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12 September 2026

NALU

122 Marine Parade, Miami Beach

DEWATERING MANAGEMENT PLAN

Eastview

Job No. GOL2026-0104AA | Version 0



Gold Coast Office

21 Activity Cres
Molendinar Gold Coast QLD 4214
Ph: 07 5556 4768

www.cmwgeosciences.com

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Job number	GOL2026-0104AA
Prepared by	Te Wera Mihaere, Project Geotechnical Engineer 
Reviewed and Authorised by	Mark Argent, Senior Principal Geotechnical Engineer, RPEQ 18789 

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1.0 INTRODUCTION

CMW Geosciences (CMW) was engaged by Eastview to carry out a geotechnical investigation of a multi-storey development site located at 122 Marine Parade, Miami Beach.

The scope of work and associated terms and conditions of our engagement were detailed in our services proposal letter referenced GOL2025-0134AA Rev1 dated 23 September 2025.

The purpose of this dewatering management plan (DMP) is to provide recommendations with respect to the geotechnical aspects of the proposed development. Site location is illustrated in Figure 1 below.

1.1 Site Description

The site of the proposed development is located at 122 Marine Parade, Miami Beach. The site is bound by residential properties to the north and south, vacant land that forms a steep hill rising to Magic Mountain to the west and Marine Parade to the east.

At the time of our investigation, the site was occupied by an existing double storey unit complex with a concrete driveway and carparking areas. Vegetation comprised of small, grassed areas as well as some trees and shrubs at the road frontage to the site. The existing buildings have subsequently been demolished. The topography of the site is practically flat.



Figure 1: Aerial image showing the existing site and surrounding infrastructure

2.0 PROPOSED DEVELOPMENT

It is understood that an approximately 7,284m^2 residential development comprising 5 floors, a roof terrace and a single level basement is proposed within the site boundary. An approximate footprint of the proposed site plan is shown in Figure 2.



Figure 2: Plan view of proposed development

3.0 FIELD INVESTIGATION

3.1 Previous Investigations

The site was previously investigated by Pacific Geotech as reported in the following:

- PG-12869, 2024-12-10, GR VER 4, dated 24 April 2025.

3.2 CMW Geotechnical Investigation

Fieldwork was carried out under the full-time supervision of CMW Geosciences in general accordance with AS1726-2017 “Geotechnical Site Investigations”. The scope of fieldwork undertaken included:

- Desktop study to review geological conditions of the site, relevant groundwater data and previous geotechnical investigations;
- Drill six (6) boreholes to a target depth of 15m below ground level or upon recovery of 5m of rock. The boreholes were drilled using a combination of track and truck mounted drilling rigs under the supervision of a CMW Geotechnical Engineer. Drilling in soils was undertaken using augering and conventional rotary wash boring. Standard Penetration Testing (SPT) or U50 undisturbed tubes would be undertaken at

typically 1.5m intervals throughout the soil profile. NMLC diamond coring was undertaken within rock strength materials;

- Installation of two (2) standpipe piezometers for accurate measurement of groundwater levels;
- Samples were collected from the borehole for laboratory testing to inform the durability classification and acid sulfate soil risk for the site.
- Information was collated into a concise geotechnical report outlining the scope of work completed, the ground conditions encountered, site classification, shallow and deep foundation design parameters, groundwater comments and geohazards.

The investigation locations are shown in the site investigation plan presented in Appendix A. Engineering borehole logs describing the subsurface materials encountered are presented in Appendix B.

The investigation locations were recorded using a hand-held GPS to the inherent accuracy of the unit. Table 1 summarises the details for the borehole(s) undertaken.

Table 1: Summary of Investigation Locations

Test ID	Easting	Northing	Elevation (mAHD)	Termination Depth (mbgl)	Groundwater Level (mbgl)
CMW-BH01	543468.214	6895841.499	4.27	14.00	3.80
CMW-BH02	543438.420	6895867.864	4.16	12.00	3.30
CMW-BH03	543384.758	6895819.986	4.33	6.00	3.50
CMW-BH04	543421.529	6895791.491	4.20	10.40	3.30
CMW-BH05	543419.011	6895814.974	4.41	10.90	3.30
CMW-BH06	543427.266	6895837.374	4.50	10.50	3.80

Freestanding groundwater was encountered during auger drilling at all boreholes. BH01 and BH02 were converted to a standpipe piezometer with a slotted screen. The groundwater well was purged of water introduced during the drilling process was recharging to a standing level of 3.5 metres below ground level after the well was purged.

Table 2: Summary of Groundwater Monitoring Wells

Location ID	Screen Top Depth (RL m AHD)	Screen Toe Depth (RL m AHD)	Screen Length (m)
CMW-BH01	2.272	-0.728	3.0
CMW-BH02	1.155	-1.845	3.0
Notes: Boreholes were backfilled with a sand filter around the screen interval with a bentonite plug to a minimum extension cover of 1m past screening depth. The borehole was then grouted to surface.			

4.0 GROUND MODEL

4.1 Regional Geology

Published geological maps for the area, accessed via QGlobe, depict the area as being underlain by Quaternary aged alluvial units with the Neranleigh-Fernvale rock formation likely underlying the surface alluvial units. Figure 2 presents the surrounding geology of the area, with the approximate site location shown in red. It is likely that the existing site consists of moderately well-sorted, fine to coarse-grained quartzose to shelly sand and some gravel; beach ridges and cheniers as indicative of the Q_{hcb} geological unit.



Figure 3: Extract from QGlobe showing the anticipated geotechnical units at 122 Marine Parade

4.2 Subsurface Conditions

The subsurface conditions encountered at each borehole is described in detail on the borehole log presented in Appendix B. The ground conditions encountered and inferred from the investigation were generally consistent with published geology for the area and CMW experience on nearby sites and can be generalised as per the geotechnical units summarised in Table 3.

Table 3: Summary of Encountered Subsurface Conditions

Unit	Description	Nature	Elevation Range of Layer (mAHD) (Approximate)					
			BH01	BH02	BH03	BH04	BH05	BH06
1	SAND, fine to medium grained, pale brown, loose to medium dense	Dune Sands	4.2 to -0.7	4.2 to 0.1	-	4.2 to -1.3	4.2 to -1.1	4.5 to -1.0
2	SAND, fine to coarse grained, pale yellow, some interbedded layers of gravel, dense to very dense	Indurated Sand	-0.7 to -4.7	0.1 to -2.8		-1.3 to -2.3	-1.1 to -1.4	-1.0 to -1.5
3A	METASILTSTONE, fine grained, very low to low strength	Neranleigh -Fernvale	-	-	4.0 to 3.3	-	-4.4 to -5.6	-1.5 to -6.5
3B	METASILTSTONE, fine grained, medium strength		-4.7 to -9.7*	-2.8 to -7.8*	3.3 to -1.7*	-2.3 to -4.4	-1.4 to -4.4	

Unit	Description	Nature	Elevation Range of Layer (mAHD) (Approximate)					
			BH01	BH02	BH03	BH04	BH05	BH06
3C	METASILTSTONE, fine grained, high to very high strength		-	-	-	-4.4 to -6.6*	-5.6 to -6.5*	-
Notes: * termination depth								

5.0 DEWATERING ASSESSMENT

CMW have not reviewed the proposed retention system but understand that the full perimeter is to be supported by a cantilevered secant pile wall with a nominal socket into the underlying Unit 3A material. A bottom of excavation level (BEL) of around RL0 and locally deeper to accommodate lift shaft footings is required.

The geotechnical data suggests a groundwater level of between RL0 to RL1mAHD, and so dewatering is likely to be required. Given the secant wall cut-off into the underlying Unit 3A Metasiltstone materials dewatering flow rates are anticipated to be small and likely controlled via sump-pump methodologies with a horizontal drainage system feeding the sump-pumps.

There has not been testing on the permeability of the underlying Unit 3A materials, but it is anticipated that these will be of low permeability with groundwater flow governed by the degree of fracturing within the rock mass. In the absence of permeability testing and/or a pumping trial, the design of the dewatering system is only able to be more conceptual but is envisaged to comprise between 4 - 8 sump-pumps with horizontal subsoil drains directing surface and subsurface groundwater flows to the sump-pumps.

6.0 DEWATERING MANAGEMENT PLAN

This DMP describes the management practices to be adopted to mitigate the potential environmental impacts of dewatering on the local environment. The preferred management strategy is to temporarily store the extracted groundwater (dewatering effluent) on-site to allow water quality monitoring and water treatment (as required) prior to off-site discharge into the local stormwater drainage system.

6.1 Dewatering Release Criteria

6.1.1 Stormwater Drainage Impact

The existing peak run-off rate at the lawful point of discharge (Stormwater End Structure 4000012424) for a flood event has been calculated to be approximately 450 L/s (825mm Concrete Pipe).

The highest simulated dewatering rate is anticipated to be significantly lower (<0.1 L/s) for a secant pile wall founded within the Unit 3A materials. Therefore, the pumped discharge will not cause any adverse impact on the stormwater drainage.

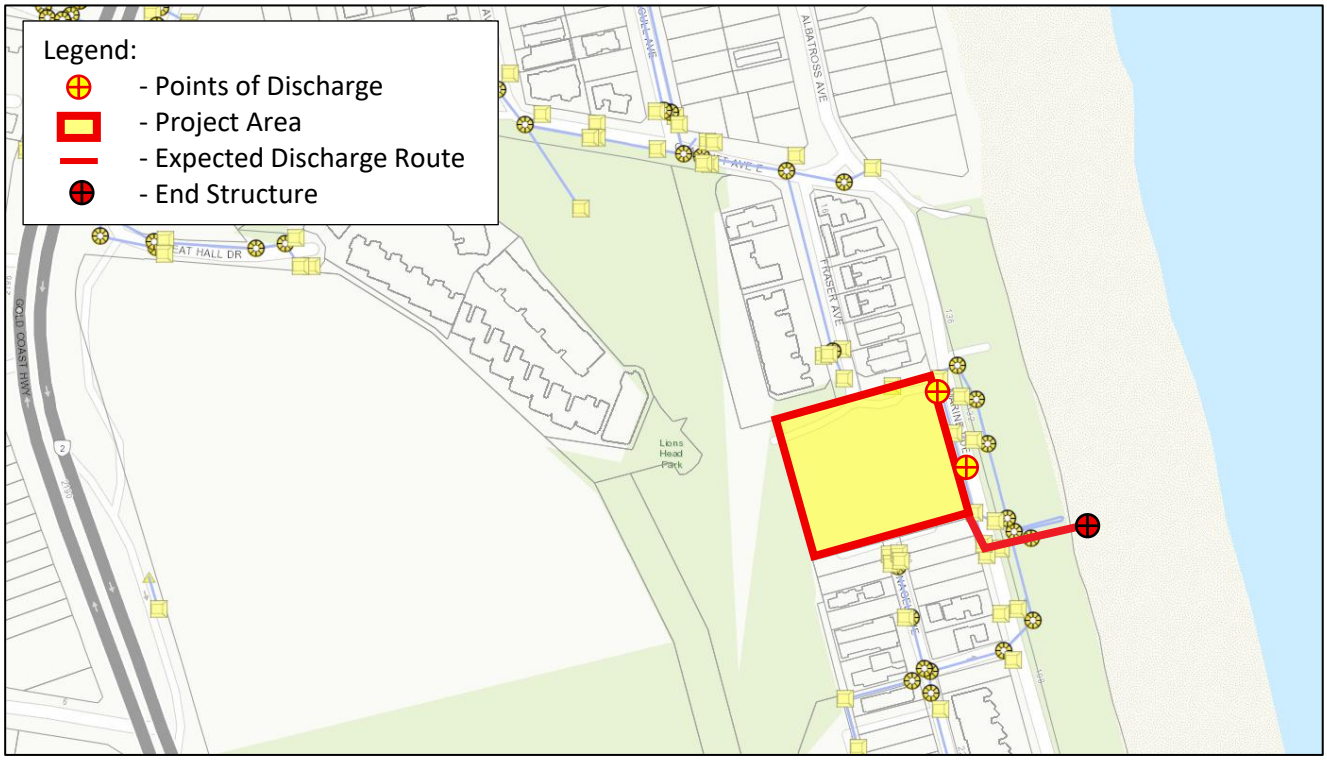


Figure 4: Extract from Gold Coast City Council 'GIS' map

6.1.2 Points of Discharge

Following temporary storage on site for testing and treatment, the treated (if required) discharge water will be transported from the project area to one of the private stormwater drainage pits located on the east side of the site adjacent to Marine Pde (4000020833 & 4000020841) (Drainage Pit), as shown in Figure 4.

The path which the effluent is expected to follow is shown in Figure 4 (starting pipe section 4000012404 and ending at pipe section 4000012424). The Stormwater End Structure (Stormwater End Structure 4000235774) receiving the effluent discharges directly into the Coral Sea / Pacific Ocean to the east of the project boundary.

6.1.3 Potential Dewatering Impacts

Potential on-site and off-site dewatering impacts may include drawdown of the water table, or impacts to the receiving environment (Tasman Sea) from the release of water containing elevated levels of dissolved heavy metals or nutrients, or high turbidity, acidity or alkalinity

6.2 Treatment of Groundwater

6.2.1 Environmental Objectives and Performance Targets

The environmental objective is to minimise the risk of on-site and off-site water quality impacts due to dewatering activities. Monitoring will be required as a key performance indicator throughout civil works and basement construction to demonstrate that this objective is being met.

The performance targets for dewatering effluent which meets the water quality criteria for discharge to this section of the Tasman Sea are listed in Tables 4–6. Monitoring data and City of Gold Coast Council (CoGC) approval will be required prior to discharging excess groundwater into the stormwater system.

Table 4: On-site dewatering water quality release criteria

Indicators	Criteria
Turbidity (NTU)	Less than 20
pH	6.5 - 8.5
Dissolve Oxygen (DO)	90th percentile is greater than 80% saturation or 6mg/L
Litter	No visible litter washed from site

Table 5: Receiving water dewatering water quality (physio-chemical) release criteria

Indicators	Queensland Water Quality Guideline 2006			
	Coastal	Estuary	Streams	Fresh water lakes
Ammonia (µg/L)	**6 – 8**	10 – 30	10 – 60	10
Total nitrogen (TN) (µg/L)	**140 – 200**	300 – 450	250 – 500	350
Chl-a (µg/L)	**1 – 2**	4 – 8	2 – 5	5
Total phosphorus (TP) (µg/L)	**20**	25 – 30	30 – 50	10
DO (% sat)	**90 – 105**	80 – 100	85 – 110	90
Turbidity (NTU)	**1 – 6**	8 – 25	25 – 50	1 – 20
pH	**8.4 – 9**	7 – 8.4	6.5 – 8.2	6.5 – 8
SS (mg/L)	**10 – 15**	20 – 25	6	-

Table 6: Receiving water dewatering water quality (toxicants) release criteria

Metals	ANZECC/ARMCANZ 2000 Guidelines – Trigger values (µg/L)							
	Fresh water level of protection (% species)				Marine water level of protection (% species)			
	99%	95%	90%	80%	99%	95%	90%	80%
Aluminium pH > 6.5	27	55	80	150	-	-	-	-
Copper	1.0	1.4	1.8	2.5	**0.3**	**1.3**	**3.0**	**8.0**
Lead	1.0	3.4	5.6	9.4	**2.2**	**4.4**	**6.6**	**12**
Zinc	2.4	8.0	15	31	**7**	**15**	**23**	**43**

6.3 Acid Sulphate Soil

The acid sulphate soil test results indicate that this site does not require an acid sulphate soil management plan with all testing indicating that ASS or PASS are not present.

6.4 Settlement Assessment

The retaining wall system is a secant pile wall retaining system will form an appropriate cut-off into the underlying greywacke. Only internal dewatering is proposed with no change of water level external to the retention system and therefore settlement induced by dewatering is anticipated to be negligible.

6.5 Noise and Vibration Mitigation

The system to be installed will most likely be a sump-pump dewatering system. Noise levels are not expected to reach over 80dBa on site. There is no vibrational impact external to the site from the dewatering system.

6.6 Odour Mitigation

To reduce potential odours, the dewatering effluent should pass through an activated carbon filter prior to discharge into the stormwater system. The odour mitigation strategy should be finalised by the Construction Contractor.

6.7 Operational Management Strategies and Monitoring

Management and monitoring actions required to achieve the performance targets for dewatering effluent and groundwater are the responsibility of the construction contractor.

6.7.1 Management of Dewatering Effluent

Only effluent that meets the discharge criteria for an estuary (Tables 4–6) may be discharged into the local stormwater drains and/or waterways once CoGC approval is received. All dewatering effluent is to be pumped into holding tanks where sampling can occur, and treatment can be carried out as necessary. Once the discharge criteria have been met, the effluent can then be discharged into the stormwater collection system via pumping to adjacent stormwater drains (subject to council approval).

6.7.2 Monitoring During Dewatering

Monitoring of groundwater levels and dewatering effluent quality is to be conducted during all dewatering activities. In addition, the water quality at the receiving water point should be monitored and is required to meet the WQOs.

Procedures for field measurements, sampling, and record keeping shall be established by a suitably qualified environmental consultant. Samples are to be collected by the environmental consultant and analysed at a NATA-accredited laboratory.

6.8 Pre-Dewatering and Baseline Data

Once baseline groundwater data has been established for the site and it can be used for comparison of future monitoring results. The existing monitoring bores, groundwater sumps excavated on-site, or on-site holding tanks should be used for water quality monitoring purposes.

Monitoring of iron and chlorine will ensure that if the development site is having issues with turbidity, the iron levels are not excessive, which can cause visual amenity issues and detriment to the aquatic ecosystem.

6.9 Dewatering Strategy

The dewatering strategy should be finalised by the Construction Contractor. As ground conditions comprise of relatively low permeability material beneath the secant perimeter retention system, it is anticipated that the dewatering strategy for the basement excavations would comprise a sump-pump system.

Groundwater (dewatering effluent) should be temporarily stored on site in holding tanks to allow monitoring of groundwater quality and treatment (as required) to occur prior to discharge into the local stormwater drainage system with Council approval.

The onsite permeability will vary due to changes in material fracturing of the Unit 3A materials. For these reasons, it is recommended that the dewatering system include dewatering pumps with greater capacity than the modelled groundwater inflows.

6.10 Dewatering Flow Rate and Duration

Dewatering of the groundwater will happen during construction of the basement which is proposed to be below the highest groundwater level at the site (ranging between RL 1.1 and 0.5 m AHD). Dewatering duration is anticipated to be in the order of 26 weeks / 6 months. In the absence of permeability testing of the underlying, metagreywacke, dewatering flow rate estimates are highly variable but are likely to be less than 0.1 L/s.

The retention system is anticipated to be a perimeter secant wall extending below the excavation level to form a cut-off around the perimeter of the excavation. The performance targets for dewatering effluent which meets the water quality criteria for discharge to this section of the Gold Coast Seaway are listed above (Table 4-6). Monitoring data and CoGC approval will be required prior to discharging excess groundwater (i.e. dewatering effluent) into the stormwater system.

6.11 Contingency Plan

During the unlikely event in which the dewatering system ceases to operate, or a “stop-work” protocol is issued, personnel employed by the dewatering contractor are to be available 24/7 and will be notified by way of 24-hour GPS monitoring. Dewatering contractor personnel are required to attend the site immediately and inspect the issue. Below are the two most common potential issues:

- In the instance of a power outage during a major storm event or similar, a back-up generator will be available to power the system and continue normal operation of the dewatering system with minimal interruption.
- Each well is provided with an individual pump. If one pump within one well fails, all the other wells and individual pumps will continue to operate and maintain normal functioning of the dewatering system as is intended. It is noted that the water level in the event of a system failure will not flood the basement immediately; this could take weeks in most instances, particularly considering the location of the project. Please note that in the event of a system issue, the site manager will also be notified and will attend the site.
- A stop-work protocol may be issued (but not limited to):
  - An emergency situation, on a local, statewide, national or international scale.
  - Construction activities cause uncharacteristic ground water issues
  - Groundwater lab testing results indicate levels not compliant with section 6.2 above.

7.0 CLOSURE

This report has been prepared for use by Eastview in relation to the NALU, 122 Marine Parade, Miami Beach project in accordance with the scope, proposed uses and limitations described in the report. Should you have further questions relating to the use of your report please do not hesitate to contact us.

Where a party other than Eastview seeks to rely upon or otherwise use this report, the consent of CMW should be sought prior to any such use. CMW can then advise whether the report and its contents are suitable for the intended use by the other party.

USING YOUR CMW GEOTECHNICAL REPORT

Geotechnical reporting relies on interpretation of facts and collected information using experience, professional judgement, and opinion. As such it generally has a level of uncertainty attached to it, which is often far less exact than other engineering design disciplines. The notes below provide general advice on what can be reasonably expected from your report and the inherent limitations of a geotechnical report.

Preparation of your report

Your geotechnical report has been written for your use on your project. The contents of your report may not meet the needs of others who may have different objectives or requirements. The report has been prepared using generally accepted Geotechnical Engineering and Engineering Geology practices and procedures. The opinions and conclusions reached in your report are made in accordance with these accepted principles. Specific items of geotechnical or geological importance are highlighted in the report.

In producing your report, we have relied on the information which is referenced or summarised in the report. If further information becomes available or the nature of your project changes, then the findings in this report may no longer be appropriate. In such cases the report must be reviewed, and any necessary changes must be made by us.

Your geotechnical report is based on your project's requirements

Your geotechnical report has been developed based on your specific project requirements and only applies to the site in this report. Project requirements could include the type of works being undertaken; project locality, size and configuration; the location of any structures on or around the site; the presence of underground utilities; proposed design methodology; the duration or design life of the works; and construction method and/or sequencing.

The information or advice in your geotechnical report should not be applied to any other project given the intrinsic differences between different projects and site locations. Similarly geotechnical information, data and conclusions from other sites and projects may not be relevant or appropriate for your project.

Interpretation of geotechnical data

Site investigations identify subsurface conditions at discrete locations. Additional geotechnical information (e.g. literature and external data source review, laboratory testing etc) are interpreted by Geologists or Engineers to provide an opinion about a site specific ground models, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist due to the variability of geological environments. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. Interpretation of factual data can be influenced by design and/or construction methods. Where these methods change review of the interpretation in the report may be required.

Subsurface conditions can change

Subsurface conditions are created by natural processes and then can be altered anthropically or over time. For example, groundwater levels can vary with time or activities adjacent to your site, fill may be placed on a site, or the consistency of near surface conditions might be susceptible to seasonal changes. The report is based on conditions which existed at the time of investigation. It is important to confirm whether conditions may have changed, particularly when large periods of time have elapsed since the investigations were performed.

Interpretation and use by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a geotechnical report. To help avoid misinterpretations, it is important to retain the assistance of CMW to work with other project design professionals who are affected by the contents of your report. CMW staff can explain the report implications to design professionals and then review design plans and specifications to see that they have correctly incorporated the findings of this report.

Your report's recommendations require confirmation during construction

Your report is based on site conditions as revealed through selective point sampling. Engineering judgement is then applied to assess how indicative of actual conditions throughout an area the point sampling might be. Any assumptions made cannot be substantiated until construction is complete. For this reason, you should retain geotechnical services throughout the construction stage, to identify variances from previous assumption, conduct additional tests if required and recommend solutions to problems encountered on site.

A Geotechnical Engineer, who is fully familiar with the site and the background information, can assess whether the report's recommendations remain valid and whether changes should be considered as the project develops. An unfamiliar party using this report increases the risk that the report will be misinterpreted.

Environmental matters are not covered

Unless specifically discussed in your report environmental matters are not covered by a CMW Geotechnical Report. Environmental matters might include the level of contaminants present of the site covered by this report, potential uses or treatment of contaminated materials or the disposal of contaminated materials. These matters can be complex and are often governed by specific legislation.

The personnel, equipment, and techniques used to perform an environmental study can differ significantly from those used in this report. For that reason, our report does not provide environmental recommendations. Unanticipated subsurface environmental problems can have large consequences for your site. If you have not obtained your own environmental information about the project site, ask your CMW contact about how to find environmental risk-management guidance.

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APPENDIX A
Site Plan



LEGEND:

- CMW Boreholes
- Pacific Geotech Boreholes

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CLIENT:	Eastview	DRAWN:	MA	PROJECT:	GOL2025-0134
PROJECT:	NALU 122 Marine Parade, Miami QLD 4220	CHECKED:	RC	FIGURE:	1
		REVISION:	0	SCALE:	1:1000
TITLE:	Site Investigation Plan	DATE:	11/10/2025	SHEET:	A4 L

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APPENDIX B
Geotechnical Logs

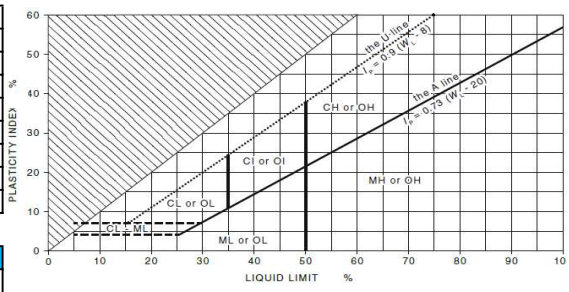
Explanatory Notes – Soil Description

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GRAVEL	Gravelly SAND	Sandy CLAY	FILL
SILTY GRAVEL	SILTY SAND	SILT	TOPSOIL
CLAYEY GRAVEL	CLAYEY SAND	Gravelly SILT	COBBLES & BOULDERS
Sandy GRAVEL	CLAY	Sandy SILT	CONCRETE
SAND	Gravelly CLAY	PEAT	NO CORE

GP	Poorly Graded Gravel	ML	Low Plasticity Silt
GW	Well Graded Gravel	MH	High Plasticity Silt
GM	Silty Gravel	CL	Low Plasticity Clay
GC	Clayey Gravel	CI	Medium Plasticity Clay
SP	Poorly Graded Sand	CH	High Plasticity Clay
SW	Well Graded Sand	OL	Organic Soils (LP)
SM	Silty Sand	OH	Organic Soils (HP)
SC	Clayey Sand	PT	Peat
	Fill		Cobbles & Boulders

Soil colours based on BGS Internal report IR/05/123 "A Revised scheme for coding unlithified deposits", 2006.



WATER	
Groundwater (Strike)	Groundwater (rise)

CLASSIFICATION AND INFERRED STRATIGRAPHY

Particle Size		
Major Division	Sub Division	Particle Size
Boulders		> 200 mm
Cobbles		63 to 200 mm
Gravel	Coarse	19 to 63 mm
	Medium	6.7 to 19 mm
	Fine	2.36 to 6.7 mm
Sand	Coarse	0.6 to 2.36 mm
	Medium	0.21 to 0.6 mm
	Fine	0.075 to 0.21 mm
Silt		0.002 to 0.075 mm
Clay		< 0.002 mm

SECONDARY/MINOR COMPONENTS	
TERMS FOR SANDS/GRAVELS (Less than 35% Particles < 0.075mm)	**TERMS FOR CLAYS/SILTS** (More than 35% Particles < 0.075mm)
trace... sand/gravel = <15% clay/silt = <5%	**trace...** sand/gravel = <15%
with... sand/gravel = >15%, <30% clay/silt = >5%, <12%	**with...** sand/gravel = >15%, <30%
Sandy... / Gravelly... >30%	**Sandy... / Gravelly...** >30%
Clayey... / Silty ... >12%	

MOISTURE CONDITION (Cohesionless Soils)

Symbol	Term	Description
D	Dry	Looks and feels dry. Cohesionless and free-running.
M	Moist	No free water on remoulding. Soil feels cool, darkened in colour. Soil tends to cohere.
W	Wet	Free water on remoulding. Soil feels cool, darkened in colour. Soil tends to cohere.

MOISTURE CONDITION (Cohesive Soils)

Symbol	Term	Description
<PL	Dry	Looks and feels dry. Hard and friable or powdery, well dry of the plastic limit
≈PL	Moist	Soil feels cool, darkened in colour. Soil can be moulded. Near plastic limit.
>PL	Wet	Soils feels cool, darkened in colour. Usually weakened and free water forms when remoulding. Wet of plastic limit.

DENSITY (Cohesionless Soils)

Sym.	Term	Density Index (%)	SPT 'N'
VL	Very Loose	Less than 15	0 to 4
L	Loose	15 to 35	4 to 10
MD	Medium Dense	35 to 65	10 to 30
D	Dense	65 to 85	30 to 50
VD	Very Dense	Above 85	Above 50

STIFFNESS (Cohesive Soils)

Sym.	Term	Undrained Shear Strength
VS	Very Soft	0 to 12 kPa
S	Soft	12 to 25 kPa
F	Firm	25 to 50 kPa
St	Stiff	50 to 100 kPa
VSt	Very Stiff	100 to 200 kPa
H	Hard	over 200kPa
Fr	Friable	-

SAMPLING AND LABORATORY / INSITU TESTING RESULTS

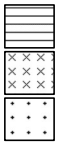
B	Bulk Disturbed Sample	U	Undisturbed Push-in Sample	CBR	California Bearing Ratio
BLK	Block Sample	W	Water Sample	UCS	Unconfined Compressive Strength
C	Core Sample	LL	Liquid Limit	PLI	Point Load Index
ES	Environmental Soil Sample	PI	Plasticity Index	N	SPT-N Value
P	Piston Sample	LS	Linear Shrinkage		

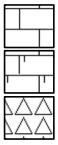
DRILLING/EXCAVATION METHOD

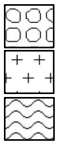
AC	Air Core	HA	Hand Auger	RC	Rotary Cored
ADH	Hollow Auger Drilling	HQ	Rotary Core 63.5mm	RO	Rotary Open Hole
AD/V	Auger with V-Bit	HQ3	Rotary Core 61.1mm	SPT	Standard Penetration Test
AD/T	Auger with TC-Bit	PQ3	Rotary Drill 83mm	TP	Test Pit
DPP	Direct Push Probe	PT	Push Tube	W	Wash Bore

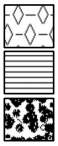
Explanatory Notes – Rock Description

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MUDSTONE
SILTSTONE
SANDSTONE


LIMESTONE
CHALK
BRECCIA


CONGLOMERATE
IGNEOUS
METAMORPHIC


GYPSUM
SHALE
PYROCLASTIC

ROCK MATERIAL STRENGTH				
Symbol	Term	Uniaxial Compressive Strength - UCS (MPa)	Point Load Index - $I_{s(50)}$ (MPa)*	Field Guide
EL	Extremely Low	Less than 0.6	Less than 0.03	Easily remoulded by hand to a material with soil properties (logged as soil).
VL	Very Low	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 3 cm thick can be broken by finger pressure.
L	Low	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150 mm long 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
M	Medium	6 to 20	0.3 to 1	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
H	High	20 to 60	1 to 3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
VH	Very High	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
EH	Extremely High	More than 200	More than 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

* Note that the rock strength should be based on UCS testing where possible. The Point Load Index ($I_{s(50)}$) to UCS correlation used in this table is presented as a guide only, using a value of 20. Rock type specific correlations should be adopted where sufficient data is availiable.

WEATHERING CLASSIFICATION		
Symbol	Term	Definition
RS	Residual Soil	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.
XW	Extremely weathered rock	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.
HW (or DW)	Highly Weathered	Rock strength usually changed by weathering. The rock may be highly discoloured. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
MW (or DW)	Moderately Weathered	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 recognizable, but shows little or no change of strength from fresh rock.
SW	Slightly weathered rock	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
FR	Fresh rock	Rock shows no sign of decomposition or staining.

CEMENTATION CLASSIFICATION		
Symbol	Term	Definition
Uc	Un cemented	Clean grains, exhibiting soil properties.
VWc	Very weakly cemented	Marginal soil-rock strengths, collapsing feel under light finger pressure, cement seen on some washed grains.
Wc	Weakly Cemented	Collapsing feel under light soil pressure, breaks down to individual grains or with some grains cemented together, cement seen on many washed grains.
MWk	Moderately Weakly Cemented	Cement on nearly all grains, breaks down to lumps and some individual grains under finger pressure, can crush to individual grains under knife blade.
Mo	Moderately Cemented	Cement on most grains, can break fragments off by hand and crush to small lumps under knife blade.
We	Well Cemented	Practically all grains cemented together, cannot break fragments off by hand, dull sound under hammer.
VWe	Very Well Cemented	Most Primary Pores filled with cement, requires firm blow with hammer to break off fragments, rings when struck

ROCK CORE RECOVERY		
Symbol	Term	Definition
TCR	Total Core Recovery (%)	The ratio of total length of core recovered to length of core run drilled, expressed as a percentage.
SCR	Solid Core Recovery (%)	The ratio of the total length of solid cylindrical pieces of core recovered to length of core run drilled, expressed as a percentage.
RQD	Rock Quality Designation (%)	The ratio of the total length of solid cylindrical pieces of core over 100mm in length recovered to length of core run drilled, expressed as a percentage.

Explanatory Notes – Defect Description

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Defect Type			
ABBREVIATION	TERM	DEFINITION	DIAGRAM
PT	Parting	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.	
JT	Joint	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed.	
SS	Sheared Surface	A near planar, curved or undulating surface which is usually smooth, polished or slickensided and which shows evidence of shear displacement.	
SZ	Sheared Zone	Zone of rock material with roughly parallel near planar, curved or undulating boundaries cut by closely spaced joints, sheared surfaces or other defects. Some of the defects are usually curved and intersect to divide the mass into lenticular or wedge-shaped blocks.	
CS	Crushed Zone / Seam	Seam of soil material with roughly parallel almost planar boundaries, composed of disoriented, usually angular fragments of the host rock material which may be more weathered than the host rock. The seam has soil properties.	
SM	Seam	Seam of soil material usually with distinct roughly parallel boundaries formed by the migration of soil into an open cavity or joint, infilled seams less than 1 mm thick may be described as a veneer or coating on a joint surface.	

Surface Roughness		
ABBREVIATION	TERM	Description
VR	Very Rough	Many large irregularities generally > 1 mm
RO	Rough	Many small irregularities generally > 1 mm
SM	Smooth	Few or no surface irregularities
PO	Polished	Shiny smooth surface
Sl	Slickensided/ Striated	Grooved/striated surface, usually polished

Orientation	
ABBREVIATION	TERM
SH	Sub Vertical
SV	Sub Horizontal
10°	Angle from horizontal

Surface Shape		
ABBREVIATION	TERM	Description
PL	Planar	Does not vary in orientation
CU	Curved	Gradual change in orientation
UN	Undulating	Wavy surface
ST	Stepped	One or more well defined steps
IR	Irregular	Many sharp changes in orientation

Aperture	
ABBREVIATION	TERM
DIS	Discontinuous
CL	Closed
5mm	Measured width between joint surfaces

Coatings		
ABBREVIATION	TERM	Description
CN	Clean	No visible coating
SN	Stained	No coating but surface discoloured
VN	Veneer	Visible coating too thin to measure
CT	Coating	Visible coating up to 1mm thick
IF	Infilled	Over 1mm thick of soil present

Block Shape	
Term	Description
Blocky	Roughly equidimensional blocks.
Tabular	Thickness of blocks much less than length or width.
Columnar	Lengths much greater than other dimensions
Irregular	Irregular discontinuities without arrangement into distinct sets,

BOREHOLE LOG - BH01-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 06/10/2025 End Date: 06/10/2025 1:25 Sheet 1 of 3

CMW Geosciences
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Logged by: HM Position: E.543468m N.6895841m Plant: Pioneer P160
Checked by: Mark A Elevation: 4.272 m (mAHD) Contractor: NCD

Drilling Method	Well	Groundwater	Coring: TCR	Coring: SCR	Coring: RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (VL L M H VH EH; 6; 60; UCS (MPa); UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm) (<20; 20-40; 40-100; 100-300; 300-1000; >1000)	Samples, test results and additional Data
						4.3			PAVER:						
						4.2			GC: Clayey GRAVEL: fine to medium grained, sub-angular to angular; brown to yellow, sand; fine to medium grained, well graded, clay is medium plasticity; (FILL)		D				
						4.1			SP: SAND: fine to medium grained, rounded to sub-rounded, poorly graded; yellow to pale brown; trace organics (Dune sand).	L					
AD/V							1								1.0m:SPT: (5,6,9) N=15
										MD					
							2				M				2.5m:SPT: (3,5,4) N=9
							3								
						0.8			SM: SILTY SAND: fine grained; dark brown to grey; low plasticity fines, with organics (roots); (Dune Sand).						
W		▼					4			L					4.0m:SPT: (0,1,4) N=5
											W				
						-0.7	5								

Termination reason: Target Material
Remarks:

BOREHOLE LOG - BH01-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 06/10/2025 End Date: 06/10/2025 1:25 Sheet 2 of 3

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Logged by: HM Position: E.543468m N.6895841m Plant: Pioneer P160
Checked by: Mark A Elevation: 4.272 m (mAHD) Contractor: NCD

Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (VL L M H VH EH; 6; 60; UCS (MPa); UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm) (<20; 20-40; 40-100; 100-300; 300-1000; >1000)	Samples, test results and additional Data
W							6		SP: SAND: fine to medium grained, rounded to sub-rounded, cemented; brown to yellow; trace gravel, fine to medium grained, angular to sub-angular; (Indurated Sand).	D	W				5.5m:SPT: (12,15,21) N=36
							7								7.0m:SPT: (13,16,26) N=42
							8			VD					8.5m:SPT: (30/140mm) N=R
						-4.7	9								
NML C			100	100	77		10		METASILTSTONE: fine to medium grained; pale grey-green with red and yellow; indistinctly gentle foliated; with some iron staining through rockmass						9.00-14.00m:C 1 Is50=2.05MPa Is50=4.93MPa 9.10m:PT, 5°, PL, SM, (Fe) 9.50m:PT, 0°, PL, SM, (Clay) 9.60m:PT, 3°, PL, SM, (Fe) 9.75m:CRS, 45°, IR, RO, (Fe)

Termination reason: Target Material
Remarks:

BOREHOLE LOG - BH01-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 06/10/2025 End Date: 06/10/2025 1:25 Sheet 3 of 3

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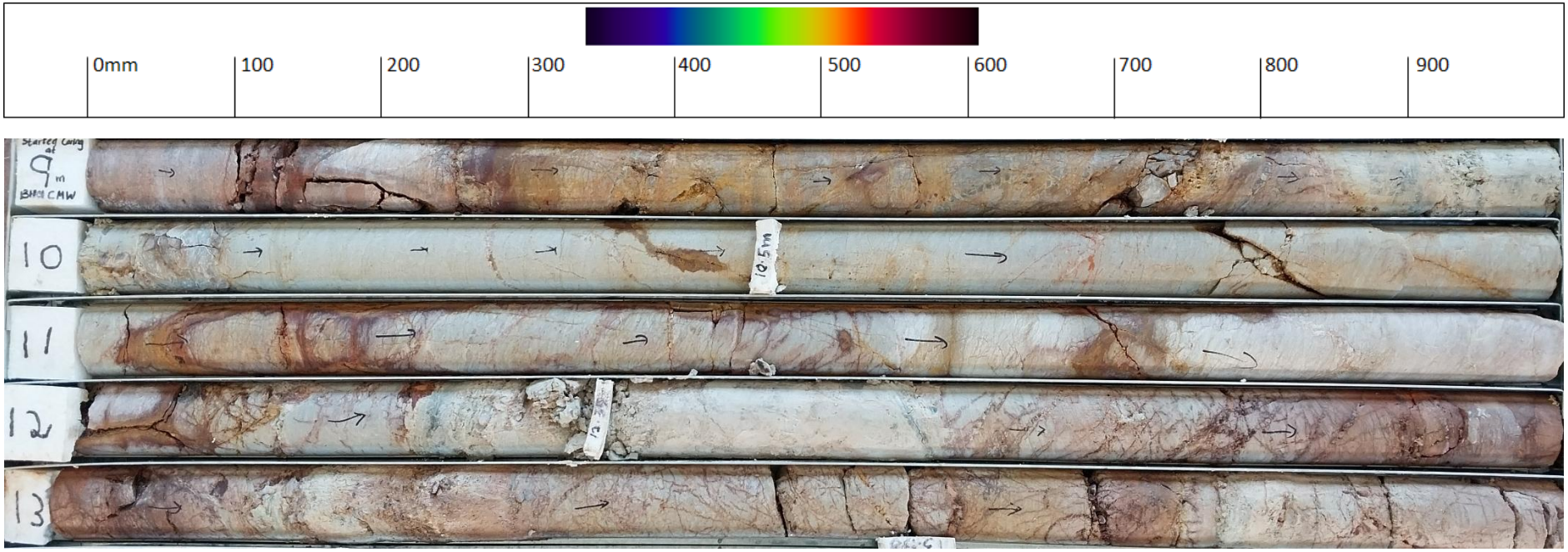
Logged by: HM Position: E.543468m N.6895841m Plant: Pioneer P160
Checked by: Mark A Elevation: 4.272 m (mAHD) Contractor: NCD

Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (VL L M H VH EH; UCS (MPa) 6 60; UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm) <20 20-40 40-100 100-300 300-1000 >1000	Samples, test results and additional Data
NML C			100	100	76		11		METASILTSTONE: fine to medium grained; pale grey-green with red and yellow; indistinctly gentle foliated; with some iron staining through rockmass						10.75m:JT, 55°, UN, SM, (Fe) Is50=0.07MPa 10.90m:PT, 5°, CU, SM, (Fe) 11.05m:PT, 5°, UN, RO, (Fe) 11.15m:PT, 5°, UN, RO, (Fe)
			100	87	65		12								11.50m:PT, 5°, UN, RO, (Fe) 11.65m:JT, 45°, IR, RO, (Fe) 12.10m:JT, 80°, CU, RO, (Fe) 12.55m:PT, 35°, PL, SM, (Clay) 12.80m:JT, 45°, PL, SM, (Fe)
			100	100	20		13								13.10m:JT, 40°, CU, SM, (Fe) 13.35m:JT, 45°, PL, SM, (Clay) 13.50m:PT, 5°, PL, RO Is50=0.66MPa 13.55m:PT, 5°, PL, SM, (Fe) 13.75m:JT, 10°, IR, SM, (Fe, Gravel) 13.90m:PT, 5°, PL, SM, (Clay)
							14		Borehole terminated at 14.0 m						
							15								

Termination reason: Target Material
Remarks:

CORE PHOTOGRAPHS: BH01-CMW

Client:	Eastview	**Project:**	Nalu
Location:	122 Marine Parade, Miami	**Project No:**	GOL2025-0134
Position:		**Date:**	October 2025
Angle:	Horizontal 90°	**Hole Diameter:**	NMLC
Plant:	P160	**Contractor:**	NCD
Logged by:	MR	**Checked by:**	MA



BH01-CMW: 9m to 14m

BOREHOLE LOG - BH02-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 08/10/2025 End Date: 08/10/2025 1:25 Sheet 1 of 3

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Logged by: MR Position: E.543438m N.6895868m Plant:
Checked by: Mark A Elevation: 4.155 m (mAHD) Angle from horizontal: 0° Contractor: North Coast

Drilling Method	Well	Groundwater	Coring: TCR	Coring: SCR	Coring: RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (VL L M H VH EH; 6; 60; UCS (MPa); UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm): <20; 20-40; 40-100; 100-300; 300-1000; >1000	Samples, test results and additional Data
ADH		▼				4.2			ASPHALT :						
						4.0			GC: Sandy clayey GRAVEL: fine to medium grained, angular; brown; sand, medium grained; clay is medium plasticity (FILL)						
						3.8			SP: SAND: fine to medium grained, rounded to sub-rounded, poorly graded; yellow to pale brown; trace organics (Dune sand).						0.50m:ES 1
						3.2	1		SM: Silty SAND: fine to medium grained, rounded to sub-rounded, cemented; brown to yellow; trace gravel, fine to medium grained, angular to sub-angular; (Indurated Sand).	MD	D to M				1.0m:SPT: (5,5,5) N=10 Rec.=450mm
															1.50-1.95m:SPTLS 3
							2								2.50m:ES 4
										L					2.5m:SPT: (1,3,4) N=7 Rec.=450mm
							3								
							4			D to VD	M to W				4.00-4.45m:SPTLS 7 4.00m:ES 6 4.0m:SPT: (17,21,29) N=50 Rec.=400mm
							5								

Termination reason: Target Material
Remarks:

BOREHOLE LOG - BH02-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 08/10/2025 End Date: 08/10/2025 1:25 Sheet 2 of 3

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Logged by: MR Position: E.543438m N.6895868m Plant:
Checked by: Mark A Elevation: 4.155 m (mAHD) Angle from horizontal: 0° Contractor: North Coast

Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (UCS (MPa) / UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm)	Samples, test results and additional Data
ADH							6		SM: Silty SAND: fine to medium grained, rounded to sub-rounded, cemented; brown to yellow; trace gravel, fine to medium grained, angular to sub-angular; (Indurated Sand).	D to VD	M to W				5.50-5.95m:SPTLS 7 5.5m:SPT: (12,14,19) N=33 Rec.=450mm
NML C			100	93	0	-2.8	7		METASILTSTONE: fine to medium grained; plae grey with red, indistinctly gently foliated; with some iron staining through rockmass, intermittent clay and XW zones.				MW		7.00-8.35m:C 8 7.0m:SPT: (50/12mm) N=R Rec.=0mm Is50=0.50MPa 7.10-7.30m:JT, 45°, UN, RO 7.10m:JT, 45°, UN, RO 7.40-7.50m:SM, (fine sand with traces of seashells and fine rounded gravels) 7.40m:JT, 30°, UN, RO 7.55m:JT, 25°, UN, RO 7.65m:, 45°, UN, RO 7.71m:, 45°, UN, RO, SN 7.80-7.95m:, 45°, UN, RO, CN, (silty clay) 7.98m:JT, 45°, UN, RO, SN 8.10m:JT, 25°, UN, RO, CN 8.27-8.32m:SS 8.40m:C 8.60m:JT, 45°, UN, RO, SN 8.70m:JT, 38°, CU, RO, CO, silty clay
			100	100	60		9						MW		9.10m:JT, 30°, UN, RO 9.26m:JT, 5°, UN, RO 9.56m:JT, 45°, UN, RO 9.57m:JT, 30°, UN, RO, CN 9.90m:C
							10								

Termination reason: Target Material
Remarks:

BOREHOLE LOG - BH02-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 08/10/2025 End Date: 08/10/2025 1:25 Sheet 3 of 3

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Logged by: MR Position: E.543438m N.6895868m Plant:
Checked by: Mark A Elevation: 4.155 m (mAHD) Angle from horizontal: 0° Contractor: North Coast

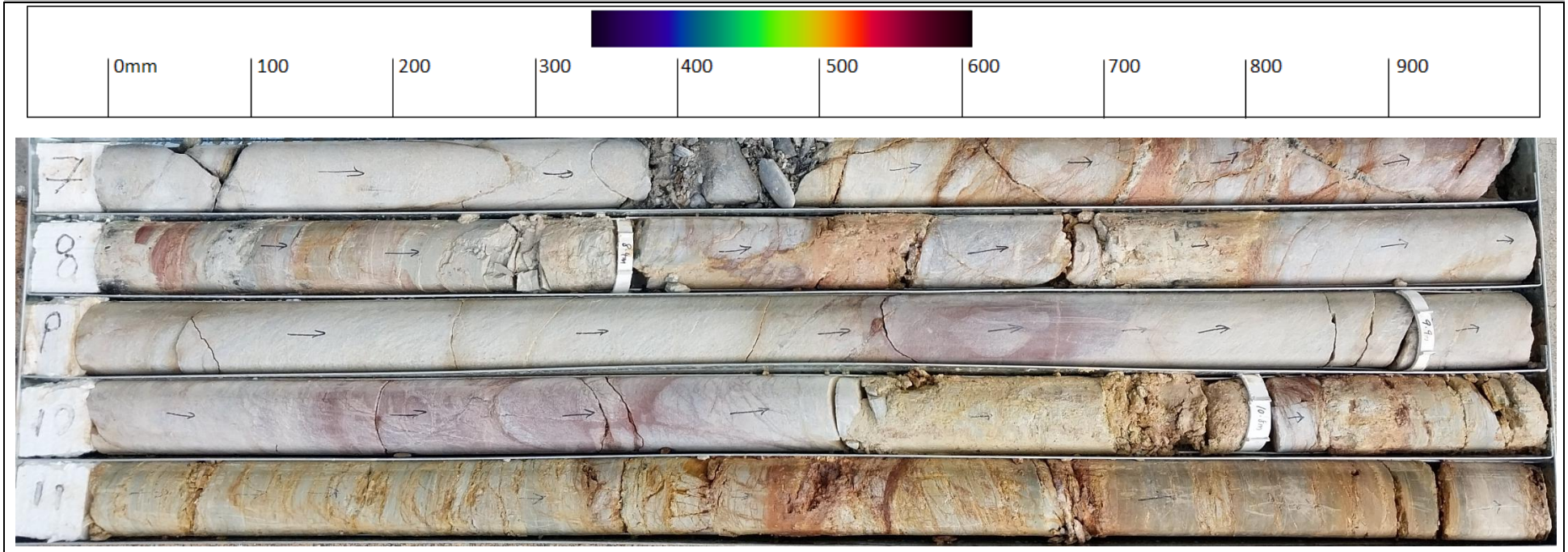
Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (VL L M H VH EH; UCS (MPa); UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm)	Samples, test results and additional Data
NML C			100	78	72	-6.3	11		METASILTSTONE: fine to medium grained; plae grey with red, indistinctly gently foliated; with some iron staining through rockmass, intermittent clay and XW zones.				MW		Is50=12.22MPa 10.20m:JT, 30°, UN, RO 10.34m:JT, 45°, UN, RO 10.37m:JT, 45°, UN, RO 10.52m:JT, 30°, UN, RO
									METAGREYWACKE: fine to medium grained; pale yellow grey; distinctly gently foliated; with some iron staining through rockmass. *... from 10.60m to 10.80m, XW clay zone*				XW		10.70-10.80m:CRS, (silty clay) 10.80m:C 10.84m:JT, 30°, UN, RO 10.92m:JT, 15°, UN, RO 10.95-11.00m:CRS, (silty clay) Is50=0.01MPa 11.10m:JT, 10°, UN, RO, SN
			100	100	75		12						MW		11.40m:JT, 0°, PL, RO, SN 11.66m:JT, 0°, PL, RO, SN 11.88m:JT, 0°, PL, RO, SN 11.91m:JT, 0°, UN, RO, SN
									Borehole terminated at 12.0 m						
							13								
							14								
							15								

Termination reason: Target Material
Remarks:

This report must be read in conjunction with accompanying notes and abbreviations.

CORE PHOTOGRAPHS: BH02-CMW

Client:	Eastview	**Project:**	Nalu
Location:	122 Marine Parade, Miami	**Project No:**	GOL2025-0134
Position:		**Date:**	October 2025
Angle:	Horizontal 90°	**Hole Diameter:**	NMLC
Plant:	P160	**Contractor:**	NCD
Logged by:	MR	**Checked by:**	MA



BH02-CMW: 7m to 12m

BOREHOLE LOG - BH03-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 07/10/2025 End Date: 08/10/2025 1:25 Sheet 1 of 2

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Logged by: MR Position: E.543384m N.6895820m Plant: NC
Checked by: Mark A Elevation: 4.325 m (mAHD) Contractor: North Coast

Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (UCS (MPa) / UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm)	Samples, test results and additional Data
						4.3			ASPHALT:						
						4.2			GC: Sandy clayey GRAVEL: fine to medium grained, angular; brown; sand, medium grained; clay is medium plasticity (FILL)						
						4.0			SC: Clayey SAND: fine to medium grained, sub-angular to sub-rounded ; red and brown; clay, low plasticity; (Extremely Weathered Material).						
AD/V											D				0.50m:ES 1
						3.3	1		METASILTSTONE: fine to medium grained; pale yellow grey; distinctly gently foliated; with some iron staining through rockmass.						1.00-1.45m:SPTLS 2 1.00-2.25m:C 3 1.0m:SPT: (30/100mm) N=R Rec.=80mm 1.05m:JT, 45°, UN, RO, CN Is50=10.66MPa 1.27m:JT, 30°, UN, RO, CO, Iron stain on joint surface 1.40m:JT, 45°, UN, RO, SN 1.50m:JT, 45°, UN, RO, SN 1.52m:JT, UN, RO, SN
			100	100	48										1.80m:JT, 45°, UN, RO, SN 1.90m:JT, 45°, UN, RO, SN
							2						HW		2.05m:JT, 45°, UN, RO, SN
															2.25m:JT, 45°, UN, RO, SN 2.25-3.40m:C 4 2.34m:JT, 30°, UN, RO 2.40m:JT, 20°, UN, RO, SN Is50=2.11MPa 2.55-2.60m:CRS
			100	100	63										
NML C							3				D				2.95m:JT, 25°, UN, RO 3.20-3.30m:SZ, (silty clay)
													MW		3.40-4.70m:C 5 3.45-3.55m:JT, 25°, UN, RO
			88	88	77		4								3.93m:JT, 10°, UN, RO, CN 4.20m:JT, 5°, UN, RO, CN
													MW to SW		4.50m:JT, 10°, UN, RO 4.70-6.00m:C 6 4.75-4.66m:CRS
							5								

Termination reason: Target Material
Remarks:

BOREHOLE LOG - BH03-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 07/10/2025 End Date: 08/10/2025 1:25 Sheet 2 of 2

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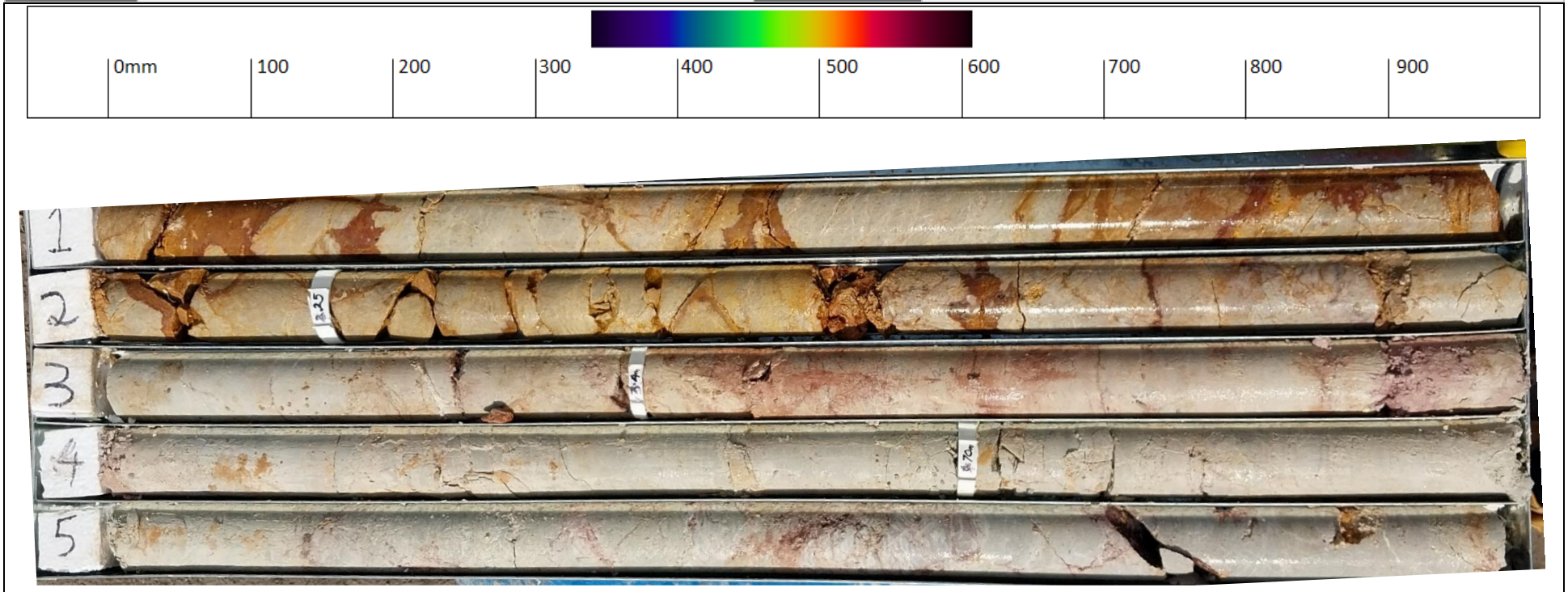
Logged by: MR Position: E.543384m N.6895820m Plant: NC
Checked by: Mark A Elevation: 4.325 m (mAHD) Contractor: North Coast

Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (VL L M H VH EH; 6; 60; UCS (MPa); UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm) (<20; 20-40; 40-100; 100-300; 300-1000; >1000)	Samples, test results and additional Data
NML C			100	100	85		6		METASILTSTONE: fine to medium grained; pale yellow grey; distinctly gently foliated; with some iron staining through rockmass.		D		MW to SW		5.78-5.82m:JT, 45°, UN, RO, CN Is50=0.70MPa
									Borehole terminated at 6.0 m						
							7								
							8								
							9								
							10								

Termination reason: Target Material
Remarks:

CORE PHOTOGRAPHS: BH03-CMW

Client:	Eastview	**Project:**	Nalu
Location:	122 Marine Parade, Miami	**Project No:**	GOL2025-0134
Position:		**Date:**	October 2025
Angle:	Horizontal 90°	**Hole Diameter:**	NMLC
Plant:	Boart Longyear LX6	**Contractor:**	Qest
Logged by:	MR	**Checked by:**	MA



BH03-CMW: 1m to 6m

BOREHOLE LOG - BH04-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 07/10/2025 End Date: 07/10/2025 1:25 Sheet 1 of 3

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Logged by: MR Position: E.543421m N.6895791m Plant: Boart Longyear LX6
Checked by: Mark A Elevation: 4.202 m (mAHD) Contractor: Quest

Drilling Method	Well	Groundwater	Coring: TCR	Coring: SCR	Coring: RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (VL L M H VH EH; 6; 60; UCS (MPa); UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm) (<20; 20-40; 40-100; 100-300; 300-1000; >1000)	Samples, test results and additional Data
ADH		▼				4.2			ASPHALT:						
						4.1			GC: Sandy clayey GRAVEL: fine to medium grained, angular; brown; sand, medium grained; clay is medium plasticity (FILL)		D to M				
						4.0			SP: SAND: fine to medium grained, rounded to sub-rounded, poorly graded; yellow to pale brown; trace organics (Dune sand).						0.50m:ES 1
							1								1.00-1.45m:SPTLS 5 1.00m:ES 2 1.0m:SPT: (2,4,4) N=8 Rec.=300mm
										L					1.50m:ES 3
							2				M				2.00m:ES 4
															2.50-2.95m:SPTLS 9 2.50m:ES 6 2.5m:SPT: (1,1,1) N=2 Rec.=450mm
							3			VL					3.00m:ES 7
															3.50m:ES 8
							4				W				4.00-4.45m:SPTLS 10 4.0m:SPT: (1,3,10) N=13 Rec.=300mm
										MD					
							5								

Termination reason: Target Material
Remarks:

BOREHOLE LOG - BH04-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 07/10/2025 End Date: 07/10/2025 1:25 Sheet 2 of 3

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Logged by: MR Position: E.543421m N.6895791m Plant: Boart Longyear LX6
Checked by: Mark A Elevation: 4.202 m (mAHD) Contractor: Quest

Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (VL L M H VH EH; 6 60; UCS (MPa) UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm) (<20 20-40 40-100 100-300 300-1000 >1000)	Samples, test results and additional Data
ADH									SP: SAND: fine to medium grained, rounded to sub-rounded, poorly graded; yellow to pale brown; trace organics (Dune sand).	MD	W				
						-1.3			GW: Sandy Cobbly GRAVEL : course grained, rounded to sub-rounded; red-grey to yellow-orange; sand, fine to coarse grained, cobbles up to 60mm, trace fines, low plasticity; (Alluvium? Colluvium?).						5.50-6.50m: Core loss 5.50-5.60m:SPTLS 11 5.50-7.00m:C 12 5.5m:SPT: (30/105mm) N=R Rec.=125mm
			17	0	0		6			VD					
						-2.7	7		METASILTSTONE: fine to medium grained; paLe grey with red, indistinctly gently foliated; with some iron staining through joints.						7.00m:JT, 30°, UN, RO 7.00-7.50m:C 13
			100	80	20										7.15m:JT, 30°, UN, RO 7.18m:JT, 25°, UN, RO 7.22m:JT, 30°, UN, RO 7.28m:JT, 35°, UN, RO 7.35m:JT, 30°, UN, RO Is50=1.44MPa
NML C															7.50m:JT, 0°, UN, RO 7.50-8.50m:C 14 7.53m:JT, 10°, UN, RO 7.60m:JT, 15°, UN, RO 7.65m:JT, 15°, UN, RO 7.70m:JT, 15°, UN, RO 7.77m:JT, 25°, UN, RO 7.92m:JT, 25°, UN, RO
			100	100	44		8								8.10m:JT, 25°, UN, RO 8.20-8.35m:JT, 70°, UN, RO
													MW		8.45m:JT, 30°, UN, RO 8.50-10.20m:C 16 8.60m:JT, 15°, CU, RO 8.65-8.70m:JT, 40°, UN, RO
			100	100	88		9								8.90m:JT, 25°, UN, RO 9.00-9.15m:JT, 30°, UN, RO 9.28m:JT, 10°, UN, RO 9.45-9.50m:JT, 5°, UN, RO 9.70m:JT, 0°, UN, RO 9.80-9.90m:, 15°, UN, RO Is50=1.35MPa
							10								

Termination reason: Target Material
Remarks:

BOREHOLE LOG - BH04-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 07/10/2025 End Date: 07/10/2025 1:25 Sheet 3 of 3

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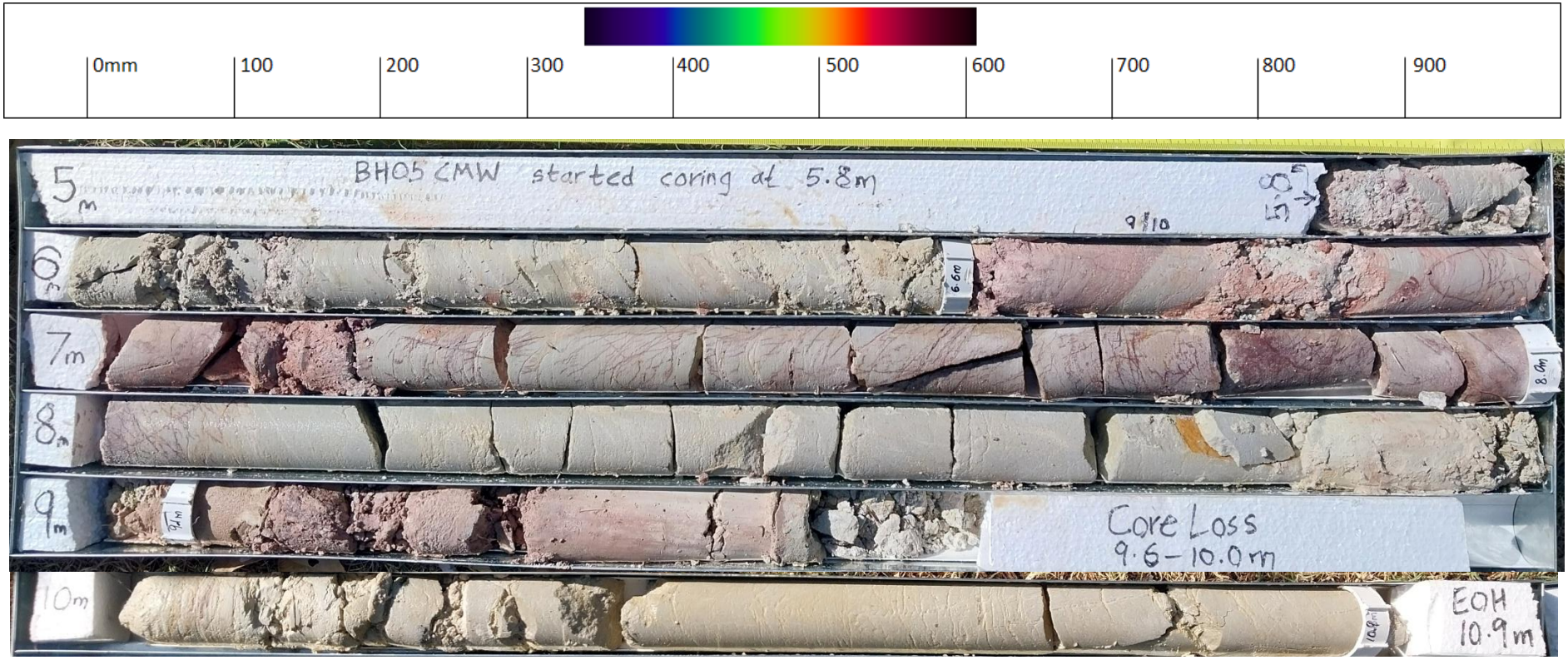
Logged by: MR Position: E.543421m N.6895791m Plant: Boart Longyear LX6
Checked by: Mark A Elevation: 4.202 m (mAHD) Contractor: Quest

Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (VL L M H VH EH; 6; 60; UCS (MPa); UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm) (<20; 20-40; 40-100; 100-300; 300-1000; >1000)	Samples, test results and additional Data
NML C			100	100	0				METASILTSTONE: fine to medium grained; paLe grey with red, indistinctly gently foliated; with some iron staining through joints.				MW		10.05m:, 25°, UN, RO, (silty sand) 10.15m:JT, 5°, UN, RO, VN 10.18m:JT, 5°, UN, RO 10.20-10.80m:C 17
									Borehole terminated at 10.5 m						10.60-1.75m:IFS, (clay)
							11								
							12								
							13								
							14								
							15								

Termination reason: Target Material
Remarks:

CORE PHOTOGRAPHS: BH05-CMW

Client:	Eastview	**Project:**	Nalu
Location:	122 Marine Parade, Miami	**Project No:**	GOL2025-0134
Position:		**Date:**	October 2025
Angle:	Horizontal 90°	**Hole Diameter:**	NMLC
Plant:	Geo205	**Contractor:**	MGS
Logged by:	MR	**Checked by:**	MA



BH05-CMW: 5m to 11m

BOREHOLE LOG - BH05-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 09/10/2025 End Date: 09/10/2025 1:25 Sheet 1 of 3

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Logged by: MR Position: E.543419m N.6895815m Plant: GEO205
Checked by: Mark A Elevation: 4.406 m (mAHD) Contractor: Mapstone

Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (VL L M H VH EH; UCS (MPa) 6 60; UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm) <20 20-40 40-100 100-300 300-1000 >1000	Samples, test results and additional Data
AD/V		▼				4.4 4.3	0 1 2 3 4 5		SM: Silty SAND: fine grained, rounded to sub-rounded; pale grey to yellow; low plasticity fines, with organics (Topsoil). SP: SAND: fine to medium grained, rounded to sub-rounded, poorly graded; yellow to pale brown; trace organics (Dune sand).	D MD L MD	D D to M M				0.50m:ES 1 1.00-1.45m:SPTLS 3 1.00m:ES 2 1.0m:SPT: (3,6,7) N=13 Rec.=150mm 1.50m:ES 10 2.50-2.95m:SPTLS 6 2.50m:ES 4 2.5m:SPT: (7,3,3) N=6 Rec.=450mm 3.00m:ES 5 3.50m:ES 7 4.00-4.45m:SPTLS 8 4.0m:SPT: (1,3,8) N=11 Rec.=450mm

Termination reason: Target Material
Remarks:

BOREHOLE LOG - BH05-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 09/10/2025 End Date: 09/10/2025 1:25 Sheet 2 of 3

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Logged by: MR Position: E.543419m N.6895815m Plant: GEO205
Checked by: Mark A Elevation: 4.406 m (mAHD) Contractor: Mapstone

Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (UCS (MPa) / UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm)	Samples, test results and additional Data
AD/V									SP: SAND: fine to medium grained, rounded to sub-rounded, poorly graded; yellow to pale brown; trace organics (Dune sand).	MD	M				5.50-5.80m:SPTLS 9 5.5m:SPT: (27,30/85mm) N=R Rec.=300mm
										VD					
						-1.4			METASILTSTONE: fine to medium grained; pale grey with red; distinctly gently foliated; with some iron staining through joints, intermittent XW zones and clay seams.						5.80-6.60m:C 11
			100	100	0		6								5.90-6.10m:JT, 45°, UN, RO, CO, silty clay 5.90m:JT, 45°, UN, RO, CO, silty clay 6.10m:JT, 30°, UN, RO, CO, silty clay 6.24m:JT, 20°, UN, RO, CO, silty clay 6.40m:JT, 30°, UN, RO, CO 6.50m:JT, 30°, UN, RO, CO 6.60m:JT, 45°, UN, RO, SN Is50=0.84MPa Is50=5.55MPa
			100	100	56		7						MW		6.80-6.90m:EWS, SN 6.90m:JT, UN, RO, SN Is50=1.93MPa 7.10m:JT, 45°, UN, RO, SN 7.30m:JT, 15°, UN, RO, SN 7.45m:JT, 10°, UN, RO, SN 7.55-7.66m:JT, 45°, UN, RO, SN
NML C			100	100	29		8				M				7.80-7.90m:JT, 45°, UN, RO, SN 7.95m:JT, 30°, UN, RO, SN 8.20m:JT, 30°, UN, RO, CO 8.30m:JT, 15°, UN, RO, CO 8.42m:JT, 15°, UN, RO, CO 8.50m:JT, 15°, UN, RO, CN Is50=2.94MPa 8.60m:JT, 10°, UN, RO, CN 8.70m:JT, 10°, UN, RO, CN 8.80-8.85m:JT, 45°, UN, RO, SN
			89	11	0	-5.2	9		CORE LOSS:				HW		8.90-9.15m:EWS, grey mottled red brown silty sand with medium sub-angular to sub-rounded gravels 9.15-9.30m:EWS, HW greywacke with fine to medium sub-angular to sub-rounded sand 9.30-9.60m:EWS, grey mottled red brown silty sand traces medium sub-angular to sub-rounded gravels
						-5.6	10								Is50=0.20MPa

Termination reason: Target Material
Remarks:

BOREHOLE LOG - BH05-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 09/10/2025 End Date: 09/10/2025 1:25 Sheet 3 of 3

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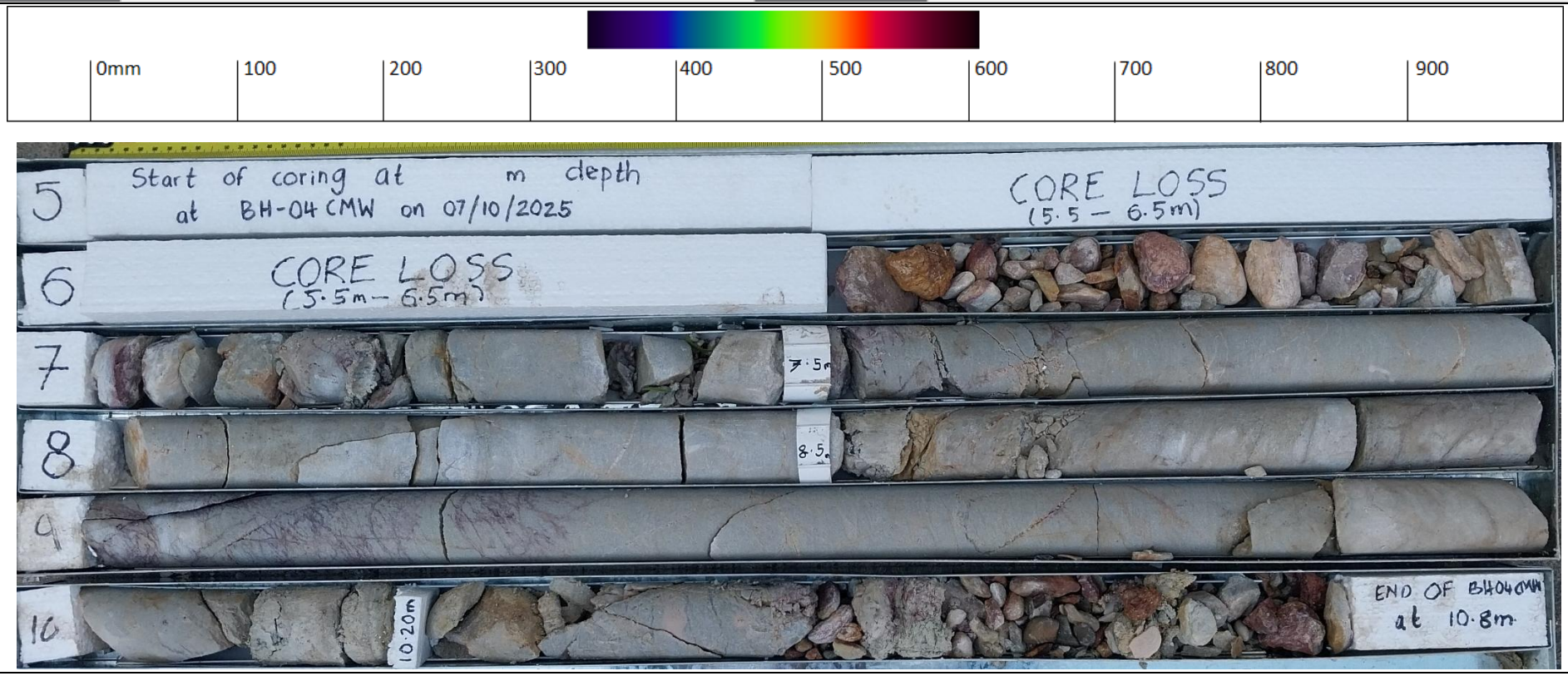
Logged by: MR Position: E.543419m N.6895815m Plant: GEO205
Checked by: Mark A Elevation: 4.406 m (mAHD) Contractor: Mapstone

Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (VL L M H VH EH; UCS (MPa) 6 60; UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm) <20 20-40 40-100 100-300 300-1000 >1000	Samples, test results and additional Data
NMLC			100	100	42				METASILTSTONE: fine to medium grained , grey mottled brown to grey , wet		M		MW		10.10-10.30m:CRS 10.35m:JT, 30°, UN, RO, CO 10.55-10.60m:JT, 45°, UN, RO, SN
									Borehole terminated at 10.9 m						
							11								
							12								
							13								
							14								
							15								

Termination reason: Target Material
Remarks:

CORE PHOTOGRAPHS: BH04-CMW

Client:	Eastview	**Project:**	Nalu
Location:	122 Marine Parade, Miami	**Project No:**	GOL2025-0134
Position:		**Date:**	October 2025
Angle:	Horizontal 90°	**Hole Diameter:**	NMLC
Plant:	P160	**Contractor:**	NCD
Logged by:	MR	**Checked by:**	MA



BH04-CMW: 5m to 11m

BOREHOLE LOG - BH06-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 09/10/2025 End Date: 10/10/2025 1:25 Sheet 1 of 3

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Logged by: MR Position: E.543427m N.6895837m Plant: Geo 205
Checked by: Mark A Elevation: 4.499 m (mAHD) Contractor: Mapstone

Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (VL L M H VH EH; 6; 60; UCS (MPa); UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm) (<20; 20-40; 40-100; 100-300; 300-1000; >1000)	Samples, test results and additional Data
						4.5			SM: Silty SAND: fine grained, rounded to sub-rounded; pale grey to yellow; low plasticity fines, with organics (Topsoil).		D				
						4.4			SP: SAND: fine to medium grained, rounded to sub-rounded, poorly graded; yellow to pale brown; trace organics (Dune sand).						
							1								1.00m:SPTLS 1 1.0m:SPT: (4,5,6) N=11 Rec.=450mm
											M				
							2			MD					
ADH															2.50m:SPTLS 2 2.5m:SPT: (4,5,8) N=13 Rec.=450mm
		▼					3								
							4				W				4.00m:SPTLS 3 4.0m:SPT: (1,2,2) N=4 Rec.=450mm
										L					
							5								

Termination reason: Target Material
Remarks:

BOREHOLE LOG - BH06-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 09/10/2025 End Date: 10/10/2025 1:25 Sheet 2 of 3

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Logged by: MR Position: E.543427m N.6895837m Plant: Geo 205
Checked by: Mark A Elevation: 4.499 m (mAHD) Contractor: Mapstone

Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (UCS (MPa) / UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm)	Samples, test results and additional Data
ADH									SP: SAND: fine to medium grained, rounded to sub-rounded, poorly graded; yellow to pale brown; trace organics (Dune sand).	L	W				5.50m:SPTLS 4 5.5m:SPT: (8/110mm) N=R Rec.=0mm
										VD					
			90	80	12	-1.5	6		METAGREYWACKE: fine to medium grained; red; distinctly gently foliated; with some iron staining through rockmass; breacciated				MW		6.00-7.00m:C 5 6.12-6.16m:JT, 45°, UN, RO, SN Is50=2.86MPa Is50=5.98MPa 6.30m:JT, 15°, UN, RO, SN
						-2.2			CORE LOSS:				XW		6.60-6.70m:CRS, (medium to coarse, angular to sub-angular, red mottled brown,grey sand with traces of fine to medium, angular to sub-angular, red mottled brown, gravels)
			100	45	15	-2.5	7		METASILTSTONE: fine grained, dark grey mottled pale grey, extremely weathered throughout with intermittent rock fabric observed; brecciated throughout;				XW		6.75-7.20m:EWS 6.75m:JT, UN, RO, SN 7.00-8.30m:C 6 7.90-8.00m:EWS
			80	55	0		8		... at 8.30m, colour become pale grey						8.00-8.20m:EWS 8.00m:C 8.30m:JT, UN, RO, CO, silty clay with sand 8.35m:JT, 30°, UN, RO, CO, silty clay with sand 8.40-8.50m:JT, 45°, UN, RO, CO, silty clay with sand 8.55m:JT, 45°, UN, RO, CO, silty clay with sand 8.77m:JT, 15°, UN, RO, CO, silty clay with sand
						-4.3			CORE LOSS:						
			100	100	90	-4.5	9		METAGREYWACKE: fine to medium grained; dark grey with pale grey-red streaks, distinctly gently foliated; with some iron staining through rockmass; intermittent clay seams.				HW		9.00m:C 9.50m:JT, 45°, UN, RO, SN
						-5.5	10								10.00m:C

Termination reason: Target Material
Remarks:

BOREHOLE LOG - BH06-CMW

Client: Eastview
Project: NALU
Location: 122 Marine Parade, Miami QLD 4220 Sub Location:
Project ID: GOL2025-0134
Start Date: 09/10/2025 End Date: 10/10/2025 1:25 Sheet 3 of 3

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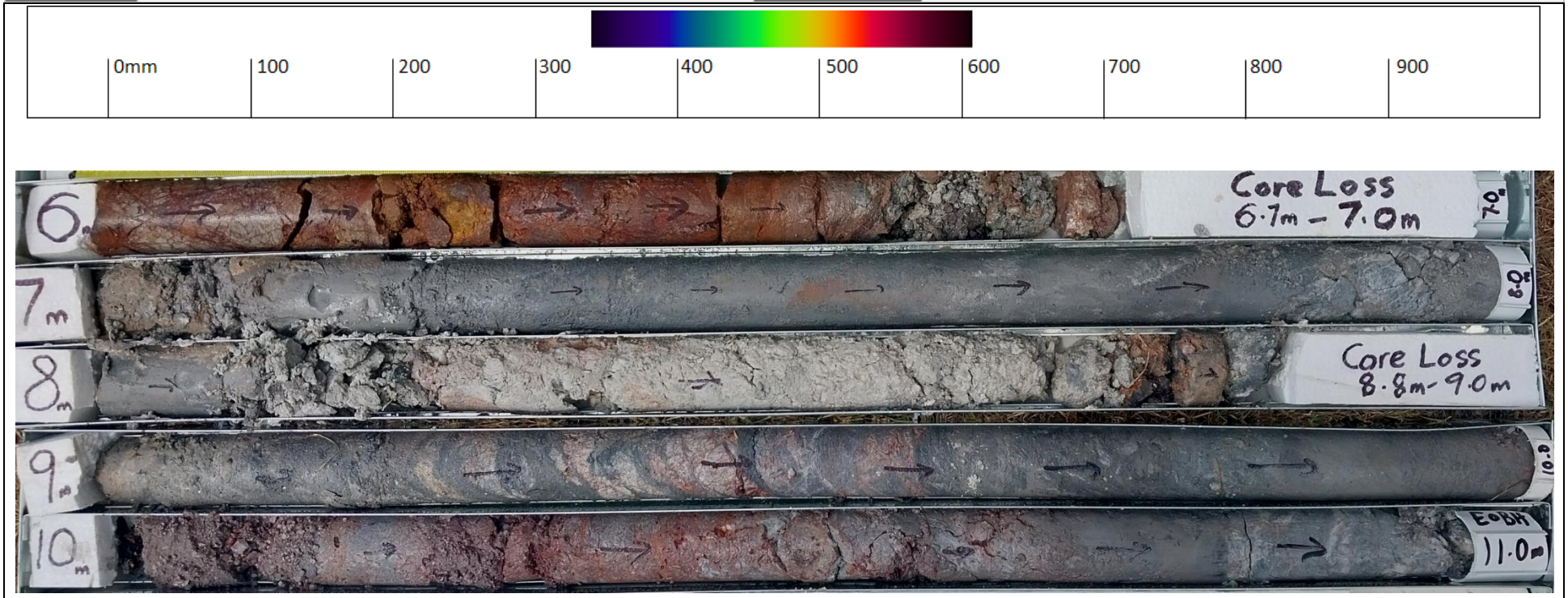
Logged by: MR Position: E.543427m N.6895837m Plant: Geo 205
Checked by: Mark A Elevation: 4.499 m (mAHD) Contractor: Mapstone

Drilling Method	Well	Groundwater	Coring TCR	Coring SCR	Coring RQD	RL (m)	Depth (m)	Graphic Log	Rock/Soil Description	Consistency	Moisture Condition	Rock Strength (VL L M H VH EH; 6; 60; UCS (MPa); UCS (from Is50))	Cementation/ Weathering	Defect Spacing (mm) (<20; 20-40; 40-100; 100-300; 300-1000; >1000)	Samples, test results and additional Data
NML C			100	90	45		11		METAGREYWACKE : fine grained, dark grey mottled pale grey, extremely weathered throughout with intermittent rock fabric observed; brecciated throughout; *... at 10.00m, colour becoming dark red* Borehole terminated at 11.0 m				HW MW		Is50=0.12MPa Is50=0.17MPa 10.40-10.50m:CRS 10.70-10.80m:JT, UN, RO, SN 10.80-11.00m:JT, 45°, UN, RO, SN Is50=0.82MPa

Termination reason: Target Material
Remarks:

CORE PHOTOGRAPHS: BH06-CMW

Client:	Eastview	**Project:**	Nalu
Location:	122 Marine Parade, Miami	**Project No:**	GOL2025-0134
Position:		**Date:**	October 2025
Angle:	Horizontal 90°	**Hole Diameter:**	NMLC
Plant:	Geo205	**Contractor:**	MGS
Logged by:	MR	**Checked by:**	MA



BH06-CMW: 6m to 11m

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APPENDIX C
Lab Results

Construction Sciences
a kiwa company

Brisbane South Laboratory
57 Mudgee Street, Kingston, QLD, 4114
Phone: 07 3320 8500
Email/Fax: Brisbane@constructionsciences.net

Report for
Determination of Uniaxial Compressive Strength -
Rock Strength Less Than 50 Mpa

Client:	13385 - Construction Sciences Gold Coast Lab	Report No:	1979/ER/2964-1
Address:	21 Activity Cres Molendinar Qld 4214	Project No:	1979/P/777
		Request No:	1979/T/25-17675
Project:	Laboratory Testing	Sample No:	1979/S/25-97359
		Client Request Ref:	13385/CC/2263
Client Reference:	13385/S/25-64020	Area / Location:	Nalu, 122 Marine Parade, Miami Beach
Component:		Bore Hole/Test Pit	CMW-BH03
Sample Source:	On-Site	Depth below ESL	1.50-1.70
Sample Description:	Rock Core		- -
Sampling Method:	Tested As Received		- -
Sampled By:	Client Supplied	Date Sampled:	13/10/25
Tested By:	TR	Date Tested:	14/10/25

Test Method: AS 4133.4.2.2

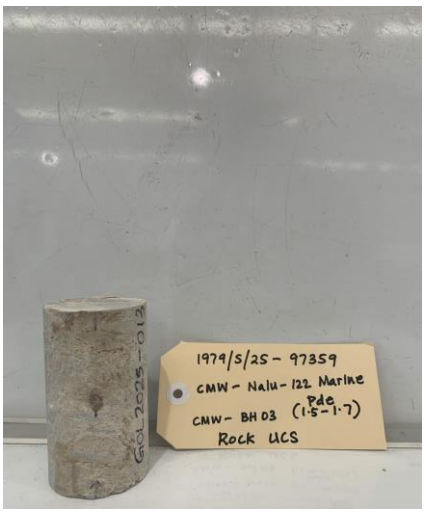
Condition at Test:	'As Received' Moisture Content	Storage Curing/Environment:	
Storage Period: (Days)			Tested As Received
Moisture Content: (%)	0.5	(AS 4133.1.1.1)	
Average Diameter: (mm)	51.6	Height: (mm)	100.9
Rate of Displacement: (mm/min)	0.010	Test Duration: (hh:mm:ss)	00:10:02

Uniaxial Compressive Strength (MPa): 14

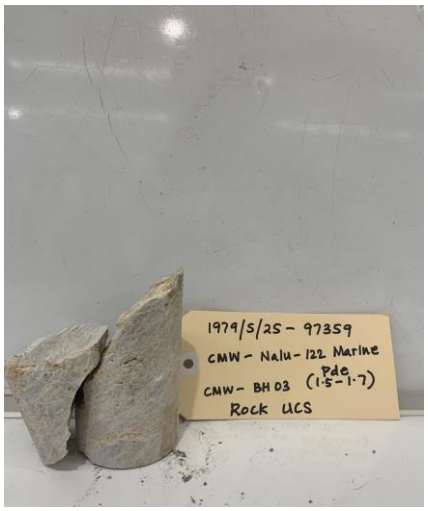
Description of Failure: Single Shear Plane

Photographs:

Before Test



After Test



Remarks: Results Apply to the Sample(s) as Received
The length to diameter ratio falls outside the test method limits of 2:1 to 3:1

NATA
WORLD RECOGNISED
ACCREDITATION

Corporate Site Number: 1979
Accreditation Number: 1986

Accredited for Compliance with ISO/IEC 17025 - Testing.

RRathnayake

Name: Theja Rathnayake
Function: Authorised Signatory
Date: 16-Oct-25

Construction Sciences
a kiwa company

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
21 Activity Crescent,
Molendinar QLD 4214

Laboratory: Gold Coast Laboratory
Phone: 07 5597 2720
Fax:
Email: GoldCoast@constructionsciences.net

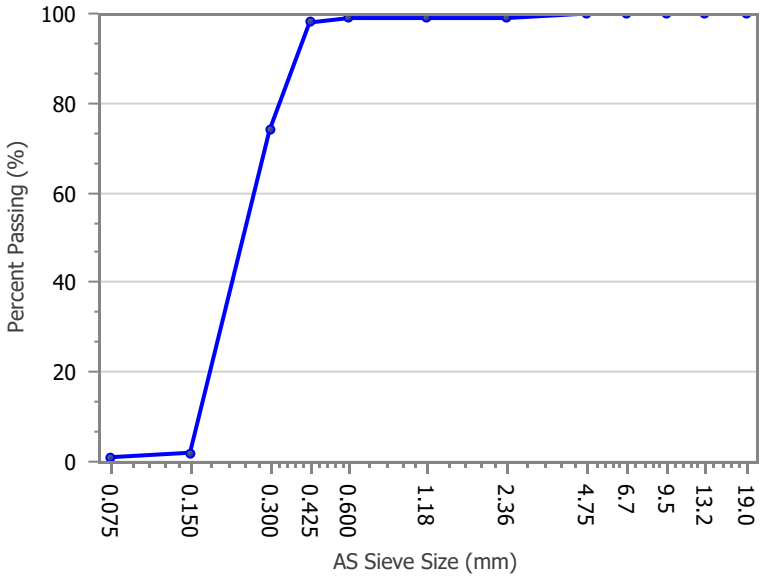
QUALITY OF MATERIALS REPORT

Client:	CMW Geosciences	Report Number:	13385/R/25-25079-1
Client Address:	Level 3, 1 Breakfast Creek Rd, NEWSTEAD	Project Number:	13385/P/1525
Project:	Nalu, 122 Marine Parade, Miami Beach	Lot Number:	-
Location:	(various)	Internal Test Request:	13385/T/25-13892
Component:	Bore Hole Testing	Client Reference/s:	GOL2025-0134
Area Description:	On-Site	Report Date / Page:	15/10/2025 Page 1 of 2

Test Procedures	AS1289.3.6.1, AS1289.1.1, AS1289.3.1.2, AS1289.3.2.1, AS1289.3.3.1			
Sample Number	13385/S/25-64018	Location		CMW-BH02
Client Reference	GOL2025-0134			
Sampling Method	Tested As Received			
Sampled By	Client Supplied	Depth	m	1.00 - 1.45
Date Sampled/Tested	13/10/2025 / 15/10/2025	Material Source	Insitu	
PSD Preparation	Unwashed / Oven	Material Type	Insitu	
Atterberg Preparation	- / Oven Dried	Prep Material > 53.0mm (%)		
Material Description	SP SAND			

AS Sieve (mm)	Specification Minimum (%)	Percent Passing (%)	Specification Maximum (%)
19.0		**100**	
13.2		**100**	
9.5		**100**	
6.7		**100**	
4.75		**100**	
2.36		**99**	
1.18		**99**	
0.600		**99**	
0.425		**98**	
0.300		**74**	
0.150		**2**	
0.075		**1**	

PARTICLE SIZE DISTRIBUTION GRAPH



Test Result	Specification Minimum (%)	Result	Specification Maximum (%)	Test Result	Specification Minimum (%)	Result	Specification Maximum (%)
Liquid Limit (%)		**Can't be determined**		0.075/0.425 Fines Ratio		**0.01**	
Plastic Limit (%)		**Can't be determined**		PI x 0.425 Ratio (%)		**-**	
Plastic Index (%)		**Non Plastic**		LS x 0.425 Ratio (%)		**-**	
Linear Shrinkage (%)				Shrinkage Observations			

Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 13385

Approved Signatory: Steven Whatley
Form ID: W85Rep Rev 3

Construction Sciences
a kiwa company

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
21 Activity Crescent,
Molendinar QLD 4214

Laboratory: Gold Coast Laboratory
Phone: 07 5597 2720
Fax:
Email: GoldCoast@constructionsciences.net

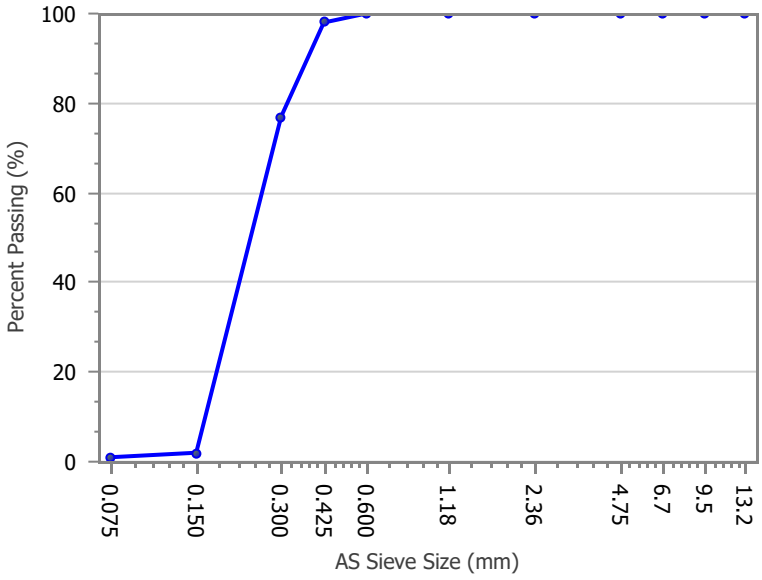
QUALITY OF MATERIALS REPORT

Client:	CMW Geosciences	Report Number:	13385/R/25-25079-1
Client Address:	Level 3, 1 Breakfast Creek Rd, NEWSTEAD	Project Number:	13385/P/1525
Project:	Nalu, 122 Marine Parade, Miami Beach	Lot Number:	-
Location:	(various)	Internal Test Request:	13385/T/25-13892
Component:	Bore Hole Testing	Client Reference/s:	GOL2025-0134
Area Description:	On-Site	Report Date / Page:	15/10/2025 Page 2 of 2

Test Procedures	AS1289.3.6.1, AS1289.1.1, AS1289.3.1.2, AS1289.3.2.1, AS1289.3.3.1			
Sample Number	13385/S/25-64019	Location		CMW-BH05
Client Reference	GOL2025-0134			
Sampling Method	Tested As Received			
Sampled By	Client Supplied	Depth	m	1.00 - 1.45
Date Sampled/Tested	13/10/2025 / 15/10/2025	Material Source	Insitu	
PSD Preparation	Unwashed / Oven	Material Type	Insitu	
Atterberg Preparation	- / Oven Dried	Prep Material > 53.0mm (%)		
Material Description	SP SAND			

AS Sieve (mm)	Specification Minimum (%)	Percent Passing (%)	Specification Maximum (%)
13.2		**100**	
9.5		**100**	
6.7		**100**	
4.75		**100**	
2.36		**100**	
1.18		**100**	
0.600		**100**	
0.425		**98**	
0.300		**77**	
0.150		**2**	
0.075		**1**	

PARTICLE SIZE DISTRIBUTION GRAPH



Test Result	Specification Minimum (%)	Result	Specification Maximum (%)	Test Result	Specification Minimum (%)	Result	Specification Maximum (%)
Liquid Limit (%)		**Can't be determined**		0.075/0.425 Fines Ratio		**0.01**	
Plastic Limit (%)		**Can't be determined**		PI x 0.425 Ratio (%)		**-**	
Plastic Index (%)		**Non Plastic**		LS x 0.425 Ratio (%)		**-**	
Linear Shrinkage (%)				Shrinkage Observations			

Remarks	Results apply to the sample/s as received.,

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 13385

Approved Signatory: Steven Whatley
Form ID: W85Rep Rev 3

Construction Sciences
a kiwa company

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
21 Activity Crescent,
Molendinar QLD 4214

Laboratory: **Gold Coast Laboratory**
Phone: 07 5597 2720
Fax:
Email: GoldCoast@constructionsciences.net

MOISTURE CONTENT REPORT

Client:	CMW Geosciences	Report Number:	13385/R/25-25080-1
Client Address:	Level 3, 1 Breakfast Creek Rd, NEWSTEAD	Project Number:	13385/P/1525
Project:	Nalu, 122 Marine Parade, Miami Beach	Lot Number:	-
Location:	(various)	Internal Test Request:	13385/T/25-13892
Component:	Bore Hole Testing	Client Reference/s:	GOL2025-0134
Area Description:	On-Site	Report Date / Page:	15/10/2025 Page 1 of 1

Test Procedures:	AS1289.2.1.1, AS1289.1.1

Sample Number		13385/S/25-64018	13385/S/25-64019		
ID / Client ID		GOL2025-0134	GOL2025-0134		
Lot Number		-	-		
Date / Time Sampled		13/10/2025	13/10/2025		
Sampling Method		Tested As Received	Tested As Received		
Sampled By		Client Supplied	Client Supplied		
Tested By		Deanne Towie	Deanne Towie		
Date Tested		14/10/2025	14/10/2025		
Material Source		Insitu	Insitu		
Material Type		Insitu	Insitu		
Location		CMW-BH02	CMW-BH05		
Depth	m	1.00 - 1.45	1.00 - 1.45		
Moisture Content (%)		**3.0**	**2.3**		

Sample Number					
ID / Client ID					
Lot Number					
Date / Time Sampled					
Sampling Method					
Sampled By					
Tested By					
Date Tested					
Material Source					
Material Type					
Location					
Depth	m				
Moisture Content (%)					

Remarks	Results apply to the sample/s as received.,

NATA

Accredited for compliance with ISO/IEC 17025 – Testing

Accreditation Number: 1986
Corporate Site Number: 13385

Approved Signatory: Steven Whatley
Form ID: W20Rep Rev 3

CMW Geosciences (East Coast)
21 Activity Crescent
Molendinar
QLD 4214

NATA Accredited
Accreditation Number 1261
Site Number 20794 & 2780

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: **Mark argent**

Report **1280696-S**
Project name NALU 122 MARINE PARADE MIAMI BEACH
Project ID GOI2025-0134
Received Date Oct 15, 2025

Client Sample ID			**CMW-BH05 0.5**	**CMW-BH05 1.0**	**CMW-BH05 2.0**	**CMW-BH05 2.5**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**B25-Oc0047649**	**B25-Oc0047650**	**B25-Oc0047651**	**B25-Oc0047652**
Date Sampled			**Not Provided**[I12]	**Not Provided**[I12]	**Oct 09, 2025**	**Not Provided**[I12]
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.4	6.5	6.3	6.6
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.5	4.0	3.6	4.0
Reaction Ratings*[S05]	0	-	2.0	2.0	4.0	2.0
Chloride	5	mg/kg	-	-	64	-
Conductivity (1:5 aqueous extract at 25 °C as rec.)	10	uS/cm	-	-	13	-
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	-	-	6.6	-
Resistivity*	0.5	ohm.m	-	-	630	-
Sulphate (as SO4)	30	mg/kg	-	-	< 30	-
Sample Properties						
% Moisture	1	%	-	-	1.9	-

Client Sample ID			**CMW-BH05 3.0**	**CMW-BH05 3.5**	**CMW-BH04 0.5**	**CMW-BH04 1.0**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**B25-Oc0047653**	**B25-Oc0047654**	**B25-Oc0047655**	**B25-Oc0047656**
Date Sampled			**Not Provided**[I12]	**Not Provided**[I12]	**Not Provided**[I12]	**Not Provided**[I12]
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.7	6.9	7.4	7.4
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.1	4.7	4.9	5.5
Reaction Ratings*[S05]	0	-	3.0	3.0	4.0	3.0
Chloride	5	mg/kg	< 5	-	-	78
Conductivity (1:5 aqueous extract at 25 °C as rec.)	10	uS/cm	< 10	-	-	< 10
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	7.1	-	-	7.5
Resistivity*	0.5	ohm.m	1300	-	-	1100
Sulphate (as SO4)	30	mg/kg	< 30	-	-	34
Sample Properties						
% Moisture	1	%	19	-	-	20

Client Sample ID			CMW-BH04 2.0	CMW-BH04 2.5
Sample Matrix			Soil	Soil
Eurofins Sample No.			B25-Oc0047657	B25-Oc0047658
Date Sampled			Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit		
Acid Sulfate Soils Field pH Test				
pH-F (Field pH test)*	0.1	pH Units	7.2	7.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	5.4	5.4
Reaction Ratings*[S05]	0	-	3.0	3.0
Chloride	5	mg/kg	< 5	-
Conductivity (1:5 aqueous extract at 25 °C as rec.)	10	uS/cm	29	-
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	7.1	-
Resistivity*	0.5	ohm.m	1700	-
Sulphate (as SO4)	30	mg/kg	< 30	-
Sample Properties				
% Moisture	1	%	23	-

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	Brisbane	Oct 20, 2025	7 Days
- Method: LTM-GEN-7060 Determination of field pH (pHF) and field pH peroxide (pHFOX) tests			
Chloride	Melbourne	Oct 17, 2025	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Conductivity (1:5 aqueous extract at 25 °C as rec.)	Brisbane	Oct 20, 2025	7 Days
- Method: LTM-INO-4030 Conductivity			
pH (1:5 Aqueous extract at 25 °C as rec.)	Brisbane	Oct 20, 2025	7 Days
- Method: LTM-GEN-7090 pH in water by ISE			
Sulphate (as SO4)	Melbourne	Oct 17, 2025	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
% Moisture	Brisbane	Oct 16, 2025	14 Days
- Method: LTM-GEN-7080 Moisture			

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

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
+61 7 3902 4600
NATA# 1261
Site# 20794 & 2780

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370 & 2554

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

Company Name: CMW Geosciences (East Coast)
Address: 21 Activity Crescent
Molendinar
QLD 4214

Project Name: NALU 122 MARINE PARADE MIAMI BEACH
Project ID: GOI2025-0134

Order No.:
Report #: 1280696
Phone:
Fax:

Received: Oct 15, 2025 5:32 PM
Due: Oct 23, 2025
Priority: 5 Day
Contact Name: Mark argent

Eurofins Analytical Services Manager : Zoe Flynn

Sample Detail						HOLD*	Acid Sulfate Soils Field pH Test	Aggressivity Soil Set	Moisture Set	Eurofins Suite B1
Melbourne Laboratory - NATA # 1261 Site # 1254								X		
Brisbane Laboratory - NATA # 1261 Site # 20794 & 2780						X	X	X	X	X
External Laboratory										
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**					
1	CMW-BH05 0.5	Not Provided		Soil	B25-Oc0047649		X			
2	CMW-BH05 1.0	Not Provided		Soil	B25-Oc0047650		X			
3	CMW-BH05 2.0	Oct 09, 2025		Soil	B25-Oc0047651		X	X	X	
4	CMW-BH05 2.5	Not Provided		Soil	B25-Oc0047652		X			
5	CMW-BH05 3.0	Not Provided		Soil	B25-Oc0047653		X	X	X	
6	CMW-BH05 3.5	Not Provided		Soil	B25-Oc0047654		X			
7	CMW-BH04 0.5	Not Provided		Soil	B25-Oc0047655		X			
8	CMW-BH04 1.0	Not Provided		Soil	B25-Oc0047656		X	X	X	

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ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
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VIC 3216
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NATA# 1261
Site# 25466

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Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
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Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
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web: www.eurofins.com.au
email: EnviroSales@eurofinsanz.com

Company Name: CMW Geosciences (East Coast)
Address: 21 Activity Crescent
Molendinar
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Project Name: NALU 122 MARINE PARADE MIAMI BEACH
Project ID: GOI2025-0134

Order No.:
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Fax:

Received: Oct 15, 2025 5:32 PM
Due: Oct 23, 2025
Priority: 5 Day
Contact Name: Mark argent

Eurofins Analytical Services Manager : Zoe Flynn

Sample Detail						HOLD*	Acid Sulfate Soils Field pH Test	Aggressivity Soil Set	Moisture Set	Eurofins Suite B1
Melbourne Laboratory - NATA # 1261 Site # 1254								X		
Brisbane Laboratory - NATA # 1261 Site # 20794 & 2780						X	X	X	X	X
9	CMW-BH04 2.0	Not Provided		Soil	B25-Oc0047657		X	X	X	
10	CMW-BH04 2.5	Not Provided		Soil	B25-Oc0047658		X			
11	CMW-BH05 1.5	Not Provided		Soil	B25-Oc0047659	X				
12	CMW-BH05 4.0	Not Provided		Soil	B25-Oc0047660	X				
13	CMW-BH02 0.5	Not Provided		Soil	B25-Oc0047661	X				
14	CMW-BH02 1.5	Not Provided		Soil	B25-Oc0047662	X				
15	CMW-BH02 2.5	Oct 08, 2025		Soil	B25-Oc0047663	X				
16	CMW-BH02 4.0	Not Provided		Soil	B25-Oc0047664	X				
17	CMW-BH03 0.5	Oct 07, 2025		Soil	B25-Oc0047665	X				
18	CMW-BH01	Oct 07, 2025		Water	B25-Oc0054445					X

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

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ABN: 50 005 085 521

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6 Monterey Road
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VIC 3175
+61 3 8564 5000
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NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
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Company Name: CMW Geosciences (East Coast)
Address: 21 Activity Crescent
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QLD 4214

Project Name: NALU 122 MARINE PARADE MIAMI BEACH
Project ID: GOI2025-0134

Order No.:
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Phone:
Fax:

Received: Oct 15, 2025 5:32 PM
Due: Oct 23, 2025
Priority: 5 Day
Contact Name: Mark argent

Eurofins Analytical Services Manager : Zoe Flynn

Sample Detail	HOLD*	Acid Sulfate Soils Field pH Test	Aggressivity Soil Set	Moisture Set	Eurofins Suite B1
Melbourne Laboratory - NATA # 1261 Site # 1254			X		
Brisbane Laboratory - NATA # 1261 Site # 20794 & 2780	X	X	X	X	X
Test Counts	7	10	4	4	1

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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			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Conductivity (1:5 aqueous extract at 25 °C as rec.)			uS/cm	< 10			10	Pass	
Sulphate (as SO4)			mg/kg	< 30			30	Pass	
Method Blank									
Chloride			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Chloride			%	100			70-130	Pass	
Sulphate (as SO4)			%	86			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
				Result 1					
Chloride	B25-Oc0048088	NCP	%	99			70-130	Pass	
Sulphate (as SO4)	B25-Oc0048088	NCP	%	84			70-130	Pass	
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)*	B25-Oc0047651	CP	pH Units	6.3	6.2	pass	20%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	B25-Oc0048089	NCP	mg/kg	44	50	13	30%	Pass	
Conductivity (1:5 aqueous extract at 25 °C as rec.)	R25-Oc0045546	NCP	uS/cm	62	61	1.0	30%	Pass	
pH (1:5 Aqueous extract at 25 °C as rec.)	B25-Oc0047651	CP	pH Units	6.6	6.4	1.7	30%	Pass	
Resistivity*	M25-Oc0051972	NCP	ohm.m	110	92	20	30%	Pass	
Sulphate (as SO4)	B25-Oc0048089	NCP	mg/kg	41	31	27	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	B25-Oc0047656	CP	%	20	19	5.0	30%	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	N/A
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
I12	Where sampling date has not been provided, Eurofins | Environment Testing is not able to determine whether analysis has been performed within recommended holding times.
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:

Jacinta Baker	Analytical Services Manager
Jonathon Angell	Senior Analyst-Inorganic
Jonathon Angell	Senior Analyst-Sample Properties
Jonathon Angell	Senior Analyst-SPOCAS
Luke Holt	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Inorganic

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.

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CMW Geosciences (East Coast)
21 Activity Crescent
Molendinar
QLD 4214

NATA Accredited
Accreditation Number 1261
Site Number 20794 & 2780

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: **Mark argent**

Report **1280696-W**
Project name NALU 122 MARINE PARADE MIAMI BEACH
Project ID GOI2025-0134
Received Date Oct 15, 2025

Client Sample ID			**CMW-BH01**
Sample Matrix			**Water**
Eurofins Sample No.			**B25-Oc0054445**
Date Sampled			**Oct 07, 2025**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	0.02	mg/L	0.72
TRH C10-C14	0.05	mg/L	0.43
TRH C15-C28	0.1	mg/L	0.8
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	1.23
BTEX			
Benzene	0.001	mg/L	0.049
Toluene	0.001	mg/L	0.33
Ethylbenzene	0.001	mg/L	0.016
m&p-Xylenes	0.002	mg/L	0.062
o-Xylene	0.001	mg/L	0.058
Xylenes - Total*	0.003	mg/L	0.12
4-Bromofluorobenzene (surr.)	1	%	96
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.01	mg/L	< 0.01
TRH >C10-C16 less Naphthalene (F2)*[N01]	0.05	mg/L	0.5
TRH C6-C10	0.02	mg/L	0.81
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	0.30
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
TRH >C10-C16	0.05	mg/L	0.50
TRH >C16-C34	0.1	mg/L	0.6
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	1.1

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
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Brisbane	Oct 22, 2025	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Brisbane	Oct 22, 2025	14 Days
- Method: USEPA SW846 8260			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Brisbane	Oct 22, 2025	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Brisbane	Oct 22, 2025	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			

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

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
+61 7 3902 4600
NATA# 1261
Site# 20794 & 2780

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370 & 2554

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

Company Name: CMW Geosciences (East Coast)
Address: 21 Activity Crescent
Molendinar
QLD 4214

Project Name: NALU 122 MARINE PARADE MIAMI BEACH
Project ID: GOI2025-0134

Order No.:
Report #: 1280696
Phone:
Fax:

Received: Oct 15, 2025 5:32 PM
Due: Oct 23, 2025
Priority: 5 Day
Contact Name: Mark argent

Eurofins Analytical Services Manager : Zoe Flynn

Sample Detail						HOLD*	Acid Sulfate Soils Field pH Test	Aggressivity Soil Set	Moisture Set	Eurofins Suite B1
Melbourne Laboratory - NATA # 1261 Site # 1254								X		
Brisbane Laboratory - NATA # 1261 Site # 20794 & 2780						X	X	X	X	X
External Laboratory										
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**					
1	CMW-BH05 0.5	Not Provided		Soil	B25-Oc0047649		X			
2	CMW-BH05 1.0	Not Provided		Soil	B25-Oc0047650		X			
3	CMW-BH05 2.0	Oct 09, 2025		Soil	B25-Oc0047651		X	X	X	
4	CMW-BH05 2.5	Not Provided		Soil	B25-Oc0047652		X			
5	CMW-BH05 3.0	Not Provided		Soil	B25-Oc0047653		X	X	X	
6	CMW-BH05 3.5	Not Provided		Soil	B25-Oc0047654		X			
7	CMW-BH04 0.5	Not Provided		Soil	B25-Oc0047655		X			
8	CMW-BH04 1.0	Not Provided		Soil	B25-Oc0047656		X	X	X	

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Melbourne Laboratory - NATA # 1261 Site # 1254								X		
Brisbane Laboratory - NATA # 1261 Site # 20794 & 2780						X	X	X	X	X
9	CMW-BH04 2.0	Not Provided		Soil	B25-Oc0047657		X	X	X	
10	CMW-BH04 2.5	Not Provided		Soil	B25-Oc0047658		X			
11	CMW-BH05 1.5	Not Provided		Soil	B25-Oc0047659	X				
12	CMW-BH05 4.0	Not Provided		Soil	B25-Oc0047660	X				
13	CMW-BH02 0.5	Not Provided		Soil	B25-Oc0047661	X				
14	CMW-BH02 1.5	Not Provided		Soil	B25-Oc0047662	X				
15	CMW-BH02 2.5	Oct 08, 2025		Soil	B25-Oc0047663	X				
16	CMW-BH02 4.0	Not Provided		Soil	B25-Oc0047664	X				
17	CMW-BH03 0.5	Oct 07, 2025		Soil	B25-Oc0047665	X				
18	CMW-BH01	Oct 07, 2025		Water	B25-Oc0054445					X

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Sample Detail	HOLD*	Acid Sulfate Soils Field pH Test	Aggressivity Soil Set	Moisture Set	Eurofins Suite B1
Melbourne Laboratory - NATA # 1261 Site # 1254			X		
Brisbane Laboratory - NATA # 1261 Site # 20794 & 2780	X	X	X	X	X
Test Counts	7	10	4	4	1

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	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	101			70-130	Pass	
TRH C10-C14	%	104			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	97			70-130	Pass	
Toluene	%	96			70-130	Pass	
Ethylbenzene	%	96			70-130	Pass	
m&p-Xylenes	%	95			70-130	Pass	
Xylenes - Total*	%	95			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH C6-C10	%	103			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	93			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	B25-Oc0055163	NCP	%	105			70-130	Pass	
TRH C10-C14	B25-Oc0059692	NCP	%	105			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	B25-Oc0055163	NCP	%	99			70-130	Pass	
Toluene	B25-Oc0055163	NCP	%	99			70-130	Pass	
Ethylbenzene	B25-Oc0055163	NCP	%	101			70-130	Pass	
m&p-Xylenes	B25-Oc0055163	NCP	%	100			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
o-Xylene	B25-Oc0055163	NCP	%	98			70-130	Pass	
Xylenes - Total*	B25-Oc0055163	NCP	%	99			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH C6-C10	B25-Oc0055163	NCP	%	107			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	B25-Oc0059692	NCP	%	94			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	B25-Oc0052688	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	B25-Oc0059691	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	B25-Oc0059691	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	B25-Oc0059691	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	B25-Oc0052688	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	B25-Oc0052688	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	B25-Oc0052688	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	B25-Oc0052688	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	B25-Oc0052688	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	B25-Oc0052688	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	B25-Oc0052688	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	B25-Oc0052688	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	B25-Oc0059691	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	B25-Oc0059691	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	B25-Oc0059691	NCP	mg/L	< 0.1	< 0.1	<1	30%	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	N/A
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.

Authorised by:

Jacinta Baker	Analytical Services Manager
Jonathon Angell	Senior Analyst-Organic
Jonathon Angell	Senior Analyst-Volatile



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

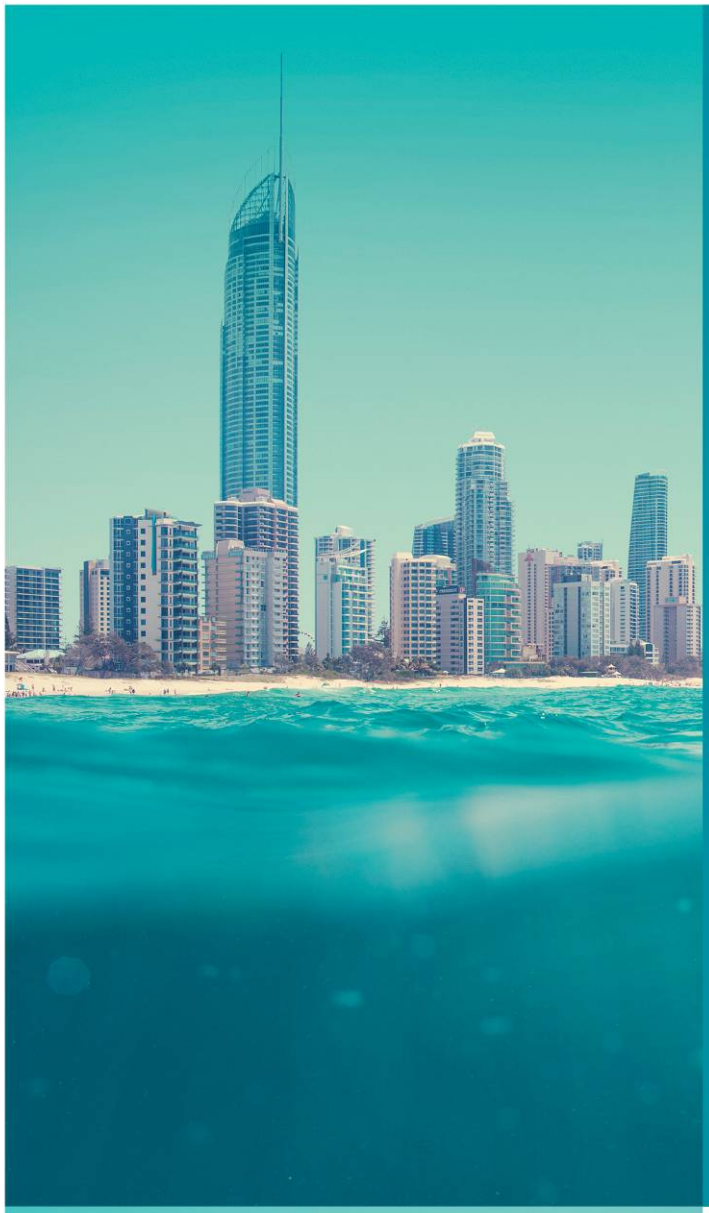
Measurement uncertainty of test data is available on request or please click here.

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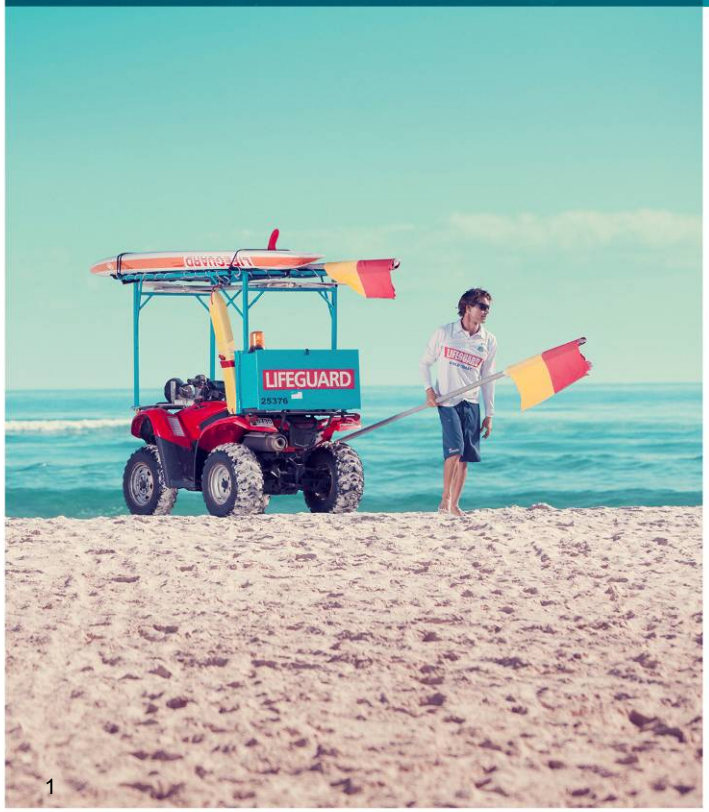
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APPENDIX D
City of Gold Coast Guidelines

CITY OF GOLDCOAST.



Guidelines for Dewatering Management Plan



City Development

Planning and Regulation

March 2018

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1. INTRODUCTION

Dewatering is defined by the process of removal of water from a site that accumulates in earthwork excavations or underneath structures at or below the existing watertable. Dewatering activities are either permanent or temporary. Permanent discharges occur from sites that have structures at or below the existing watertable, (for example, underground car parks below buildings), although this practice is being phased out. Temporary discharges occur from construction sites that have water entering the earthwork excavation. A temporary discharge usually occurs for the duration of the construction phase. This document relates specifically to temporary dewatering activities.

Construction of basements or excavation below the existing groundwater level in coastal areas has the potential to create significant sedimentation, amenity issues and other water quality impacts on sensitive estuarine and fresh water receiving environments. The problem arises from the dewatering operations associated with the basement construction. The majority of high-rise developments that incorporate basements are also located in coastal areas where the natural surface levels are below five metres Australian height datum (AHD). These areas are likely to contain actual or potential acid sulphate soils. The dewatering required for the construction of these basements therefore often results in the extraction, through the use of groundwater spears, of low pH (acidic) groundwater.

The solubility of many metals is pH sensitive and in particular the solubility of iron and aluminium increases significantly at lower pH. Because of this property, acidic groundwater often contains high concentrations of soluble metals, which are virtually colourless while in a dissolved, soluble state. While present in a soluble form at low pH, these metals are also extremely toxic to many forms of aquatic life.

Dewatering that may lower the watertable near a coastal or estuarine environment should be assessed for potential saltwater intrusion of the aquifer. The operator should control dewatering to ensure there is no significant change in water quality or change in the natural watertable or flow regime of surface water.

If the extracted acidic groundwater is discharged untreated to estuarine or marine receiving waters a range of possible impacts is likely to occur, including direct mortality or injury to aquatic life, reduction in the pH buffering capacity of estuaries, damage to infrastructure, and loss of visual amenity from visual plumes and staining.

An assessment of the impact on local vegetation, springs, wetlands and groundwater bores used by others in the vicinity of the project should be made prior to dewatering. Where assessment indicates potential reduction in watertable or quality of groundwater, the operator should either design the dewatering system to overcome this threat or provide an acceptable alternative water supply to affected parties.

The monetary costs incurred to local authorities investigating or cleaning up when responding to the one of the abovementioned incidents can also be substantial.

Odour problems that emanate from dewatering activities can negatively impact on residents surrounding the site. If the groundwater is contaminated, gases such as hydrogen sulphide and hydrocarbon can be released during the dewatering process. These gases when released can cause severe odours that can be offensive to nearby residents.

Noise emanating from the plant such as pumps and diesel generators that is used in the dewatering process, can cause a noise nuisance to nearby noise sensitive places. During temporary dewatering activities in most cases the plant is required to be operated twenty four (24) hours per day, which can increase the intrusiveness of the noise particularly during later or early morning periods when the background noise levels are minimal.

2. PURPOSE OF DEWATERING

The proponents/operators need to understand the environment they are working in and to evaluate potential impacts of dewatering discharge. The proponent or operator is required to ensure that appropriate measures are taken to prevent pollution or degradation of the receiving water body. As such, discharge water should not be allowed to:

- enter poorly defined channels as water may leave the channel and inundate vegetation
- enter any surface water, (for example, ephemeral stream, creek or river) or groundwater where the physical, chemical or biological nature of the discharge will affect the beneficial use of the receiving water body
- cause or contribute to soil erosion
- have visual impact in high profile tourist or residential areas
- have a detrimental impact on flora and fauna downstream of the discharge point

This guideline applies to dewatering operations that draw water from groundwater seepage, excavations that intersect aquifers or run-off from storm events. The main purpose is to guide the environmental management of dewatering associated from construction sites.

1. Prevent contaminated groundwater resulting from the dewatering process, being discharged into the City of Gold Coast's waterways.
2. Provide for possible treatment options of groundwater prior to discharge into waterways when the quality of the groundwater requires this.
3. Protect the environmental values of the City of Gold Coast's waterways from potential/possible impacts from poor dewatering activities.
4. Eliminate odour and noise nuisances associated with improper treatment.

3. LEGISLATIVE REQUIREMENTS

Person/s conducting dewatering activities shall do so in accordance with the requirements of the *Environmental Protection Act 1994* and *Environmental Protection Regulation 2008*. *Parts of State Planning Policy*, *Planning and Managing Development Involving Acid Sulphate Soils*, is also applicable.

Person/s conducting dewatering activities shall take all reasonable and practicable measures to:

- ensure all groundwater that is discharged from a site into receiving waters is adequately treated and disposed of so as not to create environmental nuisance or harm
- ensure all contaminated groundwater that is to be treated off-site is done so in accordance with all relevant legislation
- prevent the emission of nuisance odours associated with the dewatering process
- ensure there is no scouring or erosion at the point of discharge into the receiving waters
- manage and resolve any complaints generated by the activity
- ensure all plant and equipment associated with the dewatering process is to be adequately acoustically attenuated to comply with the *Environmental Protection Act 1994*

The *Act* provides that all persons have a general environmental duty to take all practical and reasonable measures to prevent or minimise harm when carrying out activities. Person/s carrying out dewatering activities shall take all reasonable and practical measures to ensure:

- dewatering wastewater is treated to meet requirements and is discharged or disposed in a way that does not cause environmental harm or environmental nuisance
- all groundwater treated off-site or unable to be treated is done so in accordance with relevant legislation
- no scouring or erosion at the point of discharge into the receiving waters
- no offensive odours or nuisance noise are released as a result of dewatering

4. PREPARATION OF DEWATERING MANAGEMENT PLAN (DMP)

The DMP will be submitted with the development application and must include details of who is carrying out the dewatering activities, who the developer is, and who the owner is. It will also state clearly where to address complaints or issues that may arise during dewatering activities.

For Council of the City of Gold Coast's assessment and approval, the applicant must provide the following information in the DMP.

1. Purpose of dewatering (that is, an explanation of why dewatering is necessary).
2. Dewatering technique (that is, wellpoint, deep well, open hole, etc.).
3. Anticipated dewatering flow rate and total dewatering duration.
4. Controls (that is, settling tank, turbidity curtain, etc.) and method of effluent discharge.
5. Measures and techniques to manage noise, vibration and odour issues.
6. Measures and techniques to manage geotechnical stability issues.
7. Contingency plan in case of any emergency situation.
8. If dewatering conducted in a contaminated area, engineering specifications for dewatering effluent treatment (that is, air-stripper, carbon filtration, etc.) and details for an analytical monitoring program to ensure that effluent will meet *water quality release standards* described in *Tables 1 and 2.*
9. A monitoring program to ensure that effluent will comply with applicable *water quality release standards* described in *Tables 1 and 2*.
10. Baseline assessment of the existing environment (for example, fauna and water quality) that will receive the discharge.
11. A strategy for monitoring and managing any impacts during the life and after the closure of the project.
12. The point of discharge to the stormwater system and to any waterway or water body.

Further, the proponent/operator may also be required to provide the following additional information in the DMP for any complicated site:

- a hydro geological and hydrological assessment of the project area to estimate quantity and quality of water to be discharged
- verification that the quality of discharge water will comply with the receiving water duration and frequency of the discharge
- seasonal variability of the receiving water quality
- assessment of the viability of treating or recycling the wastewater

4.1 Dewatering release criteria

Direct discharge of untreated groundwater may potently cause unlawful environmental harm which is prohibited under the *Environmental Protection Act 1994*. Prior to releasing any water from a construction site, discharges must comply with on-site discharge release criteria in accordance with *Council of the City of Gold Coast Land Development Guidelines (City Plan Policy)* . At the receiving water, 15 metres upstream and downstream of the point of discharge, discharges must comply with *receiving water release criteria* specified in *Tables 2 and 3*. However, when the receiving water discharge point is directly to Coomera River, Nerang River, Albert River, Pimpama River, Currumbin Creek or Tallebudgera Creek discharges must not exceed environmental values to protect aquatic ecosystem as outlined in *Environmental Protection (Water) Policy 1997 for Gold Coast Waterways*. For further information, refer to Department of Environment and Heritage Protection website.

At receiving water it is common that the impact from a site may be amplified as contaminants may accumulate. It is therefore critical that the receiving environment is fully investigated and understood when deciding how to manage releases from the site.

Table 1 – On-site dewatering water quality release criteria

Indicators	Criteria
Turbidity (NTU)	Less than 20
pH	6.5 – 8.5
Dissolve oxygen (DO)	90th percentile is greater than 80% saturation or 6mg/L
Litter	No visible litter washed from site

Table 2 – Receiving water dewatering water quality (physio-chemical) release criteria

Indicators	*Queensland Water Quality Guideline 2006*			
	Coastal	Estuary	Streams	Fresh water lakes
Ammonia (µg/L)	6-8	10-30	10-60	10
Total nitrogen (TN) (µg/L)	140-200	300-450	250-500	350
Chl-a (µg/L)	1-2	4-8	2-5	5
Total phosphorus (TP) (µg/L)	20	25-30	30-50	10
DO (% sat)	90-105	80-100	85-110	90
Turbidity (NTU)	1-6	8-25	25-50	1-20
pH	8.4-9	7-8.4	6.5-8.2	6.5-8
SS (mg/L)	10-15	20-25	6	-

Table 3 – Receiving water dewatering water quality (toxicants) release criteria

Metals	*ANZECC/ARMCANZ 2000 Guidelines* - Trigger values (µg/L)							
	Fresh water level of protection (% species)				Marine water level of protection (% species)			
	99%	95%	90%	80%	99%	95%	90%	80%
Aluminium pH > 6.5	27	55	80	150	-	-	-	-
Copper	1.0	1.4	1.8	2.5	0.3	1.3	3	8
Lead	1.0	3.4	5.6	9.4	2.2	4.4	6.6	12
Zinc	2.4	8.0	15	31	7	15	23	43

4.2 Issues to be addressed in DMP

Innovative techniques for dewatering structures and handling of wastewater are encouraged and will be approved on a case-by-case basis, provided the DMP details suitable justification.

The discharge of poor quality groundwater into the receiving waters can cause the following:

- severe environmental, water quality, odour, amenity and noise impacts on the receiving environment
- physio-chemical impacts on the quality of receiving waters, (for example, alteration of natural pH, increase of suspended solids)
- impacts on both aquatic and terrestrial organisms, (for example, causation of bird and fish kills)
- potential impacts on human health from swimming, skiing, boating on poor quality waters, (for example, skin irritations and eye/ear infections)

For Council of the City of Gold Coast's assessment purpose the proponent/applicant shall address the following issues in detail in the DMP or in separate reports signed by qualified consultants/engineers.

4.2.1 Treatment of groundwater

The DMP must address methods for the treatment of groundwater that is to be discharged to the stormwater system includes, but are not limited to the following:

- treatment of the groundwater – off-site removal of groundwater from the site to a treatment facility for treatment and disposal
- physical treatment – filtration of the groundwater to remove suspended solids/reduce turbidity on-site before disposal into the stormwater system
- chemical treatment, (for example ,flocculation) – addition of lime to the groundwater in order to form a precipitate of the waste content of the water – this process should be used as last resort because it can cause other solid/sludge disposal implications/costs

Often the dewatering wastewater will require treatment prior to discharge. A qualified company/ professional should be consulted and supervise water treatment procedures. The DMP must detail proposed treatment processes and operating protocols, in addition to justify these decisions. It must indicate where the treatment is being carried out in relation to the pump and other equipment and the point of discharge. Erosion prevention methods should also be detailed including pump protection at inlet and outlet.

4.2.2 Acid sulphate soils (ASS)

The occurrence of ASS in coastal areas is a common phenomenon. ASS contains iron sulphides, mostly pyrites and when they are exposed to the air they can generate large amounts of sulphuric acid. When iron sulphides have been exposed to oxygen, they become very acidic, that is with a pH less than or equal to four and can contaminate groundwater.

In the past, large scale drainage of coastal flood plains for flood mitigation, urban expansion and agriculture has exposed significant areas of ASS. This disturbance has generated acidic water, through the generation of sulphuric acid, together with elevated concentrations of typically aluminium, iron and arsenic. The discharge of acidic ‘slugs’ of water into streams, rivers or estuaries have resulted in major fish kills in rivers along the Queensland coast.

4.2.3 Geotechnical issues

The DMP should also include an assessment of the potential geotechnical and hydrological impacts of groundwater extraction. It should demonstrate that nearby structures and infrastructure will remain stable during and after dewatering. Consideration of groundwater recharge should be given. This may require groundwater modelling. Details of dewatering volume, rate, duration, equipment and procedures must be included in the DMP.

A geotechnical investigation shall be undertaken to determine the groundwater level and the absorption rate for all sites. The lowest value obtained from the geotechnical investigation shall be used in the absorption calculations. The geotechnical investigation shall report the meteorological details of the test day, the general site condition and the level of the watertable applicable at the site.

The report must identify and address the overall potential adverse effects of dewatering on the stability and integrity of any adjacent property or structure. The report shall assess the radius of influence of the draw-down cone on potential settlements and lateral movements of any adjacent structures, properties or services.

A minimum of two boreholes per site is required. One of the boreholes shall be within the proposed absorption area and others in various locations throughout the site. For developments where the gross site area (GSA) is greater than or equal to 1000 square metres, an additional borehole is required for every 400 square metres or part thereof over 1000 square metres. For example, a site with GSA of 1450 square metres, four boreholes are required. Copies of the borehole logs are to be attached to the report. Unless groundwater is encountered, borehole depth shall be a minimum of four metres from the existing ground level.

4.2.4 Noise and vibration issues

The DMP should detail the type and location of equipment to be used and the duration of use. Potential noise/vibration issues and potential sensitive receivers should be identified within the DMP. It must detail any mitigation measures and how they will prevent any noise issues.

Treatment methods for the reduction of noise emitted from the mechanical plant involved in the dewatering process include, but are not limited to methods such as:

- installation of a fully acoustically attenuated enclosure around noise generating equipment, (for example, pumps and generators)
- the use of sound attenuating material such as hay bales to surround the plant
- installation and maintenance of mufflers and suitable exhaust systems for all noise generating plant and equipment
- operation of particularly noisy equipment within restricted time periods 7am – 6pm
- restriction of operating hours of the offending plant

All noise emitted from the dewatering process is to comply with the provisions of the *Environmental Protection Act 1994.*

4.2.5 Odour issues

The presence of potential odour-causing gas hydrogen sulphide (H_2S) should be detailed in the DMP. The DMP should identify potential mitigation measures and demonstrate they will be effective. The proposed treatment methods for the dewatering process are required to be included within the DMP. The proximity of the residents should be considered when undertaking dewatering activities.

The treatment of reducing odours resulting from dewatering activities varies in complexity and effectiveness. Options range from simple methods such as placing the discharge point directly into stormwater gullies or traps, to more complex ones such as installing a surge tank with an activated carbon filter to arrest odours. The intensity of the odour arising from the dewatering process will determine the extent of the treatment method required to reduce the odour. The odour threshold for H_2S is 0.08 – 0.2ppm (parts per million), *IUE Commission Cape Town, 2001*.

4.3 Operational and monitoring requirements

Assessment during the design phase will assist in the determination of the most appropriate operational methodology, tanked or sump and pump, and the corresponding monitoring method. This will assist in compliance with legislative requirements and addressing potential impacts on the completed structure after construction.

To avoid any environmental harm where water contains significant suspended solids and other harmful chemical and toxicants, the proponent should install and operate a settling basin/balance tank with a capacity to contain a minimum of two hours prior to release to the environment, depending on sediment characteristics. This is necessary to remove flocculating matters and also allow aeration and dissolved iron to precipitate and settle. It may be also necessary to apply chemical dosing such as lime to raise pH, metal salt to enhance removal of toxicants.

Where it is not possible due to lack of space, the proponent must explore mobile tanks or other forms of solids reduction such as filtration or chemical coagulation.

To ensure that any potential environmental harm is managed correctly and to enable the proponent to demonstrate compliance, regular monitoring of water quality parameters must continue in a manner advised by professionals. The monitoring regime will depend on the wastewater quality, water treatment methods and point of discharge. The details of monitoring plans should be contained in the DMP, including:

- water quality parameters to be monitored
- frequency of monitoring during dewatering
- monitoring techniques and equipment
- availability of monitoring records

The operator should develop and maintain a program that monitors, records and reports on the effects of dewatering. The program should include:

- a record of the quantity of water discharge rate
- regular visual inspection of the dewatering system to confirm its integrity and note impacts at the point of release
- suitable monitoring facilities, (for example, bores to record the effects of pumping on the water table)
- relevant water quality analysis of the water discharged and the receiving environment
- periodic investigations of the impacts on vegetation and water resources
- photographic records of vegetation and other sensitive parameters should be included as appropriate

It is important that during construction and operational phases of a project, the existing groundwater regime is maintained as close as possible to the pre-development condition. In this regard, consideration should be given to the level and flow attributes of the groundwater regime, through appropriate monitoring. In general a minimum monthly for static water levels via piezometers in the surrounding watertable is required to assess draw-down effects.

4.4 Dewatering contingency plan

A key feature of the DMP is that it will identify risks at the planning stage before construction begins. Where problems are unlikely and are not accounted for in the general dewatering procedures, contingency plans must be prepared. Triggers that activate the contingency plans should also be detailed within the DMP. Contingency plans within the DMP are binding through conditions of approval. The DMP should identify management actions for scenarios including but not limited to the following:

- noise complaints
- odour complaints
- complaints about appearance of wastewater discharge
- unexpected contaminants found during monitoring
- failure of treatment methods
- failure of pumping systems
- groundwater seepage into construction area
- heavy rainfall
- impacts on the stability of adjacent structures
- release of any toxicant materials outside the trigger values in *Tables 1, 2 and 3*

Examples of contingency actions may include:

- consulting a professional
- stopping operations
- changing methods or equipment
- additional monitoring

Contingency plans with a higher level of detail and foresight prove more useful if the situation arises.

4.5 Deemed to comply solution for small scale development

The purpose of deemed to comply solution is mainly to help small scale development not to provide any report to Council of the City of Gold Coast (Council) for approval. Any small scale development which complies with the requirements of *Table 4* and provides necessary certifications can avoid lodgement of the DMP for Council's approval. Note: the DMP must still be prepared for the site.

Table 4 – Self assessable dewatering plan checklist

Has the DMP been prepared by suitably qualified person?				No		Yes
Is the site area less than 800 square metres? If greater than 800 square metres, a detailed DMP is required to be submitted to Council of the City of Gold Coast (Council).				No		Yes
Is the dewatering depth is less than one metre? If greater than one metre, a detailed DMP is required to be submitted to Council.				No		Yes
Has the legal point of discharge been identified, (that is the capacity of the downstream system)?				No		Yes
Does the site contain potential acid sulphate soil? If yes, a detailed DMP is required to be submitted to Council.				No		Yes
Have geotechnical issues been addressed by a Registered Professional Engineer of Queensland (RPEQ) or an equivalent qualified professional? If no, the associated reports are required to be submitted to Council.						
1. Slope stability?	No		N/A		Yes	
2. Integrity of adjacent properties?	No		N/A		Yes	
3. Cone of influence and draw-down effects?	No		N/A		Yes	
Have measures been put in place to ensure *dewatering release criteria* by a suitable qualified person as defined in *Tables 1, 2 and 3*?				No		Yes
Has noise, odour and dust issues been addressed in the *dewatering contingency plan*? If no, further approval by Council is required.				No		Yes

The applicant is advised that if "*Yes"* has been answered to the above checklist, the following two certifications MUST be provided with any development application.

1. Provide certification *Appendix A* from a qualified scientist/engineer, specialising in dewatering that all the above requirements in *Part A* have been fulfilled and achieved. This certification is to be signed by a RPEQ.
2. Provide separate certification *Appendix B* that all geotechnical requirements have been addressed, including but not limited to slope stability, integrity, acid sulphate soils, cone of influence and draw-down effects.

The applicant shall also provide a monthly monitoring report in relation to dewatering discharge and measures in how it has met the release criteria *(Tables 1, 2 and 3).* This report is to be submitted to Council for compliance and record keeping.

5. REFERENCES

Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand
Environmental Protection Act 1994, State of Queensland
Environmental Protection (Water) Policy 1997, State of Queensland
Environmental Protection Regulation 2008, State of Queensland
Environmental Protection Regulation 1998, State of Queensland
City Plan Policy Land development Guidelines, of the City of Gold Coast
IUE Recommendations for Odour Control in Tannery 2001, IUE Commission Cape Town, South Africa

Appendix A

Deemed to comply checklist certification pro-forma

Property details	
Lot number	
Registered plan number	
Property address	

Proposed works	
Description	

Proposed development	
Description	

Declaration			
I,		Water quality scientist / registered professional engineer of Queensland (RPEQ) number	
of			(Consulting engineer's firm)

being duly authorised on this behalf, do certify that the proposed development has taken all necessary measures to satisfy *Deemed to comply* requirements as outlined in *Council of the City of Gold Coast's Dewatering Management Plan Guidelines (2009).*

I am aware that Council of the City of Gold Coast will rely upon this certificate and any associated geotechnical reports, maps, graphs, tables, attachments, etc. produced as a consequence of commissioning this development proposal.

Signature		**Designation**			
Certified this		**Day of**		**20**	

Appendix B

Deemed to comply geotechnical certification pro-forma

Property details	
Lot number	
Registered plan number	
Property address	

Proposed works	
Description	

Proposed development	
Description	

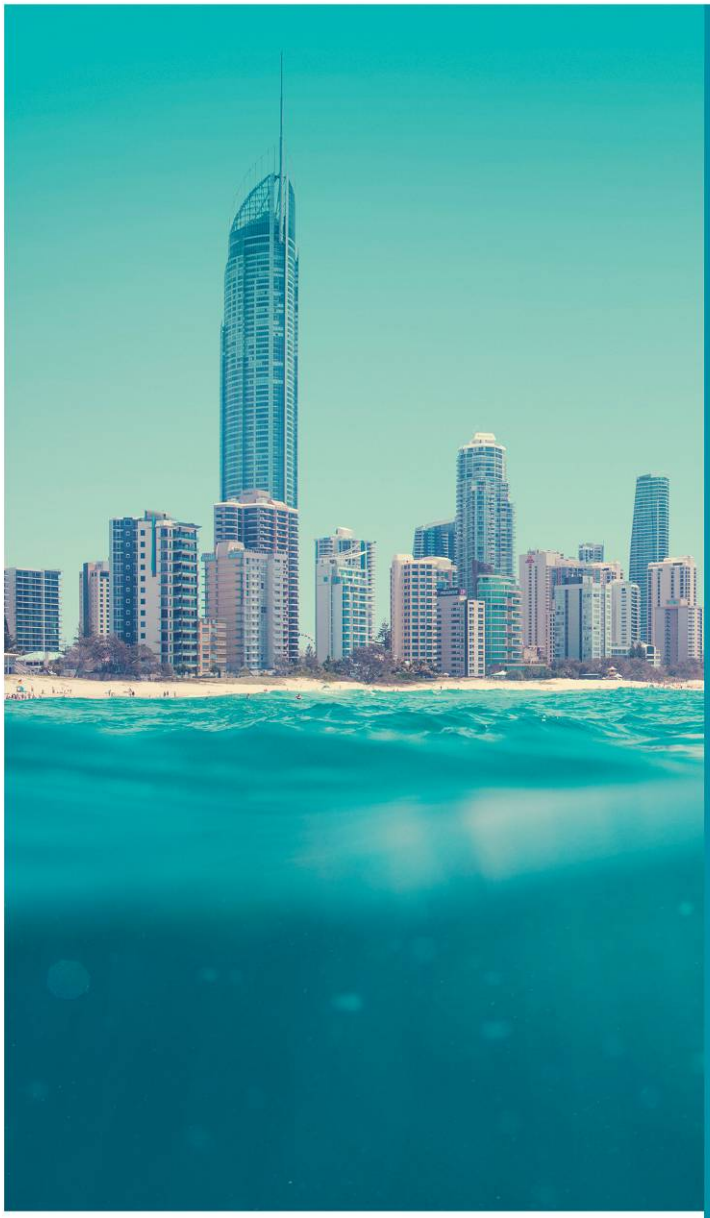
Declaration			
I,		Registered professional engineer of Queensland (RPEQ) number	
of			(Consulting engineer's firm)

being duly authorised on this behalf, do certify that all geological issues have been analysed and necessary measures have been ensured to avoid construction phase stability problem/s both on-site and external to the site.

I am aware that Council of the City of Gold Coast will rely upon this certificate and any associated geotechnical reports, maps, graphs, tables, attachments, etc. produced as a consequence of commissioning this development proposal.

Signature		**Designation**			
Certified this		**Day of**		**20**	

CITY OF
GOLDCOAST.



Council of the City of Gold Coast
PO Box 5042 GCMC Qld 9729
P 1300 GOLDCOAST
E mail@goldcoast.qld.gov.au
W cityofgoldcoast.com.au



Gold Coast Office

21 Activity Cres
Molendinar Gold Coast QLD 4214

Ph: 07 5556 4768

www.cmwgeosciences.com