & reports.

Refer to current Basix report for additional requirements to ones noted on plans.

Notes

All dimensions and setouts are to be verified on site and all omissions or any discrepancies to be notified to the architect.
Figured dimensions to be used at all times.
DO NOT SCALE measurements off drawings.

Nominated Architect: Liljana Ermilova 7887, ABN 24 243 205 327

P2 28.06.2024 Revision 3
P1 28.05.2024 Revision 1

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Australian Institute of Architects

Project
PROPOSED MIXED USE DEVELOPMENT

1 & 3 Careel Head Road Avalon Beach

Drawing Title
DRAWING LIST

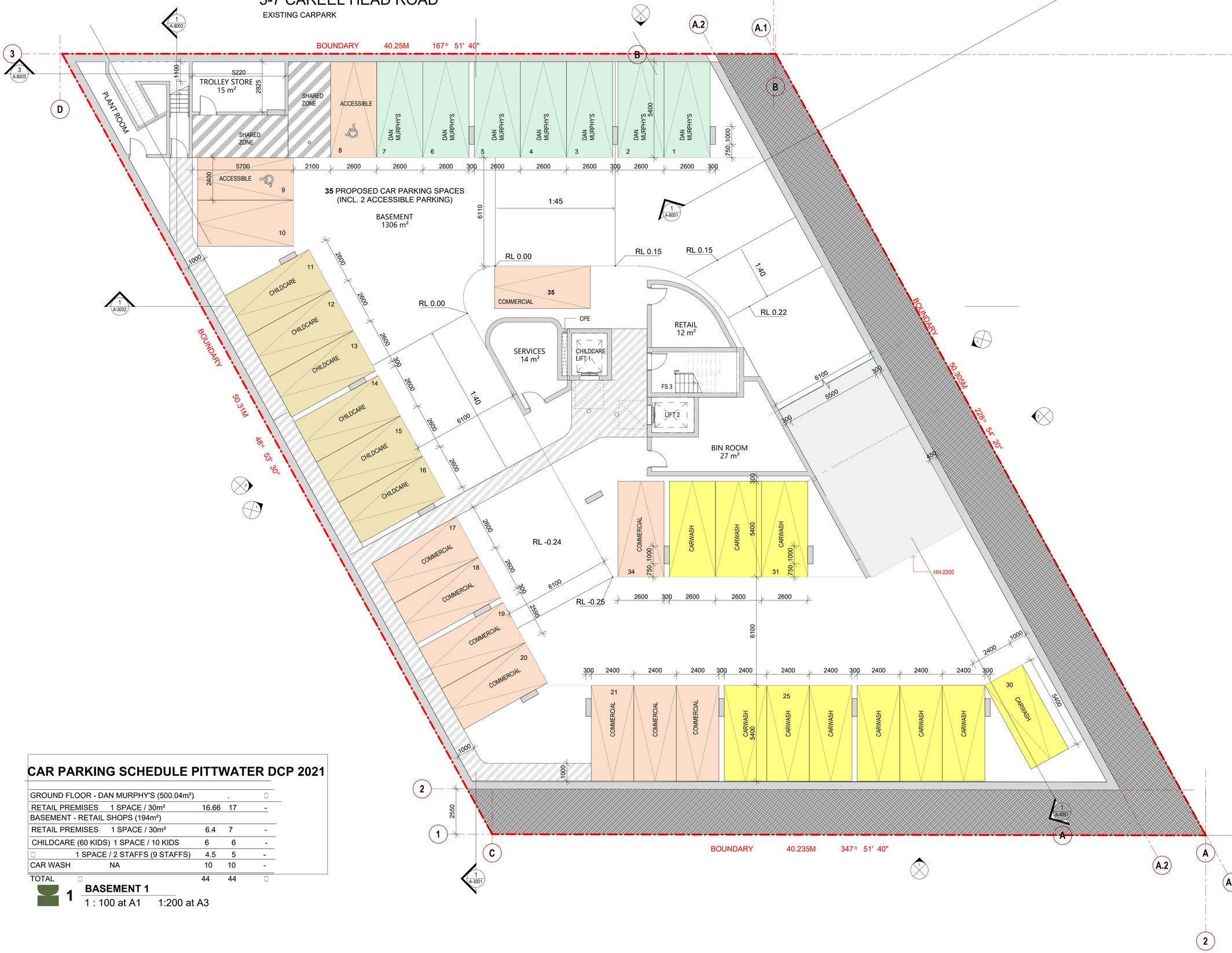
Project Stage
DA Submission

Job no.	Drawing no.	Rev.
J23587D	**DA1001**	**P2**

Drawn by	Checked by	Approved by	Date
GH	RJ	-	JUN. 2024

NEIGHBOURING PROPERTIES
5-7 CAREEL HEAD ROAD

EXISTING CARPARK



CAR PARKING SCHEDULE PITTWATER DCP 2021

GROUND FLOOR - DAN MURPHY'S (500.04m²).		.		
RETAIL PREMISES	1 SPACE / 30m²	16.66	17	-
BASEMENT - RETAIL SHOPS (194m²)				
RETAIL PREMISES	1 SPACE / 30m²	6.4	7	-
CHILDCARE (60 KIDS)	1 SPACE / 10 KIDS	6	6	-
	1 SPACE / 2 STAFFS (9 STAFFS)	4.5	5	-
CAR WASH	NA	10	10	-
TOTAL		44	44	

1 BASEMENT 1

1 : 100 at A1 1:200 at A3

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PARKING LEGEND

- CHILDCARE
- COMMERCIAL
- DAN MURPHY'S
- CAR WASH

P3	28.06.2024	Revision 3
P2	05.06.2024	Revision 2
P1	28.05.2024	Revision 1

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Project
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1 & 3 Careel Head Road Avalon Beach

Drawing Title
BASEMENT 1 FLOOR PLAN

Project Stage
DA Submission

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J23587D	DA1100	P3

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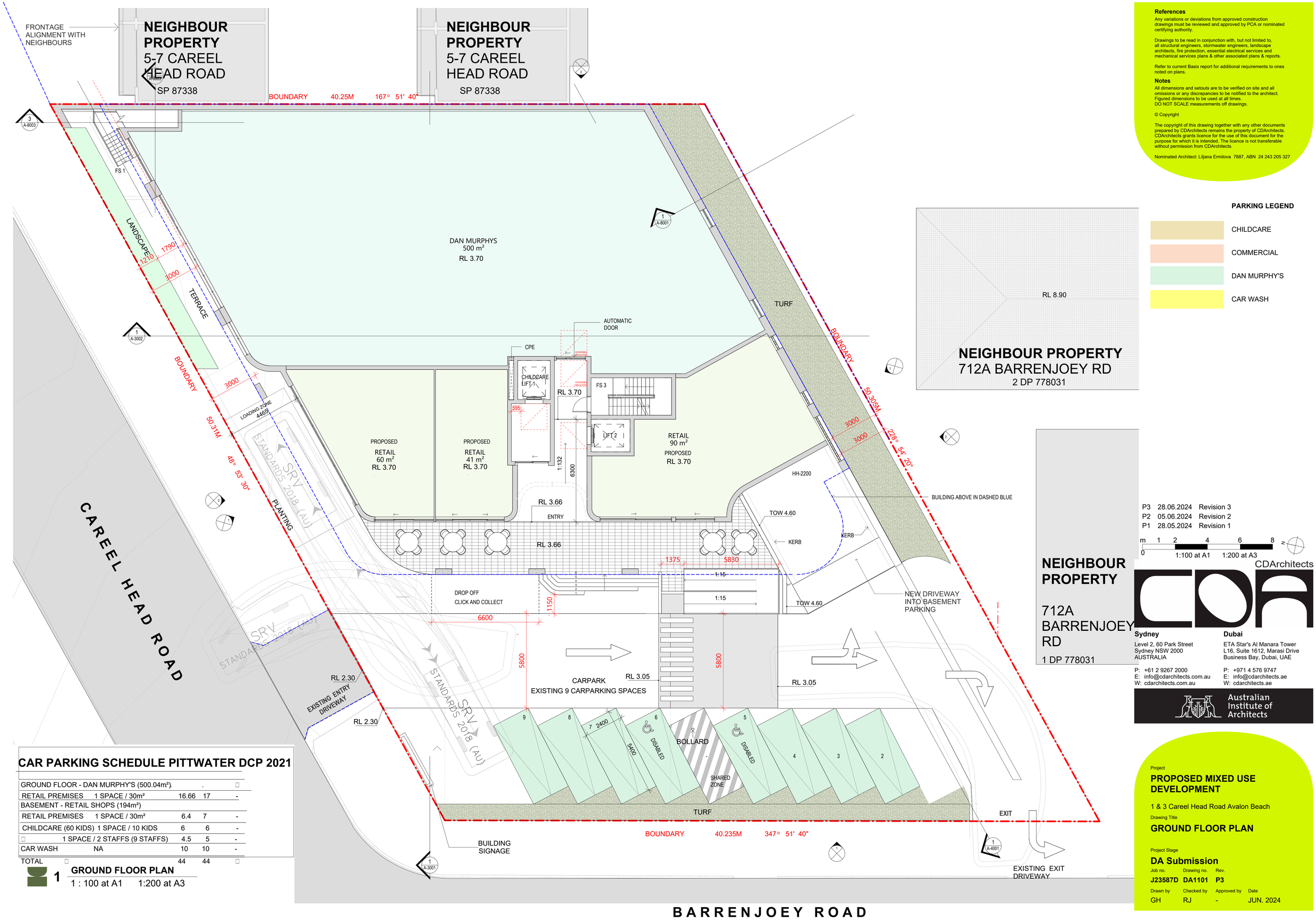
GH	RJ	-	JUN. 2024



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RETAIL PREMISES	1 SPACE / 30m²	16.66	17	-
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RETAIL PREMISES	1 SPACE / 30m²	6.4	7	-
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	1 SPACE / 2 STAFFS (9 STAFFS)	4.5	5	-
CAR WASH	NA	10	10	-
TOTAL		44	44	

1 GROUND FLOOR PLAN
1 : 100 at A1 1:200 at A3

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PARKING LEGEND

- CHILDCARE
- COMMERCIAL
- DAN MURPHY'S
- CAR WASH

P3	28.06.2024	Revision 3
P2	05.06.2024	Revision 2
P1	28.05.2024	Revision 1

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Project
PROPOSED MIXED USE DEVELOPMENT
1 & 3 Careel Head Road Avalon Beach

Drawing Title
GROUND FLOOR PLAN

Project Stage
DA Submission

Job no.	Drawing no.	Rev.
J23587D	DA1101	P3

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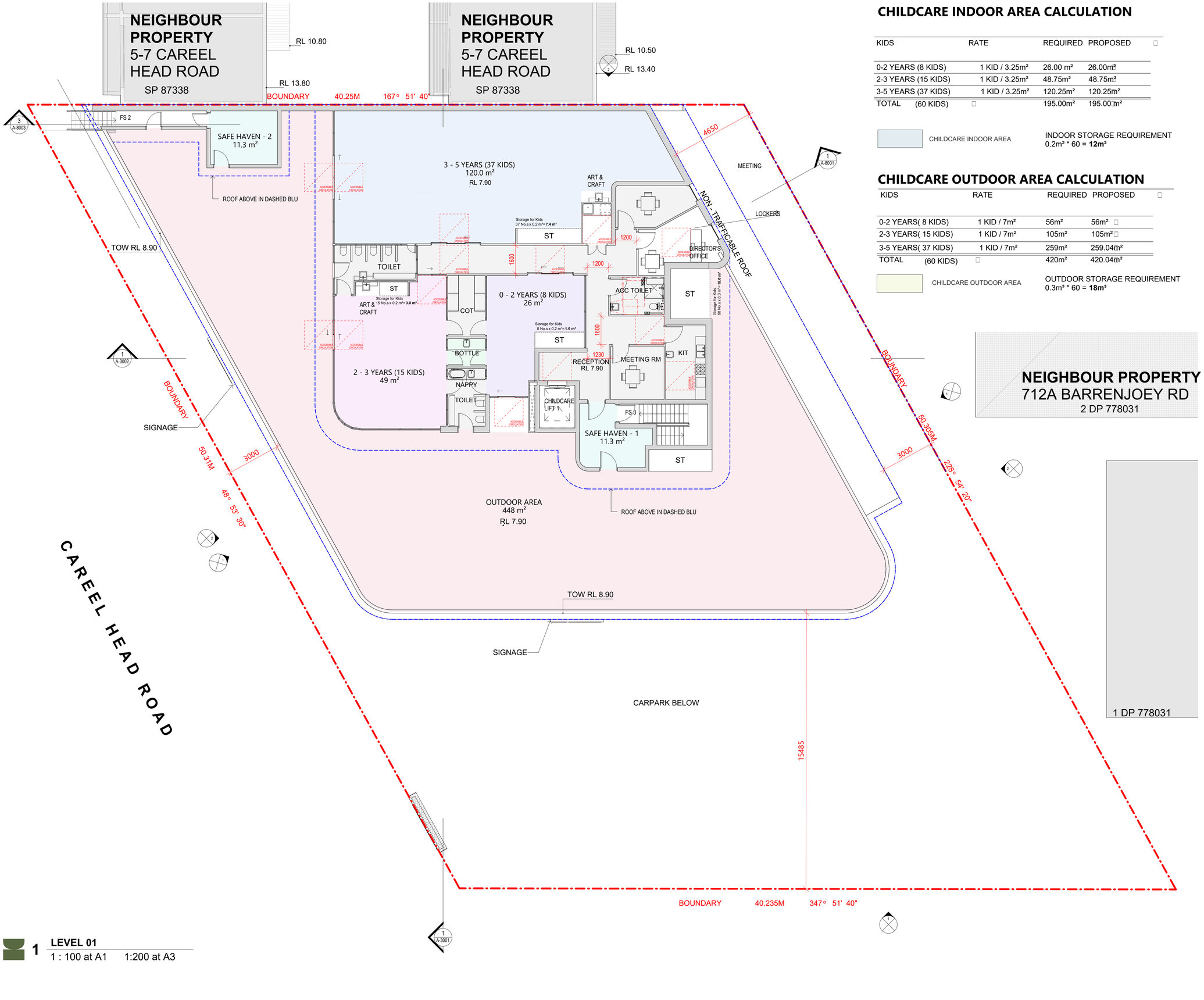
GH	RJ	-	JUN. 2024



CHILDCARE INDOOR AREA CALCULATION

KIDS	RATE	REQUIRED	PROPOSED
0-2 YEARS (8 KIDS)	1 KID / 3.25m²	26.00 m²	26.00m²
2-3 YEARS (15 KIDS)	1 KID / 3.25m²	48.75m²	48.75m²
3-5 YEARS (37 KIDS)	1 KID / 3.25m²	120.25m²	120.25m²
TOTAL (60 KIDS)		195.00m²	195.00m²

CHILDCARE INDOOR AREA

INDOOR STORAGE REQUIREMENT
0.2m³ * 60 = **12m³**

CHILDCARE OUTDOOR AREA CALCULATION

KIDS	RATE	REQUIRED	PROPOSED
0-2 YEARS(8 KIDS)	1 KID / 7m²	56m²	56m²
2-3 YEARS(15 KIDS)	1 KID / 7m²	105m²	105m²
3-5 YEARS(37 KIDS)	1 KID / 7m²	259m²	259.04m²
TOTAL (60 KIDS)		420m²	420.04m²

CHILDCARE OUTDOOR AREA

OUTDOOR STORAGE REQUIREMENT
0.3m³ * 60 = **18m³**

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P3 28.06.2024 Revision 3
P2 05.06.2024 Revision 2
P1 28.05.2024 Revision 1

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Project
PROPOSED MIXED USE DEVELOPMENT

1 & 3 Careel Head Road Avalon Beach

Drawing Title
LEVEL 01 FLOOR PLAN

Project Stage
DA Submission

Job no.	Drawing no.	Rev.
J23587D	**DA1102**	**P3**

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GH	RJ	-	JUN. 2024

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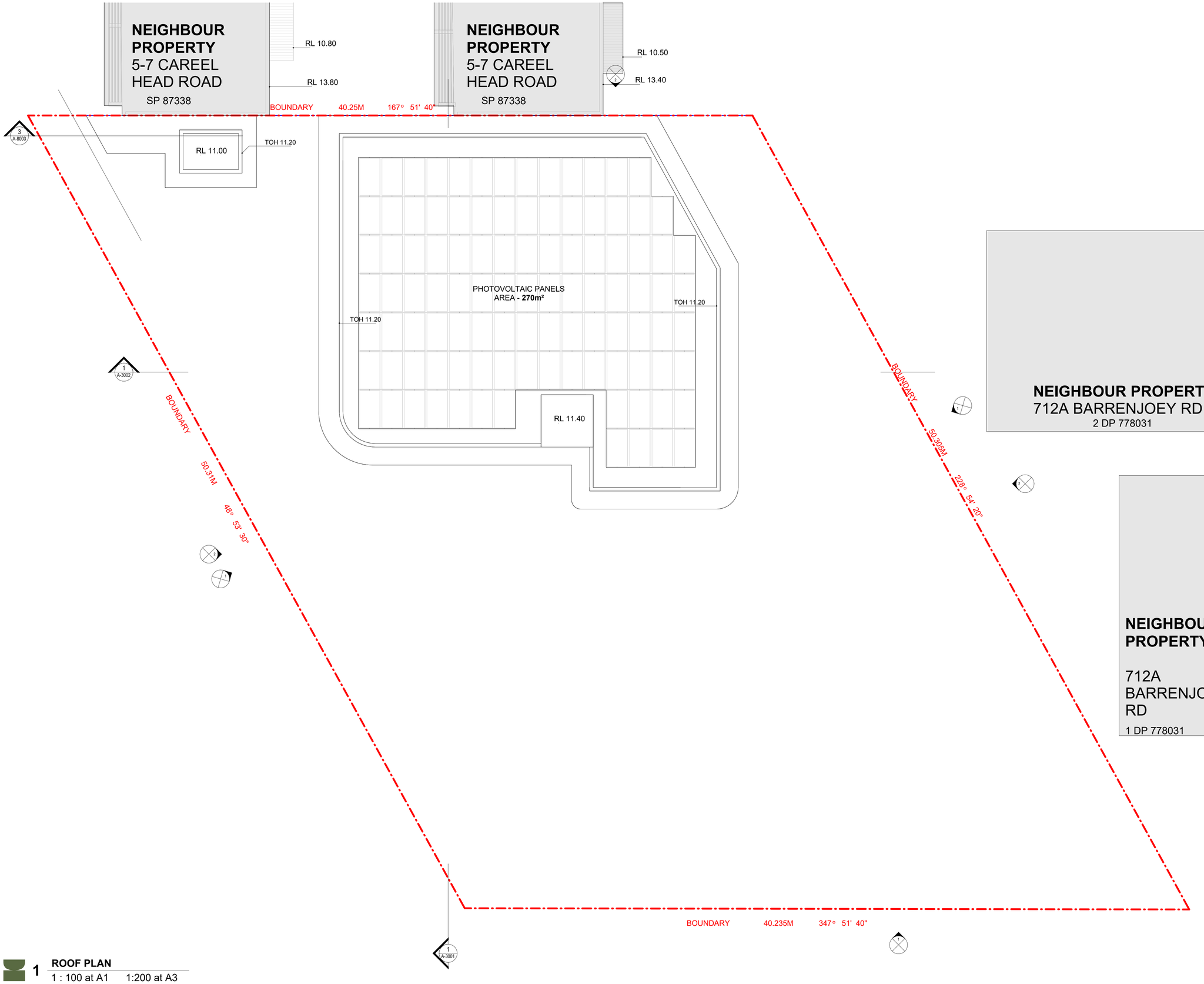

1 **ROOF PLAN**
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P1	28.05.2024	Revision 1

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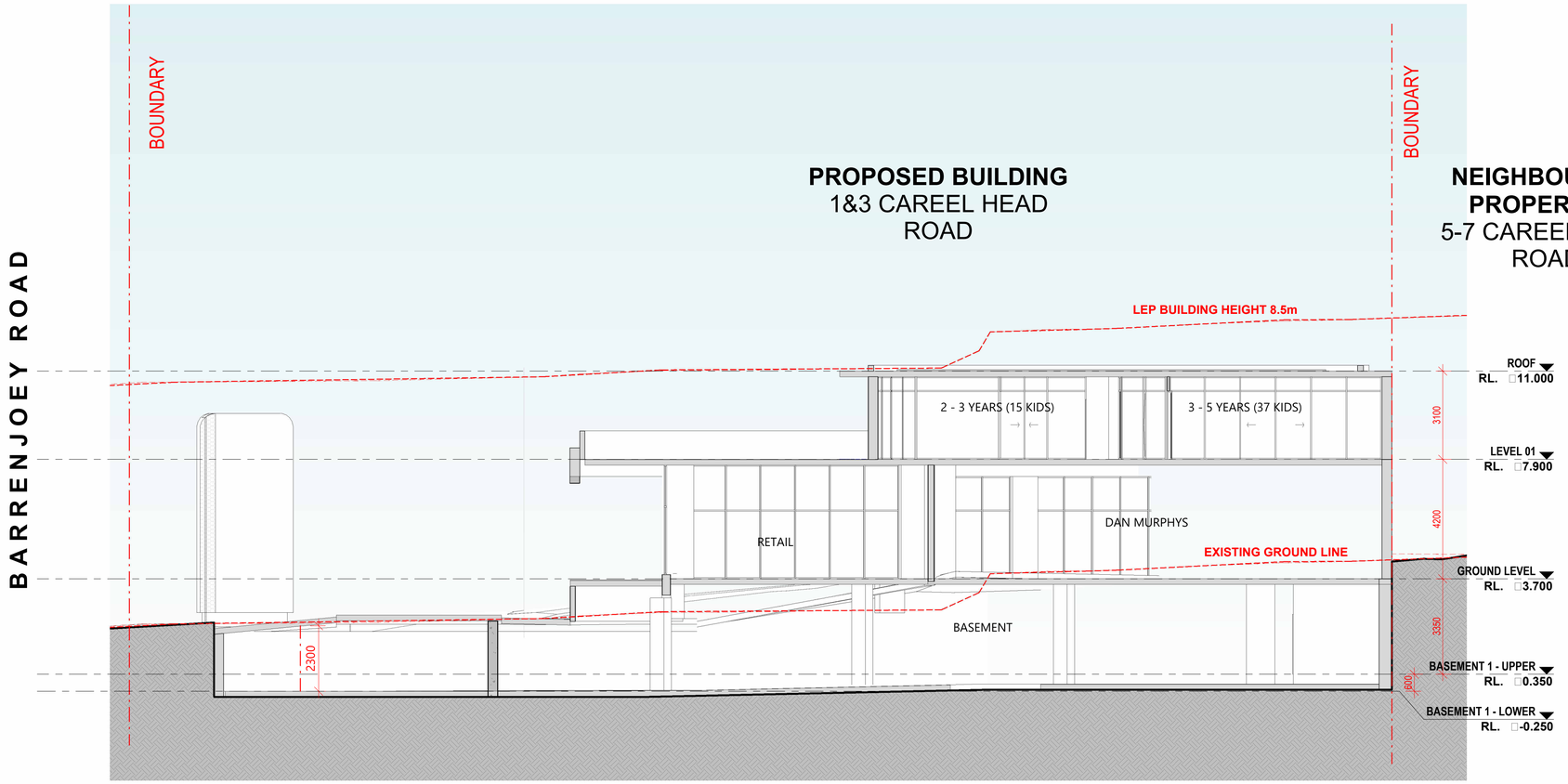
1 & 3 Careel Head Road Avalon Beach

Drawing Title
ROOF PLAN

Project Stage
DA Submission

Job no.	Drawing no.	Rev.
J23587D	DA1103	P3

Drawn by	Checked by	Approved by	Date
GH	RJ	-	JUN. 2024



1 SECTION A
1 : 100 at A1 1:200 at A3

References
Any variations or deviations from approved construction drawings must be reviewed and approved by PCA or nominated certifying authority.

Drawings to be read in conjunction with, but not limited to, all structural engineers, stormwater engineers, landscape architects, fire protection, essential electrical services and mechanical services plans & other associated plans & reports.

Refer to current Basix report for additional requirements to ones noted on plans.

Notes
All dimensions and setouts are to be verified on site and all omissions or any discrepancies to be notified to the architect. Figured dimensions to be used at all times.
DO NOT SCALE measurements off drawings.

Nominated Architect: Liljana Ermilova 7887, ABN 24 243 205 327

P1 28.06.2024 Revision 3

m 1 2 4 6 8
0
1:100 at A1 1:200 at A3

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Australian Institute of Architects

Project
PROPOSED MIXED USE DEVELOPMENT

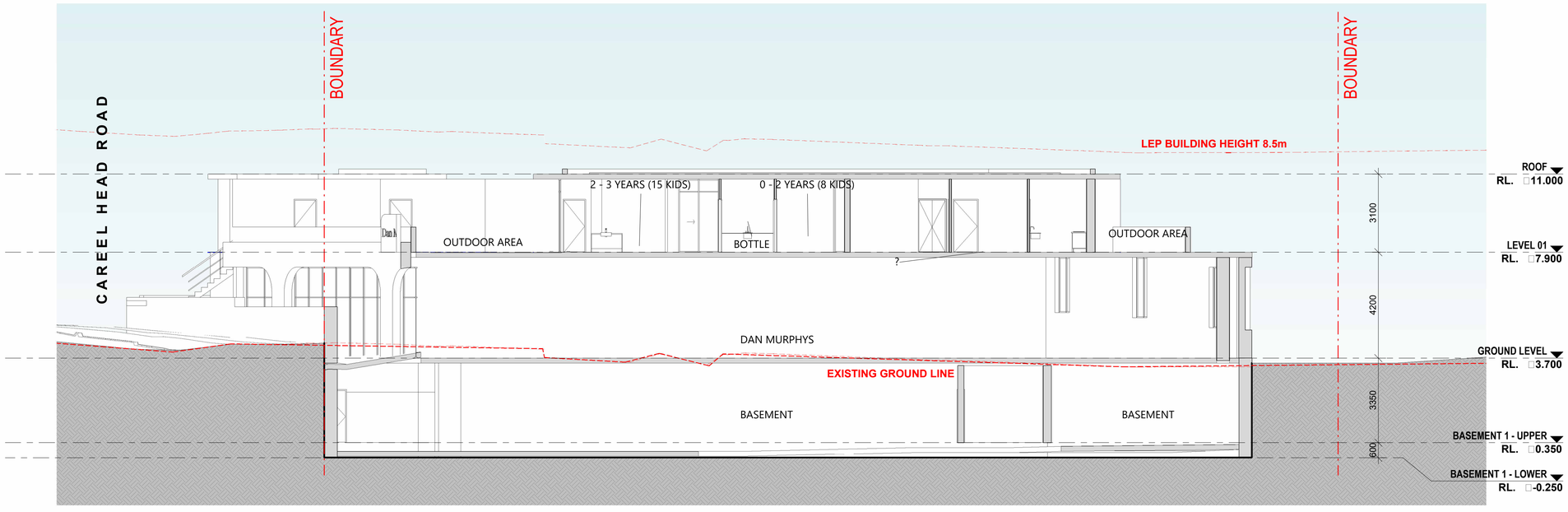
1 & 3 Careel Head Road Avalon Beach

Drawing Title
SECTION A

Project Stage
DA Submission

Job no.	Drawing no.	Rev.
J23587D	DA3001	P1

Drawn by	Checked by	Approved by	Date
GH	RJ	-	JUN. 2024



1 **SECTION B**
1 : 100 at A1 1:200 at A3

References

Any variations or deviations from approved construction drawings must be reviewed and approved by PCA or nominated certifying authority.

Drawings to be read in conjunction with, but not limited to, all structural engineers, stormwater engineers, landscape architects, fire protection, essential electrical services and mechanical services plans & other associated plans & reports.

Refer to current Basix report for additional requirements to ones noted on plans.

Notes

All dimensions and setouts are to be verified on site and all omissions or any discrepancies to be notified to the architect. Figured dimensions to be used at all times.
DO NOT SCALE measurements off drawings.

Nominated Architect: Liljana Ermilova 7887, ABN 24 243 205 327

P1 28.06.2024 Revision 3

m 1 2 4 6 8
0
1:100 at A1 1:200 at A3

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Australian Institute of Architects

Project
PROPOSED MIXED USE DEVELOPMENT

1 & 3 Careel Head Road Avalon Beach

Drawing Title
SECTION B

Project Stage
DA Submission

Job no.	Drawing no.	Rev.
J23587D	DA3002	P1

Drawn by	Checked by	Approved by	Date
GH	RJ	-	JUN. 2024

APPENDIX C – Laboratory Test Results

CEC Geotechnical
Unit 4 83 Grose Street
North Paramatta
NSW 2151

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Diego**

Report **1110580-S**
Project name ASS
Project ID ER24020A
Received Date Jun 20, 2024

Client Sample ID			**BH1-3.0**	**BH2-2.0**	**BH2-3.0**	**BH3-0.4**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S24-Jn0057476**	**S24-Jn0057477**	**S24-Jn0057478**	**S24-Jn0057479**
Date Sampled			**Jun 19, 2024**	**Jun 19, 2024**	**Jun 19, 2024**	**Jun 19, 2024**
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.3	6.5	6.3	6.4
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	5.1	4.5	4.0	3.2
Reaction Ratings*[S05]	0	comment	1.0	4.0	1.0	2.0

Client Sample ID			**BH3-4.0**	**BH4-0.3**	**BH4-1.5**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S24-Jn0057480**	**S24-Jn0057481**	**S24-Jn0057482**
Date Sampled			**Jun 19, 2024**	**Jun 19, 2024**	**Jun 19, 2024**
Test/Reference	LOR	Unit			
Acid Sulfate Soils Field pH Test					
pH-F (Field pH test)*	0.1	pH Units	6.1	6.1	6.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.9	2.9	3.0
Reaction Ratings*[S05]	0	comment	1.0	2.0	1.0

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Acid Sulfate Soils Field pH Test	Sydney	Jun 27, 2024	7 Days

- Method: LTM-GEN-7060 Determination of field pH (pHF) and field pH peroxide (pHFOX) tests

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079 & 25289

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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Site# 2370

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
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Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: CEC Geotechnical
Address: Unit 4 83 Grose Street
North Paramatta
NSW 2151

Project Name: ASS
Project ID: ER24020A

Order No.: ER24020A
Report #: 1110580
Phone: 02 9630 0121
Fax:

Received: Jun 20, 2024 12:50 PM
Due: Jun 27, 2024
Priority: 5 Day
Contact Name: Diego

Eurofins Analytical Services Manager : Adam Bateup

Sample Detail						Acid Sulfate Soils Field pH Test
Sydney Laboratory - NATA # 1261 Site # 18217						X
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	BH1-3.0	Jun 19, 2024		Soil	S24-Jn0057476	X
2	BH2-2.0	Jun 19, 2024		Soil	S24-Jn0057477	X
3	BH2-3.0	Jun 19, 2024		Soil	S24-Jn0057478	X
4	BH3-0.4	Jun 19, 2024		Soil	S24-Jn0057479	X
5	BH3-4.0	Jun 19, 2024		Soil	S24-Jn0057480	X
6	BH4-0.3	Jun 19, 2024		Soil	S24-Jn0057481	X
7	BH4-1.5	Jun 19, 2024		Soil	S24-Jn0057482	X
Test Counts						7

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	S24-Jn0057482	CP	pH Units	6.2	6.2	pass	20%	Pass	
pH-FOX (Field pH Peroxide test)*	S24-Jn0057482	CP	pH Units	3.0	3.0	pass	0%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
S05	Field Screen uses the following fizz rating to classify the rate the samples reacted to the peroxide: 1.0; No reaction to slight. 2.0; Moderate reaction. 3.0; Strong reaction with persistent froth. 4.0; Extreme reaction.

Authorised by:

Ursula Long — Analytical Services Manager

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☐ Sydney Laboratory
179 Magowar Road, Girraween, NSW 2145
+61 2 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
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+61 7 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
46-48 Banksia Road, Welshpool, WA 6105
+61 8 6253 4444 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
6 Monterey Road Dandenong South VIC 3175
+61 3 8564 5000 EnviroSampleVic@eurofins.com

Company	CEC Geotechnical	Project №	ER24020A	Project Manager	Diego E
Address	AVALON BEACH	Project Name	ASS	EDD Format (Edat, EQuIS etc)	
Contact Name	Diego Espinosa				
Phone №	432522998				
Special Directions					
Purchase Order	ER24020A				
Quote ID №					

Sampler(s)	DE	
Handed over by		
Email for Invoice	daniella@cec-au.com, zuhaib@cec-au.com, diego@cec-au.com	
Email for Results	daniella@cec-au.com, zuhaib@cec-au.com, diego@cec-au.com	

Required Turnaround Time (TAT) — Default will be 5 days if not ticked

♦Surcharge will apply

- ☐ Overnight (reporting by 9am)♦
- ☐ Same day♦ ☐ 1 day♦
- ☐ 2 days♦ ☐ 3 days♦
- ☑ 5 days (Standard)
- ☐ Other( )

Analyses — Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing

Containers — Change container type & size if necessary

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	pHf	pHox	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	BH1-3.0	19/06/24	S	X	X									Please storage all samples for posible deeper analysis
2	BH2-2.0	19/6/24	S	X	X									
3	BH2-3.0	19/6/24	S	X	X									
4	BH3-0.4	19/6/24	S	X	X									
5	BH3-4.0	19/6/24	S	X	X									
6	BH4-0.3	19/6/24	S	X	X									
7	BH4-1.5	19/6/24	S	X	X									
8														
9														
10														
		Total Counts		7	7									

Method of Shipment: ☐ Courier (#) ☐ Hand Delivered ☐ Postal

	Name	Signature	Date	Time
Received By	Ryan Phillips			

Laboratory Use Only

Received By	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	20/6/24	Time	12:50pm
Received By	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date		Time	

Temperature: 13.8°C

Report №

1110580