Intrusive Geotechnical Investigation Report

Coffs Harbour Jetty Foreshore Precinct

PSM4842-007R REV6

28 February 2025



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1. Executive Summary

This report presents the results of the geotechnical investigation undertaken for the proposed Coffs Harbour Jetty Foreshore Precinct at Jetty Beach, Coffs Harbour (**the Site**). The work was undertaken in accordance with PSM proposal PSM4842-003L dated 27 April 2023. The investigation aimed to assess site conditions, soil properties and potential challenges for future development. Borehole drilling and test pit excavation along with laboratory testing of soil samples were undertaken.

From the geotechnical investigation, several soil units were identified, including TOPSOIL, FILL, NATURAL SAND, NATURAL CLAY and BEDROCK. Based on the identified units, recommendations for development include careful consideration of soil conditions during foundation design and construction. Monitoring of groundwater levels, influenced by tidal fluctuations and weather conditions, is advised to manage potential impacts on construction activities.

It is recommended that further intrusive geotechnical investigations are undertaken at the location of each specific development following finalisation of designs to confirm or revise the provided geotechnical parameters.

2. Introduction

Property and Development NSW (PDNSW) is continuing to lead the revitalisation of the Coffs Harbour Jetty Foreshore Precinct (the Precinct) on behalf of the NSW Government. Pells Sullivan Meynink (PSM) has been engaged by PDNSW to prepare a geotechnical investigation report that characterises subsurface conditions of the precinct and to provide preliminary geotechnical advice.

This geotechnical investigation report supports a Planning Justification Report that outlines proposed amendments to the Coffs Harbour Local Environmental Plan (CHLEP) 2013 and will be submitted to the Department of Planning, Housing and Infrastructure (DPHI) as part of a State Assessed Planning Proposal (planning proposal).

As Coffs Harbour continues to grow as a Regional City, the NSW Government and Coffs Harbour City Council have, through various strategic planning exercises, identified four key strategic priorities to reimagine its direction and respond to current and future challenges and opportunities:

- Deliver a regional economy (CHCC LSPS, 2020; CH Economic Development Strategy, 2017) that is diverse, sophisticated and able to retain businesses and skills
- Evolve the tourism offering CHCC LSPS, 2020) with improved attractions, activities and accommodation
- Provide more housing (CHCC LSPS, 2020) in accessible locations, including affordable housing
- Provide better connections between places with more sustainable movement choices (CHRCAP, 2021; CHCC, 2020).

As a large, strategically located and wholly government owned site, the Precinct represents a significant opportunity to deliver on each of these key regional priorities. In this planning proposal, PDNSW seeks to celebrate the unique location, history and culture of the Jetty Foreshore to deliver outcomes for the benefit of the Coffs Harbour community. The revitalisation will be staged and funded, over time, to deliver the shared community vision.

2.1 Our shared community vision

Coffs' family playground, a precinct of parks and places, that connects community with Country. The community is and always has been at the heart of creating a thriving regional economy and destination for Coffs Harbour. Shaped with the community, our vision is to ensure The Jetty Foreshore will become a world-class oceanfront precinct through the principles shown in Inset 1.



Respecting Gumbaynggirr, environmental and maritime roots now and into the future; Promoting community character, coastal activity and local economic sustainability, and community character, coastal activity and local economic highlands. Connecting people to the water, the water to the city, and the city to the highlands.

Inset 1: Vision for the Coffs Harbour Jetty Foreshore.

3. The Precinct

The Precinct, wholly owned by the NSW Government, is strategically significant to the State and to the Coffs Harbour region. The Precinct is located on the traditional lands of the Gumbaynggirr people, in saltwater freshwater Country. It encompasses approximately 62 hectares of foreshore land, 5km east of the Coffs Harbour CBD, located on the Coffs Harbour coast with direct access to the Pacific Ocean. Access is provided on Marina Drive in the north, and Camperdown Street in the south, with Jordan Esplanade bisecting the site north to south. A Precinct map showing existing conditions is provided at Inset 2.

The west boundary is generally defined by the railway line and Coffs Harbour Railway Station. To the north the Precinct borders a culturally significant site known as "Happy Valley", which has been returned as freehold land to the Coffs Harbour and District Local Aboriginal Land Council (LALC). Gallows and Boambee Beaches are located to the south of the Precinct, where Littoral Rainforest occurs. Coffs Harbour itself, the Pacific Ocean, Muttonbird Island and South Coffs Island (Corambirra Point) form the eastern boundary.

The Precinct is a popular destination for both locals and tourists offering a variety of attractions and amenities. These include Jetty Beach and extensive parklands with biodiversity value, as well as items of heritage significance such as the Coffs Harbour Jetty and Ferguson's Cottage, owned by the Coffs Harbour LALC. Further, the Coffs Harbour Fisherman's Co-op, the Coffs Harbour Yacht Club, weekly Sunday markets, and community hub building (recently delivered by PDNSW) are located within the Precinct. Various public works including breakwater and boat ramp upgrades have been undertaken over recent years to support the marina function.

There are redeveloped and well-maintained parts in the area however, much can be done to enhance the Coffs Harbour Jetty Foreshore Precinct. A large portion of the Precinct is currently gravelled, and a large area of residual railway land is fenced off and inaccessible to the public, as shown in Inset 3. While gravelled areas provide informal overflow parking, they do not reflect the potential of this foreshore.





Inset 2: Coffs Harbour Jetty Foreshore Precinct (source: SJB).













Inset 3: Existing State of the Precinct Rail Lands and Gravelled Areas (Source: PDNSW).

4. The Illustrative Masterplan

The planning proposal is supported by an Illustrative Masterplan (Inset 4) that presents a potential development outcome that could be realised at the Coffs Harbour Jetty Foreshore Precinct – it is not prescriptive nor is it determined. The Illustrative Masterplan builds on the shared vision created via extensive community and stakeholder consultation and provides further detail in relation to land use and development outcomes sought for the Precinct.

The Place Principles shown in Inset 5, agreed with the community, guided the formation of the Illustrative Masterplan.

The Illustrative Masterplan is broadly organised across six sub-precincts that will each have a distinct character and function. These are identified as:

- 1. Foreshore Parklands with improved amenities, proposed new board walk and nature-based playground.
- 2. The Marina An active marina revitalised to accommodate local marine based businesses that reflect their regional importance.
- 3. North Park Functional open space with recreational courts and formalised parking.



- 4. Jetty Hub A hub of residential and tourist accommodation supporting activation, tourism and regional attraction located adjacent to the current Jetty Walkway, with massing capped at 6 storeys stepping down in scale when closer to public areas.
- 5. Activity Hub and Village Green An active village green that delivers increased public open space connected to the existing foreshore parklands and may include family-friendly food and beverage, community uses and club houses or facilities to support events. A local business activity zone connected to the rail station.
- 6. Corambirra Point A new regional tourist destination on the site of the former Deep Sea Fishing Club site including publicly accessible cafes and restaurants, a function space, activity centre and tourist accommodation.

A precinct map showing the Illustrative Masterplan and the six distinct zones is provided at Inset 6.



Inset 4: Illustrative Masterplan (Source: SJB).









Gathering place

Become the premier place on the North Coast where all are welcome and feel at home, now and in the future







Seamlessly connected

Tie the city structure and regional networks into the precinct and provide accessibility for all abilities throughout







Sustainable economy

Foster a wider mix of uses that leverage existing industry to create a balance of local employment opportunities and waterfront activation







Resilient environment

Be the exemplar for the North Coast on adapting to climate change by safeguarding existing assets and mitigating future risk







Choice destination

Enhance the precinct as a family friendly collection of local and regional destinations offering an accessible, engaging, safe, comfortable and inclusive environment day and night







Celebrate Country

Ensure opportunities for Gumbaynggirr people to Care for Country and heal Country, with long-term community involvement, cultural activation and education, and protection of significant heritage sites

Inset 5: **Community-Led Place Principles.**





Inset 6: Sub-Precinct Map (Source: SJB).

5. The Planning Proposal

The master planning of large-scale precincts follows a highly consultative and stepped approach. The current step, which paves the way for the revitalisation of the Coffs Harbour Jetty Foreshore Precinct, is the application for a State Assessed Planning Proposal, which is a legislated process.

PDNSW is lodging a planning proposal with the Department of Planning, Housing and Infrastructure that seeks approval for:

- Changes to permissible land uses
- Changes to permissible maximum building heights
- Planning controls for future State Significant Development Applications including design guidelines and design excellence processes.

This geotechnical investigation report supports this planning proposal.

6. Background

6.1 General

PSM previously completed a desktop study for the proposed precinct (Ref: PSM4842-002L dated 13 September 2023). The desktop study was to inform preliminary site conditions and to identify any initial geotechnical issues to be addressed. The results of the geotechnical investigation included in this report further contribute to the initial



findings of the desktop study with regards to the indicative masterplan and rezoning submission comprising the overarching aim of the report.

The following documents were provided to PSM from the aforementioned study:

- Property and Development NSW, Request for Tender PROC3143 dated 14 July 2022:
 - Part A Conditions of Tendering
 - Part B Tender Schedules
 - Part C The Services.

A revised Masterplan for the proposed development (Ref. NSW Government "Coffs Jetty Revitalisation Refined Masterplan" dated December 2022) has been provided since the completion of the desktop study, to assist with the geotechnical investigation described herein.

Based on the provided documents, it is understood that the proposed development at the Site will comprise the following:

- Upgrading of the foreshore parkland area between Jordan Esplanade and the beach
- · Construction of multiple, multi-storey residential and commercial buildings with basement car parking
- Re-development of the existing Marina and Fish Co-op
- Multi-storey tourist building at the southern end of the development area
- Realigning and managing of carparking across the precinct, and
- Creation of an accessible connection to the Jetty Foreshore from the city.

7. Geotechnical Investigation

An intrusive geotechnical investigation was undertaken across the proposed Coffs Harbour Jetty Foreshore Precinct and is described in the following sections. The geotechnical investigation was undertaken within the wider masterplan and not restricted to the areas which are to be rezoned.

7.1 Fieldwork

The fieldwork was undertaken between 31 July 2023 and 4 August 2023 and included the following:

- Drilling of six (6) boreholes with a track mounted drill rig, drilling to depths of between 2.5 m and 12.4 m.
 The drilling works employed rotary auger drilling and was boring techniques in soils and some weathered bedrock and NMLC coring techniques in the underlying bedrock
- Standard penetration tests (SPTs) at regular intervals within the soil units
- Excavation of sixteen (16) test pits with a 5 tonne excavator to depths of between 0.6 m and 2.9 m
- Perth sand penetrometer (PSP) testing adjacent to each test pit.

The fieldwork was conducted under the full-time supervision of a PSM engineer who undertook the following tasks:

- Directing the service locating and investigation locations
- Preparing engineering field logs of material encountered
- Collecting soil samples for laboratory testing documented in Section 7.2
- Conducting point load testing on recovered rock cores
- Photographing recovered rock cores
- Undertaking PSP testing.

Prior to the investigation, the borehole and test pit locations were checked by a certified service locator under the supervision of a PSM geotechnical engineer to detect for the presence of underground services.

Boreholes were drilled to either a pre-determined maximum depth of 12 m as per PSM fee proposal, PSM4842-003L dated 27 April 2023, or terminated at a shallower depth following poor core return indicative of existing rock fill.

Test pits were terminated at a maximum depth of 3.0 m indicative of the machine limit or collapse of the material in the test pit.



Upon completion, each borehole was reinstated by backfilling with cuttings and/or fine gravels and compacted by tamping with hard tools or the excavator bucket.

Figure 1 presents the borehole and test pit locations. The location of the boreholes and test pits was recorded using a hand-held GPS with a horizontal accuracy of approximately ±5 m.

Figures 2 to 7 present some selected site photos.

Appendix A presents the engineering borehole and test pit logs of the materials encountered.

Appendix B presents test pit photographs.

Appendix C presents the results of the point load testing.

Appendix D presents the results of the PSP testing.

7.2 Laboratory Testing

7.2.1 California Bearing Ratio

PSM recovered four (4) bulk soil samples from the test pits for the CBR testing. The following sample preparation was undertaken prior to CBR testing:

- Compact to 98% Standard Maximum Dry Density at optimum moisture content (OMC)
- Four (4) day-soaked sample; and
- 4.5 kg surcharge.

Table 1 presents a summary of the CBR test results. The laboratory test report is included in Appendix E.

Table 1 - CBR Test Results

Sample Location and Depth (m)	Inferred Geotechnical Unit	Soaked CBR (%)	Optimum Moisture Content (%)	Standard Maximum Dry Density (t/m³)	Swell (%)
TP02 (0.5 - 0.8 m)	CLAY FILL	11	32.0	1.29	0.0
TP04 (0.5 - 0.8 m)	SAND	6 ^[1]	7.2	1.48	1.0
TP09 (1.0 - 1.5 m)	SAND	16	6.3	1.44	1.0
TP16 (0.2 - 0.6 m)	SANDY GRAVEL FILL	25	13.4	1.75	0.5

⁽¹⁾ CBR with 2.5 mm penetration

7.2.2 Aggressivity and Salinity Testing

Eight (8) disturbed soil samples were retrieved for aggressivity and salinity testing in an analytical laboratory. Sampling locations are summarised in Table 2. The following tests were undertaken:

- Cation Exchange Capacity (CEC) of calcium, magnesium, potassium and sodium
- Exchange sodium percentage
- Salinity (EC 1:5, one part soil to five parts water)
- Soil pH
- Chlorides
- Sulphates
- Resistivity.

Table 2 presents a summary of the results. The laboratory test report is presented in Appendix F.



Table 2 - Summary of Aggressivity and Salinity Testing Results

Sample ID		Exchange	eable Cations	[meq/100g]		Exchange		Electrical	Sulfate	Chloride	Resistivity
(Depth)	Са	Mg	K	Na	CEC	Sodium [%]	рН	Conductivity [µS/cm]	[mg/kg]	[mg/kg]	[ohm cm]
TP01 (1.0 m)	1.6	<0.2	<0.2	<0.2	1.6	<0.2	7.8	27	<10	<10	37000
TP04 (0.5 m)	0.5	<0.2	<0.2	<0.2	0.5	<0.2	8.9	42	<10	<10	23800
TP06 (1.0 m)	1.5	<0.2	<0.2	<0.2	1.5	<0.2	7.7	119	<10	<10	8400
TP09 (0.3 m)	2.9	<0.2	<0.2	<0.2	2.9	<0.2	7.8	65	<10	<10	15400
TP10 (0.8 m)	0.7	<0.2	<0.2	<0.2	0.7	<0.2	9.0	54	<10	<10	18500
TP12 (1.0 m)	2.8	<0.2	<0.2	<0.2	2.8	<0.2	7.8	58	<10	20	17200
TP14 (0.5 m)	0.4	<0.1	<0.1	<0.1	0.4	3.4	7.0	8	<10	<10	125000
TP16 (1.0 m)	2.2	<0.2	<0.2	<0.2	2.2	<0.2	7.5	28	<10	<10	35700

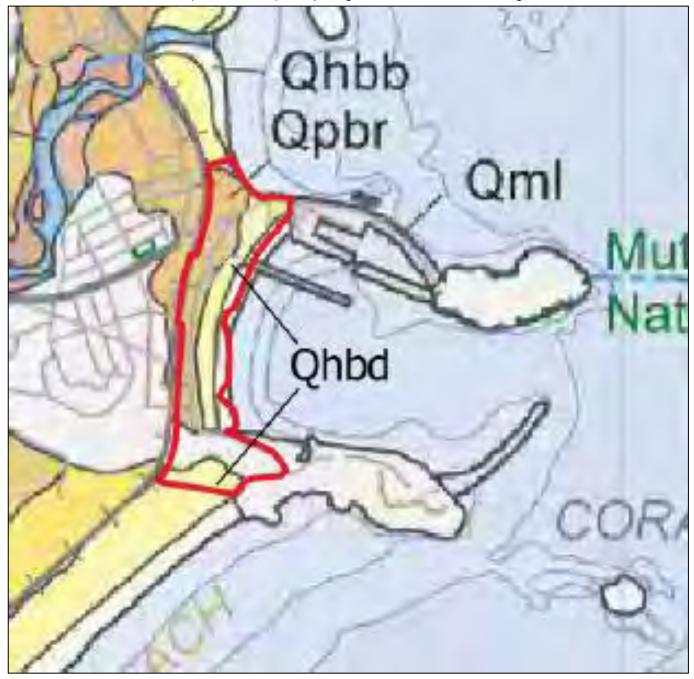


8. Site Conditions

8.1 Geological Setting

As discussed in the desktop study previously undertaken by PSM and reproduced below, the Coffs Harbour 1:100,000 Coastal Quaternary Geology Map (2007), shown in Inset 7, indicates that the Site is underlain by:

- Pleistocene Sediments (Qpbr), comprising of marine sand, indurated sand and gravel, and
- Holocene Sediments (Qhbb & Qhbd), comprising of marine sand, shells and gravel.



Inset 7: Snippet of the Coffs Harbour Geological Map. (1:100,000) (approximate site extent in red)

A further reference to the Dorrigo-Coffs Harbour 1:250,000 Geological map (1971) indicates that the Site is underlain by:

- Quarternary sediments (Qs) comprising beach and dune sand, and
- Rocks of the Brooklana Formation (Cb) comprising siliceous argillite, slate and rare siliceous greywacke.



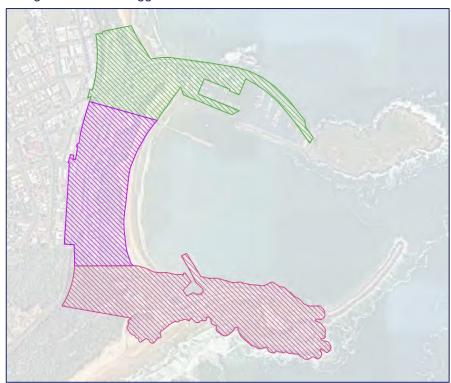
8.2 Surface Conditions

The Site currently serves as the foreshore to Jetty Beach located on the eastern boundary of the Site. A railway line is located along the western extent of the proposed development area.

The Site can be sectioned into three distinct portions, namely the northern, central and southern areas. Inset 8 presents the approximate extent of the portions of the site to be described. Each area is discussed below:

- The northern portion of the site consists of a large open-air carpark and a developed area with restaurants
 and boat clubs. The remainder and minor portion of the northern section consists of parkland. It is
 understood by PSM, based on anecdotal information from locals, that the open-air carpark previously
 consisted of an old timber mill with an accompanying rail line assisting in the movement of lumber.
- The central section of the site encompasses a strip of parkland in a north to south orientation. This section of the site has Jordan Esplanade in the centre of the section with parks and recreation areas to the east. The rail corridor and sparsely vegetated areas cover the western section. There are minor built structures located within this section i.e., public toilets, barbeque pits and playgrounds. It is noted that the topography within the grassed area tends to be undulating with distinct mounds observed throughout the area.
- The southern section of the site is noted to currently be undergoing road works to upgrade thoroughfare within the section of the site. The restaurant, Jetty Beach House, is located at a significantly higher elevation to the surrounding area which consists of an unsealed carpark and a boat ramp. It is noted that there is a rock outcrop present within the area.

In general, the topography is relatively flat with the site sloping gently eastwards towards the ocean. The majority of the site consists of parks with some sealed areas integrated into the existing landform. It is noted that topography changes are more exaggerated towards the southern end of the site.



Inset 8: Surface Condition Zoning.

8.3 Inferred Subsurface Conditions

8.3.1 Historical Photos

Based on publicly available historical information and anecdotal information from Coffs Harbour locals, PSM understands that the southern section of the Site was previously a quarry which has since ceased operations. A timber mill was also located at the northern end of the foreshore.

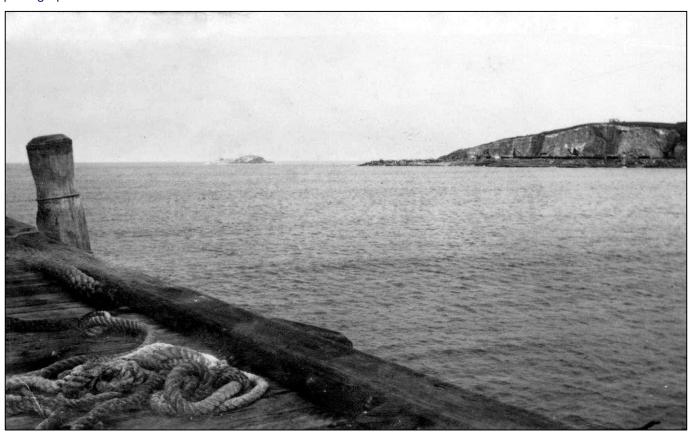
We have reviewed available aerial photos of the Site, though it is noted that aerial imagery prior to 1979 was not found. Appendix G presents the aerial images.



Based on the historical photos and publicly available historical archives, we note:

- The quarry originally began operations on South Coffs Island, now called Corambirra Point, in the early 1900's.
- In 1913 construction began to connect South Coffs Island to the mainland and establish a breakwall to the east of the island.
- The extent of the backfilling operation is not clear, however, it is anticipated that the south-eastern extent
 of the proposed development area around the existing Deep Sea Fishing Club is likely to comprise a
 significant volume of backfill material including Argillite and Siltstone boulders, cobbles and gravel.
- The overall development Site has remained largely untouched since the late 1970's.

Inset 9 below shows a photograph of the old quarry taken from the Coffs Harbour jetty, though the date of the photograph is not known.



Inset 9: Historic Photograph Taken from the Jetty Towards the Old Quarry.

(Sourced from Coffs Collections website https://coffs.recollect.net.au/nodes/view/69566 on 31 August 2023)

8.3.2 PSM Test Pits and Boreholes – July and August 2023

The subsurface conditions encountered within the boreholes and test pits are summarised in Table 3. We note that the test pits and boreholes are at discrete locations only so some variability can be expected e.g. localised fill, depths to rock and soil characteristics.

Table 4 presents the inferred reduced level (RL) to the top of the inferred geotechnical units encountered. Elevations at the location of the boreholes and test pits has been estimated using publicly available digital elevation mapping (DEM) data, and not a detailed survey. As such, the elevations shown in Table 4 are indicative only.

The encountered subsurface conditions were generally consistent with the published information and other geotechnical investigations completed in the vicinity.



Table 3 - Summary of Inferred Geotechnical Units Encountered in Boreholes and Test Pits

Unit Name	Approximate Depth to the Top of Unit (m)	Description
	_	Silty SAND to Silty SAND with gravel; brown to dark brown, fine to coarse grained, gravel is sub-angular to angular up to 50 mm, with organics Silty CLAY to Silty CLAY with gravel; dark brown, low to medium plasticity, gravel is
TOPSOIL	0	angular up to 10 mm, trace organics Clayey SAND with silt; dark brown, coarse grained, clay is low plasticity, with organics
		SAND trace clay to SAND with clay trace gravel; dark brown, medium grained, clay is low plasticity, gravel is angular up to 30 mm
FILL	0 - 0.2	Sandy GRAVEL/ Gravelly SAND to GRAVEL with cobbles; brown and grey, sand is fine to medium grained, gravel is angular to sub-angular up to 100 mm
		CLAY to CLAY with sand; brown and orange, medium to high plasticity, sand is coarse grained Clayey GRAVEL/ Gravelly CLAY; orange and grey, clay is low to medium plasticity,
		gravel is sub-angular to sub-rounded up to 100 mm
NATURAL SAND	0.2 - 2.0	SAND to SAND with gravel: yellow to yellow and brown, coarse grained, gravel is sub-angular up to 30 mm, minor bands of medium plasticity clay, inferred medium dense to dense
NATURAL CLAY	6.0 - 7.9	CLAY: grey mottled red to grey and brown, high plasticity
BEDROCK	6.3 - 11.9	ARGILLITE (metamorphous siltstone): grey, red and brown, highly weathered to moderately weathered, medium strength, iron stained, highly fractured
		SILTSTONE: grey, moderately weathered, medium strength



Table 4 - RL's to the Top of Inferred Geotechnical Units Encountered in Boreholes and Test Pits

	Approximate Reduced Level (RL) to Top of Unit (m AHD)										
ID	TOPSOIL	FILL	NATURAL SAND	NATURAL CLAY	BEDROCK	ЕОН					
BH01	2.4	2.0	1.8	NE	-6.9	-8.8					
BH02	5.7	5.5	3.7	-0.3	-0.6	-6.2					
BH03	5.3	5.1	4.5	-2.6	NE	-7.1					
BH04	4.3	4.1	2.5	-1.7	-7.6	-8.1					
BH05	NE	7.7	NE	NE	NE	3.1					
BH06	NE	8.1	NE	NE	NE	5.6					
TP01	NE	5.7	5.3	NE	NE	3.2					
TP02	NE	5.2	3.2	NE	NE	2.5					
TP03	5.6	5.5	5.1	NE	NE	2.7					
TP04	6.0	5.9	5.4	NE	NE	3.7					
TP05	3.6	3.5	2.3	NE	NE	0.8					
TP06	3.0	2.9	2.0	NE	NE	0.6					
TP07	4.8	4.7	4.3	NE	NE	2.2					
TP08	2.8	2.7	2.5	NE	NE	0.5					
TP09	4.4	4.3	4.0	NE	NE	1.8					
TP10	3.1	3.0	2.6	NE	NE	0.6					
TP11	4.1	4.0	NE	NE	NE	3.5					
TP12	4.8	4.6	3.1	NE	NE	3.0					
TP13	4.5	4.3	3.4	NE	NE	2.1					
TP14	14.7	14.7	14.5	NE	NE	11.8					
TP15	7.9	7.7	NE	NE	NE	5.2					
TP16	8.6	8.4	NE	NE	NE	5.6					

⁽¹⁾ RLs estimated from Elevation Foundation Spatial Data (ELVIS), 1 metre Resolution Digital Elevation Model

8.4 Groundwater

Groundwater was unable to be observed in the boreholes due to the drilling methodology adopted i.e. wash boring. Groundwater was observed in the following test pits and depths:

- TP05 at 1.8 m
- TP06 at 1.7 m
- TP08 at 1.8 m
- TP10 at 2.3 m.

No long-term groundwater monitoring was undertaken for the site. It is noted that groundwater levels can be affected by such things as weather conditions and soil permeability and as a result can vary over time. Groundwater was encountered in the above test pits at around RL 1 m. Our expectation is that groundwater would be located between RL 0 m and RL 2 m and rise further from the beach, and will also be heavily influenced by ocean tidal levels



⁽²⁾ EOH = End of Hole

⁽³⁾ NE = Not Encountered

9. Salinity and Aggressivity/Corrosivity Assessment

9.1 Soil Chemistry

The salinity and aggressivity test results summarised in Table 2 indicate the following:

- pH of the soil samples analysed to be in the range of 7.0 to 9.0
- Concentrations of chlorides in samples analysed to be in the range <10 mg/kg to 20 mg/kg
- Concentrations of sulphates in samples analysed to be <10 mg/kg
- The 1:5 soil to water extraction and subsequent electrical conductivity (EC_{1:5}) of the soil samples analysed to be in the range of 8 μ S/cm to 119 μ S/cm
- Cation Exchange Capacity (CEC) in samples analysed to be in the range 0.4 meq/100g to 2.9 meq/100g
- Exchange Sodium Percentage (ESP) in samples analysed to be in the range of <0.2% to 3.4%
- Resistivity to be in the range of 8400 ohm.cm to 125000 ohm.cm.

9.2 Salinity

Site investigations for Urban Salinity (DLWC 2002) classify soil salinity based on electrical conductivity (EC_e). The method of conversion from EC_{1:5} to EC_e (electrical conductivity of saturated extract) is based on DLWC (2002) and given by EC_e = EC_{1:5} x M, where M is the multiplication factor based on "Soil Texture Group".

The "Soil Texture Group" of the samples tested were assessed during our investigation. The salinity classification for the soil samples that were tested are presented in Table 5.

Table 5 - Salinity Classification

Sample ID	EC _{1:5} (dS/m)	Soil Type	М	EC _e (dS/m)	Salinity Class
TP01 (1.0 m)	0.027	Sand	17	0.459	Non-saline
TP04 (0.5 m)	0.042	Sand (Fill)	17	0.714	Non-saline
TP06 (1.0 m)	0.119	Sand	17	2.023	Slightly-saline
TP09 (0.3 m)	0.065	Light Medium Clay (Fill)	8	0.520	Non-saline
TP10 (0.8 m)	0.054	Sand	17	0.918	Non-saline
TP12 (1.0 m)	0.058	Sand (Fill)	17	0.986	Non-saline
TP14 (0.5 m)	0.008	Sand	17	0.136	Non-saline
TP16 (1.0 m)	0.028	Sand (Fill)	17	0.476	Non-saline

It is assessed that the soils on site are typically classified as "Slightly-saline" to "Non-saline". It is noted that the soil samples were taken from the in-situ natural soils and fill materials located above the groundwater.

9.3 Corrosivity / Aggressivity

Table 4.8.1 and Clause 4.8.2 of AS3600 (2018) 'Concrete Structures' provides criteria for exposure classification for concrete in sulphate soils and saline soils based on sulphates in soil and groundwater, soil electrical conductivity (EC_e) and pH of soil. On the basis of the sulphate and pH testing completed, we assess the exposure classification for concrete in sulphate soils above the tidal zone (i.e. up to 1 m above the highest astronomical tide) or splash zone to be "A2".

Testing of groundwater was not undertaken at the time of the investigation, however, given the proximity of the development area to the ocean, it is anticipated that groundwater comprises highly saline sea water. As per Table 4.3 of AS3600 (2018) the exposure classification for concrete structures located within the tidal/splash zone is C2.



Similarly, Table 6.4.2(C) of Australian Standard AS2159 (2009) 'Piling - Design and Installation', provides criteria for exposure classification for concrete piles based on sulphates in the soil and groundwater, soil and groundwater pH, and chlorides in groundwater. On the basis of the soil sulphates, pH testing completed and assumption of disturbed soil, we assess the exposure classification for concrete piles in the soil to be "Mild".

Table 6.4.2(A) of AS2159 (2009) indicates that the exposure classification for concrete piles within the tidal/splash zone of sea water is "Severe".

Table 6.5.2(C) of the Australian Standard AS2159-2009, 'Piling - Design and Installation', provides criteria for exposure classification for steel piles based on resistivity, soil and groundwater pH, and chlorides in soil and groundwater. On the basis of the pH, chloride, resistivity testing completed and assumption of disturbed soil, we assess the exposure classification for steel piles in the soil above the tidal zone to be "Non-aggressive".

Table 6.5.2(A) of AS2159 (2009) indicates that the exposure classification for concrete piles within the tidal/splash zone of tropical/subtropical sea water (north of 30° South) is "Very Severe".

9.4 Sodicity

Sodicity provides a measure of the likely dispersion on wetting and to shrink/swell properties of a soil. Soil sodicity is classified based on the Exchangeable Sodium Percentage (ESP) which is the amount of exchangeable sodium as a percentage of the Cation Exchange Capacity (DLWC, 2002).

The Exchangeable Sodium Percentages calculated from these laboratory results, ranging from <0.2% to 3.4%, indicates that the soils are "Non-sodic" when compared to the criteria listed in "Site Investigations for Urban Salinity", (DLWC, 2002).

10. Discussion

10.1 General

We note that structural engineering drawings for specific structures have not been received for the proposed development. The design advice provided in the following sections has been prepared on the details specified in Section 6 i.e. proposed construction of multiple, multi-storey residential and commercial buildings with basement car parking, construction of on-grade car parks and upgrading of existing parklands.

The engineering parameters provided below are for preliminary planning and design of development works. Additional intrusive investigation should be undertaken at specific locations for the proposed built structures to confirm or revise the provided parameters.

10.2 Excavation Conditions

Based on the results of the geotechnical investigation, it is anticipated that any excavation will include TOPSOIL/FILL and NATURAL SAND soil units. Excavation in soil should be achievable using conventional earth moving equipment (e.g., excavators and dozers). Though considered highly unlikely, excavation of the medium to high strength BEDROCK may require the use of hydraulic impact breakers, rock saws and/or rock grinders, if encountered.

Prospective contractors should make their own assessment of excavatability based on our logs and their experience. It is our experience that excavatability is heavily dependent on both the operator and the plant used.

10.3 Permanent and Temporary Batters

The batter slope angles shown in Table 6 are recommended for the design of batters up to 2 m height and above the groundwater table, subject to the following controls:

- 1. The batters shall be protected from erosion.
- 2. Permanent batters shall be drained.
- 3. Temporary batters shall not be left unsupported for more than 1 month without further advice, and inspection by a geotechnical engineer should be undertaken following significant rain events.
- 4. Where loads are imposed or structures/services are located within on batter height of the crest of the batter, further advice should be sought.



Table 6 - Design Batter Slope Angles

Unit	Temporary	Permanent
TOPSOIL/FILL	2.5H: 1V	3H: 1V
NATURAL SAND	2H: 1V	2.5H: 1V

Steeper batters may be possible subject to further advice, typically involving inspection during construction.

The batters should be inspected by an experience geotechnical engineer or engineering geologist during excavation to confirm the batter advice provided and assess the need for localised support.

10.4 Excavation Support

Cuts in the TOPSOIL/FILL and NATURAL SAND units steeper than the recommended permanent batter slopes in Table 6 will need to be supported by some form of retaining structure or ground reinforcements.

The selection of the appropriate retention system is a matter of design. The designer should consider the following factors in making its selection:

- Technical factors:
 - Performance
 - Ground conditions (this is addressed below with the design parameters)
 - Surcharge loading and
 - Proximity of structures, buildings and roads, etc.
- Non- technical factors:
 - Cost (to build and to maintain)
 - Other constraints such as real estate, neighbouring site/boundary, aesthetics, legislation, etc.

The design of these structures should be based on the following:

- Proposed wall geometry
- Effective soil strength parameters in Table 7
- Water pressure (depending on the type of structure).

Note that design of retention systems may be based on either K_a or K_o earth pressures. Design using active earth pressures provides the minimum lateral earth pressure that must be supported to avoid failure and requires a wall that can rotate or translate to allow the pressures to reduce to these values (vertical and lateral movements up to 2% of height may occur, typical movements will be much less).

Where the design is based on K_0 pressures, construction should be carefully controlled to avoid unwanted effects. It should be noted that designing for K_0 pressures do not, of themselves, ensure that movement does not occur. Movements are controlled by the construction method, especially sequence.

Both surface and sub-surface drainage needs to be designed and constructed properly to prevent pore water pressures from building up behind the retaining walls or appropriate water pressures must be included in the design.

If relying on a passive support from embedment of piles into the BEDROCK unit (e.g., a cantilevered piled wall or propped or anchored piled wall), the designer shall ignore the support provided in the upper 0.5 m of embedment and can adopt a lateral resistance of one third of the allowable bearing pressure (ABP) in Table 7.



Table 7 - Engineering Parameters of Inferred Geotechnical Units

	Bulk	Soil Effe Strengtl Parame		Ultimate Bearing Pressure	Allowable Bearing Pressure	Ultimate	Elastic Parameters		
Inferred Unit	Unit Weight (kN/m3)	c' (kPa)	φ' (deg)	under Vertical Centric Loading ^[2] (kPa)	(ABP) under Vertical Centric Loading ^[3] (kPa)	Shaft Adhesion (kPa)	Long Term Youngs Modulus (MPa)	Poisson's Ratio	
TOPSOIL/FILL	18	0	28	N/A	N/A	N/A	8	0.3	
NATURAL SAND	18	0	30	420	150 ^[1]	N/A	30	0.3	
NATURAL CLAY	18	0	30	420	150 ^[1]	N/A	10	0.3	
BEDROCK	22	N/A	N/A	6000	1500	350	200	0.2	

⁽¹⁾ Pad Footings (for ABP of 150 kPa) should have a minimum horizontal dimension of 1 m and a minimum embedment depth of 0.5 m

As discussed in Section 6.1, the engineering parameters provided in Table 7 are for preliminary planning and design purposes and additional intrusive investigation should be undertaken for specific built structures to confirm the engineering parameters for detailed design.

10.5 Foundations

10.5.1 Pad Footings

It is anticipated that the proposed multi-storey buildings will be supported on pile footings within the NATURAL SAND, NATURAL CLAY or BEDROCK unit. However, lightweight structures could be supported by pad footings founded on or within the NATURAL SAND and NATURAL CLAY unit below the FILL.

Pad footings can be proportioned on the basis of an allowable bearing pressure (ABP) for centric vertical loads provided in Table 7. Further advice should be sought if the footings are located adjacent to a batter or wall.

We note that an allowable bearing pressure (ABP) is not a soil property. It depends on many factors such as the size of the footings, the embedment depth, the load direction and eccentricity, the stiffness of the footing, the adopted factor of safety (FOS), as well as the soil properties. As footings get bigger or deeper the capacity increases rapidly, and as the load gains eccentricity or becomes inclined, the capacity reduces rapidly.

Settlements in the NATURAL SAND and NATURAL CLAY units can be estimated using the elastic moduli provided in Table 7. When assessing the settlement of the shallow footings, the designer needs to consider the additional ground settlement due to the total building load on both shallow and deeper units.

The differential settlement due to the building load shall also be assessed.

Foundation conditions at the proposed shallow pad footing locations should be inspected by a suitably qualified geotechnical engineer prior to the pouring of concrete.

Where footings are located within the zone of influence of an existing batter or retaining wall, the bearing capacity may need to be reduced and further advice should be sought. The zone of influence is defined as the zone above a 2H:1V line extending from the toe of the batter or the toe of the retaining wall.

10.5.2 Piles on Bedrock

Piles should be designed in accordance with the requirements in AS 2159 (2009) 'Piling - Design and Installation'. The parameters provided in Table 7 may be adopted in the design of piles found within the BEDROCK unit. It is considered that continuous flight auger (CFA) piles would be an appropriate piling methodology given the subsurface sand materials and shallow groundwater.



²⁾ Ultimate values occur at large settlement (>5% of minimum footing)

⁽³⁾ ABP is an end bearing pressure to cause settlement of <1% of minimum footing.

The designer should note the following with regards to the pile design:

- The ABP needs to be confirmed by a geotechnical engineer through pile inspections prior to pouring concrete. Where the installation method does not allow confirmation of founding conditions, additional drilling or adopting a lower ABP may be required.
- Deflection should be checked using the recommended elastic parameters in Table 7.
- Where adjacent foundation details differ (e.g., pile and pad, differing loads or ground conditions), differential settlement should also be assessed.

With regards to the pile design, we recommend that:

• A basic geotechnical strength reduction factor, Φ_{gb} = 0.60 (AS2159 CL. 4.3.2) be adopted for a high redundancy system for an assessed average risk rating (ARR) between 2.5 and 3.0. This should be reviewed to suit the specific design and appropriate pile testing proposed by the structural/pile designers in accordance with the requirements of AS2159.

We note that according to AS2159 cl. 8.2.4(c), the following pile testing requirements are given:

- Serviceability: 1% of piles to be tested for ARR 2.5-2.99 (Table 8.2.4(A))
- Pile shaft integrity: level of testing to be nominated by designer.
- It may be possible to increase the pile reduction factors, if the details of the proposed pile installation procedures indicate a high level of quality control with regards to concrete placement, base cleanliness, etc.
- If a geotechnical strength reduction factor, $\Phi g = 0.40$ is adopted then no pile testing will be required (AS2159 Clause 8.2.4 (b)).

Any structural settlement due to shortening (or extension) of the footing element itself should be considered.

Where the founding or loading conditions between footings vary, consideration should be given to the effects of differential settlements.

10.5.3 Floating Piles

Piles founded within the NATURAL SAND or NATURAL CLAY units (floating piles) may also be considered for the proposed built structures though additional intrusive investigation involving cone penetration tests (CPTs) should be undertaken to confirm engineering parameters of the NATURAL SAND and NATURAL CLAY for detailed design.

CPTs involve continuously pushing a cone with friction sleeve attachment attached to metal rods into the ground through a hydraulic ram attached to a truck. The resistance to penetration and friction are measured and plotted over a continuous depth to assist with detailed pile design in soil units. CPTs will terminate on bedrock.

The CPT data will allow detailed design of piles founded in the NATURAL SAND or NATURAL CLAY.

If this option is considered, advice from a specialist pile contractor shall be sought, as the ultimate bearing capacity and pile settlements will depend on pile type, installation method, verification method etc.

For preliminary design and planning purposes, the following engineering parameters can be used:

- Ultimate pile capacity of 1,100 kN for a 0.6 m diameter bored pile founded 6 m into at least medium dense NATURAL SAND
- Ultimate pile capacity 850 kN for a 0.6 m diameter bored pile founded 4 m into very stiff NATURAL CLAY.

Where floating piles are founded in the NATURAL SAND unit, the effect of the underlying NATURAL CLAY unit on pile capacity and settlements shall be considered.

10.6 Pavements

Four (4) CBR tests were undertaken on samples collected from TP02, TP04, TP09 and TP16.

Subgrade CBR for pavement design depends on the material at the finished subgrade levels. The CBR test undertaken by PSM (refer to Table 1) indicates a CBR value of between 6% and 25%.

Given the results of the CBR testing we consider that a design CBR of 6% can be adopted, subject to specific CBR testing being undertaken at subgrade level when pavement layouts are finalised. This is particularly important where imported clay fill is used as the subgrade material.



11. General

The geotechnical investigation described above presents a broad overview of the geotechnical conditions for the proposed development works within the Coffs Harbour Jetty Foreshore Precinct. Further geotechnical investigation is recommended as each specific building design is developed and would likely include CPTs and boreholes within the specific building footprint, though this would be informed by the proposed development.

Advice for site preparation works, including earthworks specifications if required, can also be provided following development of building designs.

Should there be any queries, please do not hesitate to contact the undersigned.

Yours Sincerely

KEN TONG LEE

Me to

GEOTECHNICAL ENGINEER

WILLIAM PIPER
ASSOCIATE GEOTECHNICAL ENGINEER

DAVID PICCOLO PRINCIPAL

Encl.

Figure 1	Site Locality Plan
Figure 2	Selected Site Photographs (1 of 6)
Figure 3	Selected Site Photographs (2 of 6)
Figure 4	Selected Site Photographs (3 of 6)
Figure 5	Selected Site Photographs (4 of 6)
Figure 6	Selected Site Photographs (5 of 6)
Figure 7	Selected Site Photographs (6 of 6)
Appendix A	Engineering Logs

Appendix A Engineering Logs

Appendix B Test Pit Photos

Appendix C Point Load Testing

Appendix D PSP Testing

Appendix E CBR Results

Appendix F Aggressivity and Salinity Testing
Appendix G Historical Aerial Photographs



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Photo 1: General site conditions looking south from TP01



Photo 2: General site conditions looking south from TP16



Coffs Harbour Jetty Revitalisation
Coffs Harbour, NSW
SELECTED SITE PHOTOGRAPHS (1 OF 6)
31 JULY TO 4 AUGUST 2023

PSM4842-007R



Photo 3: Exposed rock outcrop at southern boundary of the Site



Photo 4: Shell fragment observed within NATURAL unit



Coffs Harbour Jetty Revitalisation
Coffs Harbour, NSW
SELECTED SITE PHOTOGRAPHS (2 OF 6)
31 JULY TO 4 AUGUST 2023

PSM4842-007R



Photo 5: Typical fill unit



Photo 6: Typical natural unit



Coffs Harbour Jetty Revitalisation
Coffs Harbour, NSW
SELECTED SITE PHOTOGRAPHS (3 OF 6)
31 JULY TO 4 AUGUST 2023

PSM4842-007R



Photo 7: Typical bedrock unit



Photo 8: Excavator utilised



Coffs Harbour Jetty Revitalisation
Coffs Harbour, NSW
SELECTED SITE PHOTOGRAPHS (4 OF 6)
31 JULY TO 4 AUGUST 2023

PSM4842-007R



Photo 9: Drill Rig utilised



Photo 10: General site conditions looking north west from TP06



Coffs Harbour Jetty Revitalisation
Coffs Harbour, NSW
SELECTED SITE PHOTOGRAPHS (5 OF 6)
31 JULY TO 4 AUGUST 2023

PSM4842-007R



Photo 11: General site conditions looking south from TP07



Photo 12: Encountered deleterious materials from TP12



Coffs Harbour Jetty Revitalisation
Coffs Harbour, NSW
SELECTED SITE PHOTOGRAPHS (6 OF 6)
31 JULY TO 4 AUGUST 2023

PSM4842-007R

Appendix A Engineering Logs





Borehole ID

BH01

Page 1 of 4

Engineering Log - Non Cored Borehole

Client: JBS&G Commenced: Project Name: Coffs Harbour Jetty Revitalisation Completed:

Refer to Figure 1 KTL Hole Location: Logged By: Hole Position: 513636 m E 6647676 m N MGA2020 Zone 56 Checked By: WP

			Dril	ling Informat	tion					Soil Description				Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations	Moisture Condition	Consistency / Relative Density	Hand Penetromete UCS (kPa)	r Structure, Zoning, Origin, Additional Observations
AD/I				SPT 0.50-0.95 m 4,7,7 N=14			- - - 1-			SAND trace clay: dark brown, medium grained, clay is low plasticity SAND: red and brown, fine to medium grained Becomes brown only.	M M 			0.40: INFERRED FILL 0.60: INFERRED NATURAL
				SPT 1.50-1.95 m 4,6,7 N=13			2-					MD to D		
WB) 		SPT 3.00-3.45 m 7,13,17 N=30			3-			SAND: grey, coarse grained				
				SPT 4.50-4.95 m 7,10,14 N=24			4					MD		
SPA	D/T - D/V - /B - PT - T - S -	Was Stan Push Auge	er dri er dri hbor dard n tub er sc	penetration tes	st N	Z Z R	stance efusal		> Infl ⊲ Pai	ater Samples and Tests U - Undisturbed Sample tial Loss SPT - Standard Penetration Test mplete Loss ES - Environmental Sample TW - Thin Walled LB - Large Disturbed Sample	M	D M	re Condition - Dry - Moist - Wet	Consistency/Relative Dens VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense Ce - Cemented

Project No.:

PSM4842

01/08/2023

01/08/2023



Borehole ID

BH01

Page 2 of 4

Engineering Log - Non Cored Borehole

Client: JBS&G Coffs Harbour Jetty Revitalisation Project Name:

Refer to Figure 1 Hole Location: Hole Position: 513636 m E 6647676 m N MGA2020 Zone 56

Drill Model and Mounting: Comacchio Geo 205 -90° RL Surface: Inclination: No survey

Project No.:

Commenced:

Completed:

Logged By:

Checked By:

PSM4842

01/08/2023

01/08/2023

KTL

WP

		eter:		120) mm				Bearing: Datum:		Ai	HD Ope	erator: Mulligan Geotech
	,	Drilli	ng Informat	ion					Soil Description		Observations		
Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations	Moisture Condition	Consistency / Relative Density	Hand Penetrometer UCS (kPa)	Structure, Zoning, Origin, Additional Observations
Penetral Penetral	O					6— 7— 8— 9—			SAND: grey, coarse grained (continued) Continued on cored borehole sheet		MD	2 2 2 3 3 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	

WB - Mushbore
SPT - Standard penetration test
PT - Push tube
AS - Auger screwing
CT - Continuous push tube 1.5m long 76mm diameter

D - Disturbed Sample
SPT - Standard Penetration Test
ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

- Soft - Firm - Stiff - Very stiff - Hard - Very loose - Loose - Medium dense - Dense - Very dense - Cemented - Compact St VSt H VL L MD D VD Ce C

Logged in accordance with AS 1726:2017 Geotechnical site investigations



Borehole ID

BH01

Page 3 of 4

PSM4842

Project No.:

Engineering Log - Cored Borehole

Client:JBS&GCommenced:01/08/2023Project Name:Coffs Harbour Jetty RevitalisationCompleted:01/08/2023

Hole Location: Refer to Figure 1 Logged By: KTL Hole Position: 513636 m E 6647676 m N MGA2020 Zone 56 Checked By: WP

Hole Position: 513636 m E 6647676 m N MGA2020 Zone 56							Checked By: WP																	
-					_	Coma										ırve	-							
Barrel Type and Length:			Bearing:				Datum: AHI			HD	Operator: Mulligan G					eotechn	ica							
Drilling Information					tion		Rock Substance										Rock Mass Defects							
Method	Water TCR (%) RQD (%) Samples and Field Tests		Depth (m)	Graphic Log	ROCK NAME: particle/ colour, fabric/texture,	grain cha inclusion	Weathering			1.0 0			Defect Spacing (mm)			Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other								
NMIC	90% Water RETURN	31	0																	- CZ, F - JT, 6	RF 8°, RF	·, PR, R	F	
Method AD/T - Auger drilling TC bit AD/V - Auger drilling V bit WB - Washbore HQ3- Wireline core (63.5 mm) PQ3- Wireline core (85.0 mm)					m)	Graj	> Inflo ☐ Part ☐ Com ☐ Core indica	w al Loss plete Loss og/Core Loss recovered (hatching tes material)	XW - E HW - H MW - N SW - S FR - F VL - V L - L M - H H - H	Extremely Weathered dighty Weathered doderately Weathered Slightly Weathered resh rength reny Low dwedium digh	SM - Seam IS - Infilled Seam JT - Joint CO - Contact CZ - Crushed Zone VN - Vein FZ - Fracture Zone			ce ting n	CN - Clean SN - Stain VN - Veneer CO - Coating RF - Rock fn G - Gravel S - Sand Z - Silt CA - Calcite CL - Clay FE - Iron				SL - Slickensided POL - Polished S - Smooth g RF - Rough agments VR - Very Rough Shape PR - Planar CU - Curved UN - Undulating ST - Stepped					
	D B DINAMI CINAMI CINAM	MILO MERITOR MERITOR MARKET RETURN MARKET RETURN	Drill Modes Barrel Type Drill Mater Mater	Drill Model and Barrel Type an Drilling In Mater RETURN Mater Mate	Drill Model and Mounting Barrel Type and Length Drilling Information (%) Mater	Drill Model and Mounting: Barrel Type and Length: Drilling Information Water Wager Water Wat	Drill Model and Mounting: Coma Barrel Type and Length: Drilling Information	Drill Model and Mounting: Comacchic Barrel Type and Length: Drilling Information	Drill Model and Mounting: Comacchio Geo 205 Inc. Barrel Type and Length: Be Drilling Information Barrel Type and Length: Be	Drill Model and Mounting: Barrel Type and Length: Drilling Information	Drilli Model and Mounting: Comacchio Geo 205 Inclination: -90° Bearing: Drilling Information Rock Substance	Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Bearing: Date	Drilling Information Part Type and Length: Comacchio Geo 205 Inclination: -90° RL Sur Datum:	Drilling Information Page 1 Page 2 Page 2	Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° Rt. Surface: Datum: Drilling Information Rock Substance	Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Surface: N Datum: AI Drilling Information	Drill Model and Mounting: Drilling Information Rock Substance Material Description ROCK NAME: particle grain characteristics, cooper, included from non-cored borehole sheet ARCILLITE: grey, highly weathered, medium ARCILLITE: grey, hig	Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Surface: No surve Bearing: Drilling Information Rock Substance Material Description ROCK NAME: particlegrain characteristics, colous, flathoribosture, mineral correposition, alteration of components, moliture, mineral correposition, alteration of the composition, alteration of the composition of the compo	Drill Model and Mounting: Comacchio Geo 205 Barrel Type and Length: Rock Substance Rock Substance Rock Substance Rock Substance Strength (150) ROCK NAME partial Description ROCK NAME partial Description, albertation ROCK NAME partial Description ROCK NAME partial Desc	Drill Model and Mounting: Comacchic Geo 205 Inclination: -90° RL Surface: No survey Datum: AHD Open Months of the Park of the	Drill Model and Mounting: Comacchio Geo 205 Inclination: -90* RL Surface: No survey Deature: AHD Operator: **Rock Multiple and Length: AHD Operator: Rock Multiple and Experiment Composition (AHD Operator: Rock Multiple and Experiment Composition) (AHD Operator: Rock Multiple an	Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Surface: No survey Darkum: AHD Operator: Multiple Information Rock Substance Rock Substance Rock Mass Inclination: -90° RL Surface: No survey Darkum: AHD Operator: Multiple Information Rock Substance Rock Mass Inclination: -90° RL Surface: No survey Darkum: AHD Operator: Multiple Information Rock Mass Inclination Rock Mass I	Dill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Surface: No survey Operator: Multigan Comacchio Geo 205 Bearing: Barrel Type and Length: Strong Material Description Material Description Aphabet Company (m) Property of the Company (m) Prop	Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Surface: No survey Operator: Mulligan Geotechn Politics Inclination: -90° Resigning: -90° RL Surface: No survey Operator: Mulligan Geotechn Politics Inclination: -90° Resigning: -90° Resign



BH01

Page 4 of 4

Engineering Log - Cored Borehole

Client: JBS&G Project Name: Coffs Harbour Jetty Revitalisation

Logged By: Hole Location: Refer to Figure 1 KTL Hole Position: 513636 m E 6647676 m N MGA2020 Zone 56 Checked By: WP

Project No.:

Commenced:

Completed:

PSM4842

01/08/2023

01/08/2023

Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Surface: No survey

				d Mounti d Lengt	-	Coma	cchio	Geo 205 Inclination: -90° Bearing:		L Sı atur		ce:		No s AHD	urve)	•	Оре	erator	: Mulligan Geotechnica
		Dril	ling l	nformat	ion			Rock Substance									-	Rock	Mass Defects
Method	Water	TCR (%)	RQD (%)	Samples and Field Tests	RL (m)	Depth (m)	Graphic Log	Material Description ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteratio	n	athe		0-1.0	treng ls(50 - Axi Diam) ial	S	Defe	ing	Des	ect Descriptions / Comments scription, alpha/beta, infilling coating, shape, roughness, thickness, other
	ETURN	31	0			-		CORE LOSS: 0.81 m(continued)											
OIMIN	90% Water RETURN	100	0			- 11-		ARGILLITE: grey, highly to moderately weathered, medium strength, highly fractured											r, RF
GLB Log PSM AU CORE BH (H.Z EDITED) GINT BH.GPJ < <drawingfile>> 0109/2023 15:49 10.03.00.09 Datgel Fence and Map Tool LB; PSM 3.02.1.2019-03-06 Ph; PSM 3.02.1.2019-03-06</drawingfile>						12—		Hole Terminated at 11.23 m Target depth, borehole backfilled with excavated spoil											
GLB Log PSMAU CC	AD. WE HQ	/T - Aug /V - Aug 3 - Wa 3- Wir	jer drilli shbore eline co	ng TC bit ng V bit		<	> Inflov □ Parti	Title Tingtiny Troductorou	I	SS SZ SBP SM	- Fau - She - She - Bed - Sea	ear Su ear Zo dding	irface ine parting		() () (ON -	Clean Stain Venee Coatin	g ragments	Roughness SL - Slickensided POL - Polished S - Smooth RF - Rough VR - Very Rough

HQ3- Wireline core (63.5 mm)
PQ3- Wireline core (85.0 mm)
SPT- Standard penetration test
PT - Push tube

Logged in accordance with AS 1726:2017 Geotechnical site investigations

WPT - Water pressure test

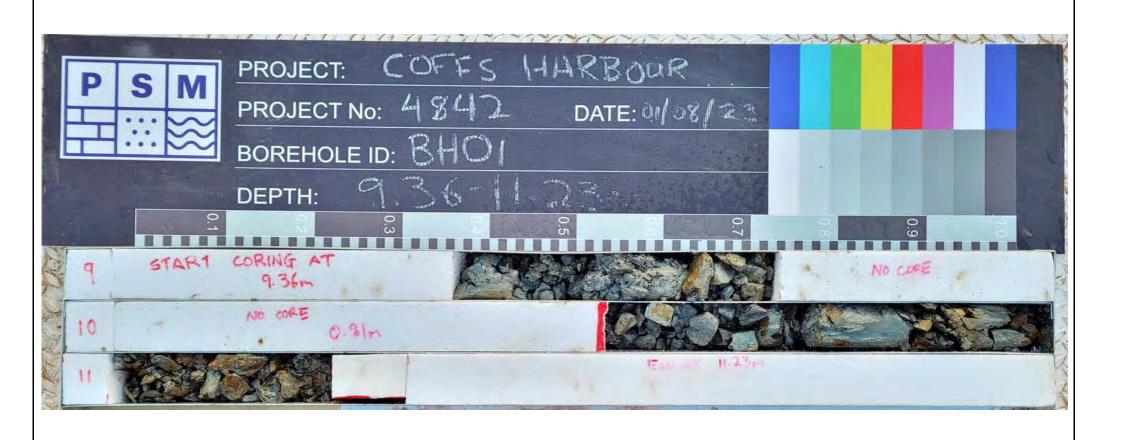
Graphic Log/Core Loss Core recovered (hatching indicates material)

No core recovery

| Strength | VL - Very Low | L - Low | M - Medium | H - High | VH - Very High | EH - Extremely High |

CO - Coating
RF - Rock fragments
G - Gravel
S - Sand
Z - Silt
CA - Calcite
CL - Clay
FE - Iron
QZ - Quartz
X - Carbonaceous BP - Bedding parting
SM - Seam
IS - Infilled Seam
JT - Joint
CO - Contact
CZ - Crushed Zone
VN - Vein
FZ - Fracture Zone
BSH - Bedding Shear
DB - Drilling Break

VR - Very Rough Shape
PR - Planar
CU - Curved
UN - Undulating
ST - Stepped
IR - Irregular





JBS&G

Coffs Harbour Jetty Revitalisation
Coffs Harbour, NSW
CORE PHOTOS BH01
(Core Photo 1 OF 1)

PSM4842-007R

Appendix A



BH02

Page 1 of 4

Engineering Log - Non Cored Borehole

Client: JBS&G Commenced: Project Name: Coffs Harbour Jetty Revitalisation Completed:

Refer to Figure 1 Hole Location: Logged By: KTL Hole Position: 513418 m E 6647628 m N MGA2020 Zone 56 Checked By: WP

Project No.:

PSM4842

31/07/2023

31/07/2023

Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Surface: No survey

		-	Drill	ing Informati	on					Soil Descr	iption					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, beh particle characteristics of component, colour, secondary additional observatio	aviour or or in a spring sprin	Consistency /	100 Penal Pe	Hand etrom UCS (kPa)	neter)	Structure, Zoning, Origin, Additional Observations
							-			TOPSOIL: Silty SAND; dark brov grained Sandy GRAVEL: grey, gravel is a 50 mm, sand is fine grained						0.20: INFERRED FILL
		z					1-			SAND with gravel: brown, fine to grained, gravel is angular up to 3	medium 0 mm					
				SPT 1.50-1.95 m 1,1,2 N=3			-			SAND: brown, fine to medium gr	М					2.00: INFERRED NATURAL
							- - -			SAND: brown and grey, medium grained	to coarse					
		z		SPT 3.00-3.45 m 6,8,8 N=16			3-					ME to [
	1						4									
				SPT 4.50-4.95 m 11,18,22 N=40			-									

Push tube
 Auger screwing
 Continuous push tube 1.5m long 76mm diameter

ES - Environmental Sample TW - Thin Walled LB - Large Disturbed Sample



BH02

Page 2 of 4

Engineering Log - Non Cored Borehole

Client: JBS&G Commenced: Coffs Harbour Jetty Revitalisation Project Name: Completed:

Hole Location: Refer to Figure 1 Logged By: KTL Hole Position: 513418 m E 6647628 m N MGA2020 Zone 56 Checked By: WP

Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Surface: No survey

Hole Diameter 120 mm Rearing: Datum: ΔHD Mulligan Geotechn

Project No.:

PSM4842

31/07/2023

31/07/2023

	am	eter:		120) mm				Bearing: Datu	ım:		ΑH	ID		С	perator: Mulligan Geotechi
	ı	Drillii	ng Informatio	on					Soil Description							Observations
Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary componer additional observations		Condition	Consistency / Relative Density	Pen	Handetron UCS (kPa	nete ;)	r Structure, Zoning, Origin, Additional Observations
	N					6			SAND: brown and grey, medium to coarse grained (continued) CLAY with gravel: grey, gravel is sub-angu			MD to D				
						_			CLAY with gravel: grey, gravel is sub-anguup to 20 mm (possibly extremely weathere ARGILLITE)	ed						
						7— 8— - 9— -			Continued on cored borehole sheet							

WB - Washbore
SPT - Standard penetration test
PT - Push tube
AS - Auger screwing
CT - Continuous push tube 1.5m long 76mm diameter

ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

F - Stiff
St - Stiff
H - Hard
VL - Very loose
L - Loose
MD - Medium dense
D - Dense
VD - Very dense
C - Cemented
C - Compact



PSM4842

Project No.:

Borehole ID **BH02**

Page 3 of 4

Engineering Log - Cored Borehole

Client: JBS&G Commenced: 31/07/2023 Coffs Harbour Jetty Revitalisation Completed: 31/07/2023 Project Name:

Refer to Figure 1 KTL Hole Location: Logged By: Hole Position: 513418 m E 6647628 m N MGA2020 Zone 56 Checked By: WP

	Drill	Mode	al and	l Mounti	na.	Come	cchic	Geo 205 Inc	lination:	-90°	RL Surfa	ce. No si	urvey			
- 1				d Lengt	•	JUITE	iooi IIO		aring:	-90	Datum:	AHD	•	Oper	ator: Mulligan Ge	otechnica
		Dril	ling l	nformat	ion			F	Rock Subsi	tance				R	ock Mass Defects	
Method	Water	TCR (%)	RQD (%)	Samples and Field Tests	RL (m)	Depth (m)	Graphic Log	Material De ROCK NAME: particle/ colour, fabric/texture, components, moisture, mine	grain charact inclusions or	minor ion alteration	Weathering & 출표 & 윤	Strength Is(50) • - Axial O - Diametral	Defection (mm)	ng)	Defect Descriptions / Description, alpha/be or coating, shape, ro thickness, oth	eta, infilling oughness,
						- - - 6—		Continued from non-cored	porehole she	et					CZ PE	
Map T αν Lib: PSM 3.02.12019-03-06 Prj: PSM 3.02.12019-03-06		06	0	Is(50) d=1.24 a=0.43 MPa		- - 7-		ARGILLITE: grey and red, he medium strength, ironstained in the strength ironstained i	nighly weathe						CZ, RF CZ, RF JT, 20°, CN, PR, S BP, 2°, CN, ST, S CZ, RF JT, 55°, CN, CU, S JT, 10°, CN, PR, S CZ, RF DT, 30°, RF, PR, RF BP, 2°, CN, IR, RF	
15:49 10.03.00.09 Datget Fence and Map Tool Lib: PSM 3.02.1.2019- NMIC	90% Water RETURN	100	75	Is(50) d=2.32 a=0.43 MPa		8— - -		ARGILLITE: grey and red, weathered, medium, ironst	highly ained						BP, 10°, CN, PR, S BP, 9°, CN, PR, S BP, 9°, CN, IR, RF JT, 2°, CN, CU, S BP, 2°, CN, CU, S CZ, RF SM, CL JT, 44°, CN, PR, RF JT, 11°, CN, ST, RF JT, 11°, CN, ST, RF JT, 13°, CN, ST, S JT, 13°, CN, ST, S	
PSMAU CORE BH (HLZ EDITED) GINT BH.GPJ < <drawingfile>> 0109/2023 19</drawingfile>		100	41	Is(50) d=1.16 MPa Is(50) d=2.04 a=0.49 MPa		9									TJT, 43°, CN, CU, RF JT, 11°, CN, CU, RF JT, 70°, CN, CU, SP JT, 70°, CN, CU, SP JT, 32°, RF, PR, SP JT, 13°, CN, PR, RF JT, 7°, CN, RF, RF JT, 20°, CN, RF, RF	
M 3.02.2. LIB (HLZ).GLB Log	AD. WE HQ PQ SP PT WF	/T - Aug /V - Aug 3 - Wa 3- Wir 3- Wir T- Sta - Pus PT - Wa	ger drilli shbore eline co eline co ndard p sh tube ter pres	ng TC bit ng V bit ore (63.5 m ore (85.0 m penetration	m) test	Gra	➤ Inflov □ Partia □ Com □ Core indica □ No co	al Loss plete Loss pg/Core Loss ecovered (hatching tes material) re recovery	HW - Highly	nely Weathered Weathered attely Weathered y Weathered y Weathered ow m	FT - Fau SS - She SZ - She	ar Surface ar Zone ding parting m led Seam it tact shed Zone n tutzer Zone ding Shear	Infilling/ CN - C SN - V CO - C RF - R G - G S - S Z - S CA - C CL - C FE - In QZ - Q	clean tain eneer coating cock frag cravel and ilt calcite clay on	SL - Silok POL - Polisis S - Smor RF - Roug gments VR - Very Shap PR - Plan CU - Cur UN - Und ST - Step IR - Irreg	ensided ned hth h Rough Pe ar ed llating



BH02

Page 4 of 4

Engineering Log - Cored Borehole

Client: JBS&G Project Name: Coffs Harbour Jetty Revitalisation

Hole Location: Refer to Figure 1

Hole Position: 513418 m E 6647628 m N MGA2020 Zone 56

Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Surface: No survey

				l Mounti d Lengt	-	Coma	iccnio		Inclination: -90° Bearing:	RL Surfa Datum:	ice: No si AHD	urvey Ope	rator: Mulligan Geotechnica
		Drill	ing l	nformat	ion				Rock Substance			F	Rock Mass Defects
Method	Water	TCR (%)	RQD (%)	Samples and Field Tests	RL (m)	Depth (m)	Graphic Log	ROCK NAME: partic colour, fabric/textur components, moisture, m	Description cle/grain characteristics, re, inclusions or minor ineral composition, alteratio	Weathering	Strength Is(50) - Axial - Diametral	Defect Spacing (mm)	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
		100	41			_		ARGILLITE: grey and red medium strength, ironsta	d, highly weathered, ained <i>(continued)</i>				H'JT, 80°, CN, CU, RF JT, 30°, CN, PR, RF CZ, RF
2019-03-06 NMI C	90% Water RETURN	100	65	Is(50) d=1.32 a=0.5 MPa Is(50) d=1.12 a=0.42 MPa		- - 11— - -		ARGILLITE: grey and br weathered, medium stre	own, moderately ngth				- CZ, RF BP, 2°, CN, PR, RF JT, 23°, CN, PR, RF JT, 23°, CN, PR, RF JT, 23°, CN, PR, RF JT, 26°, CN, PR, RF JT, 26°, CN, PR, RF CZ, RF BP, 2°, CN, IR, RF JT, 28°, CN, PR, RF JT, 10°, CN, UN, RF SM, CL JT, 13°, CN, PR, RF
PSMAU CORE BH (H.L.Z EDITED) GINT BH GPJ <-Chrawing-file>> 01009/2023 15:49 10.03.00.09 Datgel Fence and Map Tool Lib. PSM 3.02.1 2019-03-06 Prj: PSM 3.02.1 2019-03-06						12—		Hole Terminated at 11.90 Target depth, borehole b spoil					
3.02.2. LIB (HLZ).GLB Log PSMAU CORI	AD WE HQ PQ SP PT	/T - Aug /V - Aug / - Was // Wird // Star / Pus	er drilli shbore eline co eline co ndard p h tube	ng TC bit ng V bit ore (63.5 m ore (85.0 m enetration	m)	<	> Inflov ☐ Partide Come Come Core indica	al Loss plete Loss pg/Core Loss recovered (hatching tes material)	Weathering XW - Extremely Weathered HW - Highly Weathered MW - Moderately Weathered SW - Slightly Weathered FR - Fresh Strength VL - Very Low L - Low M - Medium H - High	FT - Fau SS - Shi SZ - Shi BP - Bei SM - Sei IS - Infi JT - Joi CO - CO CZ - Cru VN - Vei	ear Surface ear Zone dding parting am elled Seam nt ntact ished Zone n	Infilling/Coa CN - Clean SN - Stain VN - Veneer CO - Coating RF - Rock fr G - Gravel S - Sand Z - Silt CA - Calcite CL - Clay	SL - Slickensided POL - Polished S - Smooth RF - Rough VR - Very Rough Shape PR - Planar CU - Curved UN - Undulating
< I				AS 1726:201	17 Geotec	hnical site		re recovery ations	VH - Very High EH - Extremely High		cture Zone dding Shear ling Break	FE - Iron QZ - Quartz X - Carbona	ST - Stepped IR - Irregular aceous

Project No.:

Commenced:

Completed: Logged By:

Checked By:

PSM4842

31/07/2023

31/07/2023

KTL

WP





Coffs Harbour Jetty Revitalisation
Coffs Harbour, NSW
CORE PHOTOS BH02
(Core Photo 1 OF 1)

PSM4842-007R

Appendix A



BH03

Page 1 of 3

Engineering Log - Non Cored Borehole

Client: JBS&G Commenced: Project Name: Coffs Harbour Jetty Revitalisation Completed:

Refer to Figure 1 Hole Location: Logged By: KTL Hole Position: 513356 m E 6647379 m N MGA2020 Zone 56 Checked By: WP

Project No.:

PSM4842

02/08/2023

02/08/2023

	rill Mo			d Mounting:		macc) mm	hio Ge	eo 205	5	Inclination: Bearing:	-90°	RL Surfa Datum:	ce:	No Al-	sur HD	vey	O	perator: Mulligan Geotechnica
		1	Drill	ing Informa	tion						Soil Descr	iption						Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	SOIL NAME: Poparticle chara component, colour,	cteristics of p	aviour or orimary components,	Moisture Condition	Consistency / Relative Density	Pene	Hand etrom UCS (kPa)	neter	Structure, Zoning, Origin, Additional Observations
AD/T		Z		SPT 0.50-0.95 m 5,8,6 N=14			-			TOPSOIL: Silty SAN to medium grained, to 60 mm Sandy GRAVEL: gre (gravel up to 60 mm, SAND with gravel: bi grained, gravel is an	gravel is sub yey to dark gre sand is med rown and yel	angular up angular ay, angular lium grained llow, coarse	D to M M M					0.20: INFERRED FILL
orlj Poli ava: i za revenu				SPT 1.50-1.95 m 4,5,7 N=12			1			SAND: brown and ye	illow, coarse	grained						0.80: INFERRED NATURAL
MW		O		SPT 3.00-3.45 m 3,4,5 N=9			3							MD to D				
ADDRESS OF THE PROPERTY OF THE		etho	d or dril	SPT 4.50-4.95 m 13,21,21 N=42	Pe	netra	-	8		/ater	Samples a		M	loistu	re Co	ondit	ion	Consistency/Relative Density
AE WI SF PT AS CT	B - V PT - S F - F S - A	Wasi Stan Push Auge	nbore dard tube er scr	lling TC bit lling V bit e penetration tes e ewing us push tube 1	st	Z Z R	stance efusal mm dia			rtial Loss D - SPT - mplete Loss ES - TW -	Thin Walled	ample enetration Test ital Sample		M	- C - M / - V	/loist		VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense Ce - Cemented C - Compact

VSI - Very sill |
H - Hard |
VL - Very loose |
L - Loose |
MD - Medium dense |
D - Dense |
VD - Very dense |
Ce - Cemented |
C - Compact |



BH03

Page 2 of 3

Engineering Log - Non Cored Borehole

Client: JBS&G Commenced: 02/08/2023 Coffs Harbour Jetty Revitalisation Completed: 02/08/2023 Project Name:

Project No.:

PSM4842

Refer to Figure 1 Hole Location: Logged By: KTL Hole Position: 513356 m E 6647379 m N MGA2020 Zone 56 Checked By: WP

Drill Model and Mounting: Comacchio Geo 205 -90° RL Surface: Inclination: No survey

L	Hole D			J) mm	1110 Ge		'	Bearing: Datum:		AF	ID	vey		Operator: Mulligan Geotechi	nical
		1	Drilli	ing Informatio	on					Soil Description						Observations	
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations	Moisture Condition	Consistency / Relative Density	Pen	Handetron UCS (kPa	nete S)		
).GLB	AD/T - AD/S SPT - PT - AS	Pusn Auae	r drill r drill nbore dard tube r scre	penetration test	N	netrat o resis Re ng 76r	stance efusal		> Inflo ⊲ Par	Atter CLAY: grey mottled red Samples and Tests W U U U U U U U U U U U U U U U U U U		MD to D		o ndi i Dry	tion	7.90: INFERRED CLAY Colour changed observed from water return	



BH03

Page 3 of 3

Engineering Log - Non Cored Borehole

Client: JBS&G 02/08/2023 Commenced: Coffs Harbour Jetty Revitalisation 02/08/2023 Project Name: Completed:

Logged By: Hole Location: Refer to Figure 1 KTL Hole Position: 513356 m E 6647379 m N MGA2020 Zone 56 Checked By: WP

Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Surface: No survey

Project No.:

PSM4842

Drilling Information Soil Description Material Description Material Description Material Description Material Description Soil, NAME: Plastalisty, behaviour or partial	H	Hole D	iam	eter	:	120) mm				Bearing:	Datum:		Αŀ	ID		(perate	or: Mulligan (Geotechnica
CLAY: grey mottled red (continued)				Drill	ing Informatio	on					Soil	Description							Observation	ons
CLAY: grey mottled red (continued)	Method	Penetration	Support	Water	Tests	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	SOIL NAME: Plastici particle characteris component, colour, seco	ity, behaviour or tics of primary ondary components,	Moisture Condition	Consistency / Relative Density	Pene	etron UCS (kPa	nete 3)		Structure, Zonin Additional Obse	g, Origin, ervations
Hole Terminated at 12.40 m Target depth, borehole backfilled with excavated spoil				ater RETURN				- - -							1		4 0		: Coring began at 11	.9 m
	PSMALI NONCORE BH NZ AU GINT BH GPJ < <p>CADRAWITFIRe> 01/09/2023 15:51 10.038 000.09 Datgel Fence and Map Tool I.Lie, PSM 3.02.1 2019-03-06 MP TOOL I.Lie, PSM 3.02.1 2019-03-06 MP TOOL II.E., PSM 3.02.1 2019-03-06 MP TOOL III.E., PSM 3.02.1 2019-03-06 MP TOOL III.</p>			10 <mark>0</mark> % W				-			Target depth, borehole ba	m ackfilled with								

Washbore
 Standard penetration test
 Push tube
 Auger screwing
 Continuous push tube 1.5m long 76mm diameter

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Complete Loss

D - Disturbed Sample SPT - Standard Penetration Test ES - Environmental Sample TW - Thin Walled LB - Large Disturbed Sample

- Soff - Firm - Stiff - Very stiff - Hard - Very loose - Loose - Medium dense - Dense - Very dense - Cemented - Compact F St VSt H VL MD D VD Ce C



BH04

Page 1 of 4

Engineering Log - Non Cored Borehole

Client: JBS&G Commenced: 31/07/2023 Project Name: Coffs Harbour Jetty Revitalisation Completed: 01/08/2023

Project No.:

PSM4842

Refer to Figure 1 KTL Hole Location: Logged By: Hole Position: 513347 m E 6646938 m N MGA2020 Zone 56 Checked By: WP

	ole [ounting:		mm		eo 205		Inclination: Bearing:	-90°	RL Surfa Datum:		AF	sur HD	vcy		perator:	Mulligan Geotech
			Dr	illing	Informat	ion					:	Soil Descri	ption							Observations
Method	Penetration	Signort	Water		Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	SOIL NAME: P particle chara component, colour additiona	cteristics of p , secondary o al observation	rimary omponents, s	Moisture Condition	Consistency / Relative Density	Pene	Handetron UCS (kPa	nete 3)		Structure, Zoning, Origin, Additional Observations
WB AD/T				SP 1.5 2.6 N =	T 0-1.95 m ,4 10 0-1.			1- 			TOPSOIL: Silty CLA medium plasticity, g mm CLAY: dark brown, r SAND with clay trac brown, coarse grain- red mottled brown, g mm SAND trace clay tra grained, clay is low r up to 10 mm SAND: yellow, coars	ravel is angul medium plast e gravel: yelk ed, clay is lov gravel is angu	ar up to 20 —————— city ————— w and r plasticity, lar up to 10	D to M M	D					ERRED FILL
AE W SF PT AS CT	D/T - D/V - B - PT - I - S - I -	Aug Wa Sta Pus Aug Co	ger d ger d ishbo indai sh tu ger s ntinu	Irilling ore od per be crewi ous p	TC bit V bit netration tes ng ush tube 1.	t No.	R ng 76	stance efusal mm dia	ımeter	> Infl ⊲ Pai	rtial Loss D - SPT - mplete Loss ES - TW -	Samples a Undisturbed Disturbed St Standard Pe Environmen Thin Walled Large Distur	Sample ample netration Test al Sample		Moistu D M W	re Co - [- N - V)ry ⁄loist		Con	Sistency/Relative Density



BH04

Page 2 of 4

Engineering Log - Non Cored Borehole

Client: JBS&G 31/07/2023 Commenced: Coffs Harbour Jetty Revitalisation 01/08/2023 Project Name: Completed:

Logged By: Hole Location: Refer to Figure 1 KTL Hole Position: 513347 m E 6646938 m N MGA2020 Zone 56 Checked By: WP

Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Surface: No survey

Project No.:

PSM4842

Hole Diameter:	120 mm	Bearing:	Datum:	AHD O	perator: Mulligan Geotechnic
Drilling Informa	ation	Soil L	Description		Observations
Samples Tests Remarks Remarks		Material Description SOIL NAME: Plasticit particle characterist component, colour, secon additional observations.	y, behaviour or expression of primary of the primar	Consistency / Relative Density 100 COS (RAa) S00 COS	Structure, Zoning, Origin, Additional Observations
WB C	6	SAND: yellow, coarse grained by the second s	ned (continued)	D	6.00: INFERRED CLAY Colour changed observed from water return
Method AD/T - Auger drilling TC bit AD/V - Auger drilling V bit WB - Washbore	Penetration No resistance	Inflow U - Undis	ples and Tests Note turbed Sample bed Sample lard Penetration Test	Moisture Condition D - Dry M - Moist W - Wet	Consistency/Relative Density VS - Very soft S - Soft F - Firm

Washbore
 Standard penetration test
 Push tube
 Auger screwing
 Continuous push tube 1.5m long 76mm diameter

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Complete Loss

D - Disturbed Sample SPT - Standard Penetration Test ES - Environmental Sample TW - Thin Walled LB - Large Disturbed Sample

F St VSt H VL

Soft
Firm
Stiff
Very stiff
Very loose
Very loose
Loose
Medium dense
Dense
Very dense
Cemented
Compact MD D VD Ce C



BH04

Page 3 of 4

Engineering Log - Non Cored Borehole

Client: JBS&G Coffs Harbour Jetty Revitalisation Project Name:

Hole Location: Refer to Figure 1

Hole Position: 513347 m E 6646938 m N MGA2020 Zone 56

Comacchio Geo 205 RL Surface: No survey Drill Model and Mounting: Inclination: -90°

AHD Hole Diameter: 120 mm Bearing: Datum: Operator: Mulligan Geotechnica

Project No.:

Commenced:

Completed:

Logged By:

Checked By:

PSM4842

31/07/2023

01/08/2023

KTL

WP

	Hol	e Dia	nete	r:	120) mm				Bearin	g:	Datum:		Αŀ	HD_		0	perator: Mulligan (Seotechnical
			Dril	ling Informatio	n						Soil Desc	ription						Observation	ons
	Method	Penetration	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	SOIL NA particle component,	Material Description ME: Plasticity, bete characteristics of colour, secondary diditional observations.	haviour or f primary components,	Moisture Condition	Consistency / Relative Density	Pene	Hand etrom UCS (kPa)	netei)	Structure, Zonin Additional Obse	ig, Origin, ervations
90.506	WB						- - - 111 — -			CLAY: grey an	nd brown <i>(continu</i>	ed)					4 40		
PSM AU NONCORE BH NZ AU GINT BH.GPJ < <drawingfile>> 0109/2023 15:51 10.03.00.09 Datgel Fence and Map Tool Lb: PSM 3.02.1.2019-03-08 Prj; PSM 3.02.1.2019-03-08</drawingfile>							13			Continued on	cored borehole s	heet							
og PSMAU NON	AD/ AD/ WB	Meti T - Au √ - Au - Wa - Sta	ger dri ger dri ger dri shbor	illing TC bit illing V bit e I penetration test	Pe	netrat o resis	ion stance		> Inflo ✓ Par	tial Loss	Samples U - Undisturbe D - Disturbed SPT - Standard I	Sample Penetration Test		loistu D M W	re Co - [- N	ondit Ory Moist Vet	tion	Consistency/Relate VS - Very soft S - Soft F - Firm St - Stiff	tive Density t

Washbore
 Standard penetration test
 Push tube
 Auger screwing
 Continuous push tube 1.5m long 76mm diameter

Logged in accordance with AS 1726:2017 Geotechnical site investigations

D - Disturbed Sample
SPT - Standard Penetration Test
ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

- Soft - Firm - Stiff - Very stiff - Hard - Very loose - Loose - Medium dense - Dense - Very dense - Cemented - Compact F St VSt H VL MD D VD Ce C



BH04

Page 4 of 4

PSM4842

31/07/2023

01/08/2023

KTL

WP

Project No.:

Commenced:

Completed: Logged By:

Checked By:

Engineering Log - Cored Borehole

Client: JBS&G Project Name: Coffs Harbour Jetty Revitalisation

Hole Location: Refer to Figure 1

Hole Position: 513347 m E 6646938 m N MGA2020 Zone 56

Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Surface: No survey

				d Lengt	-	00		Bearing:	Datum:	AHD	•	rator: Mulligan Geotechnica
		Dril	ling l	nformat	ion			Rock Substance			F	Rock Mass Defects
Method	Water	TCR (%)	RQD (%)	Samples and Field Tests	RL (m)	Depth (m)	Graphic Log	Material Description ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteratior	Weathering	Strength Is(50) • - Axial O - Diametral	Defect Spacing (mm) 0001	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
01/09/2023 15:49 10.08.00.08 Dargel Fence and Map Too Ltb: PSM 3/02 1 2019-03-06 NMLC NMLC	TTURN	100	76 RG	Is(50) d=2.36 a=0.86 MPa	(m)	(m)	15	Continued from non-cored borehole sheet SILTSTONE: grey, moderately weathered, medium strength Hole Terminated at 12.40 m Target depth, borehole backfilled with excavated spoil	XW		\$20 \$20 \$21 \$22 \$23 \$24 \$25 \$25 \$25 \$25 \$25 \$25 \$25 \$25 \$25 \$25	—JT, 10°, CN, IR, RF —JT, 9°, CN, PR, RF —JT, 33°, CN, PR, RF
PSMAU CORE BH (HLZ EUTIED) GINI BH:GF3 < <ur></ur>	AD	/T - Aug	ger drilli	ing TC bit ing V bit			W /o> Inflo	Title Tilgrily Woulding	FT - Fau	ear Surface		ting Roughness SL - Slickensided POL - Polished S - Smooth

AD/V - Auger drilling V bit WB - Washbore HQ3- Wireline core (63.5 mm) PQ3- Wireline core (85.0 mm) SPT- Standard penetration test PT - Push tube

Logged in accordance with AS 1726:2017 Geotechnical site investigations

WPT - Water pressure test

 Complete Loss Graphic Log/Core Loss

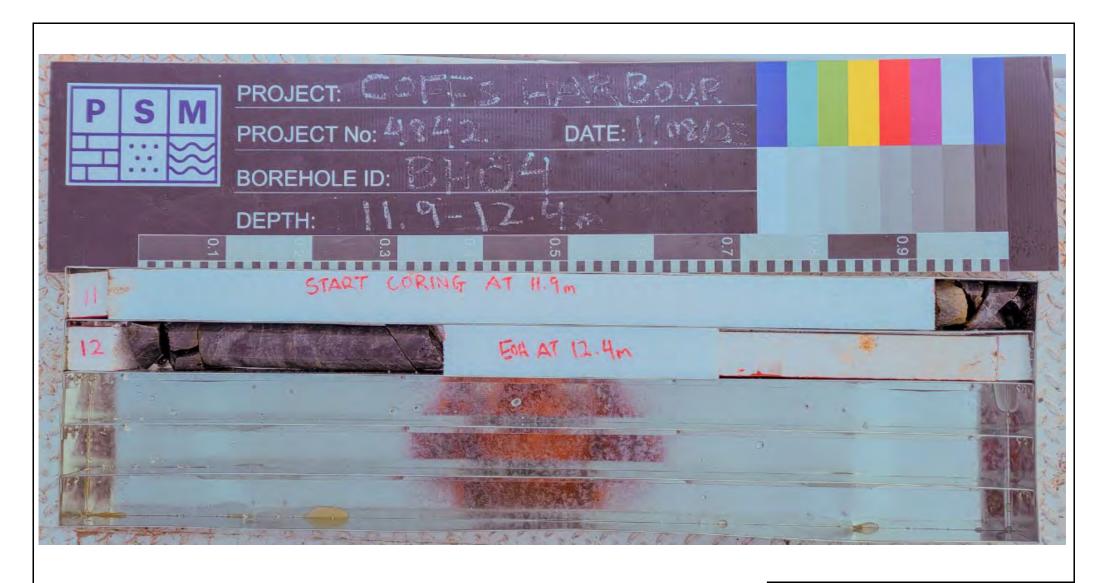
Core recovered (hatching indicates material) No core recovery

MW - Moderately Weathe SW - Slightly Weathered FR - Fresh

| Strength | VL - Very Low | L - Low | M - Medium | H - High | VH - Very High | EH - Extremely High |

SS - Shear Zone
BP - Bedding parting
SM - Seam
IS - Infilled Seam
JT - Joint
CO - Contact
CZ - Crushed Zone
VN - Vein
FZ - Fracture Zone
BSH - Bedding Shear
DB - Drilling Break

S - Smooth RF - Rough VR - Very Rough Shape
PR - Planar
CU - Curved
UN - Undulating
ST - Stepped
IR - Irregular





Coffs Harbour Jetty Revitalisation
Coffs Harbour, NSW
CORE PHOTOS BH04
(Core Photo 1 OF 1)

P S M → ::: ※

PSM4842-007R

Appendix A



BH05

Page 1 of 2

Engineering Log - Non Cored Borehole

Client: JBS&G Commenced: Coffs Harbour Jetty Revitalisation Completed: Project Name:

Refer to Figure 1 Hole Location: Logged By: KTL Hole Position: 513585 m E 6646662 m N MGA2020 Zone 56 Checked By: WP

Drill Model and Mounting: Comacchio Geo 205 -90° RL Surface: Inclination: No survey

	,	Drill	ing Informatio	on					Soil Description						Observations
Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations	Moisture Condition	Consistency / Relative Density	Pene	Hand etrom UCS (kPa)	neter)	Structure, Zoning, Origir Additional Observations
	Z		SPT 0.50-0.65 m 6,20/0mm HB N=R						Silty CLAY with gravel: dark brown, medium plasticity, gravel is angular up to 15 mm Gravelly CLAY/ Clayey GRAVEL: dark brown, low to medium plasticity, gravel is angular of \arglitte origin up to 50 mm Continued on cored borehole sheet	M					0.00: INFERRED FILL

Project No.:

PSM4842

01/08/2023

01/08/2023

WB - Washbore
SPT - Standard penetration test
PT - Push tube
AS - Auger screwing
CT - Continuous push tube 1.5m long 76mm diameter

■ Complete Loss

ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

F - Stiff
St - Stiff
H - Hard
VL - Very loose
L - Loose
MD - Medium dense
D - Dense
VD - Very dense
C - Cemented
C - Compact



BH05

Page 2 of 2

PSM4842

01/08/2023

01/08/2023

KTL

Project No.:

Commenced:

Completed:

Logged By:

Engineering Log - Cored Borehole

JBS&G Client: Project Name: Coffs Harbour Jetty Revitalisation

Hole Location: Refer to Figure 1

- 1	Hole Hole	Posi			eter to 3585	-		62 m N MGA2020 Zone 56	Checked	-	KIL NP	
- 1				l Mounti d Lengt	U	Coma	cchio	Geo 205 Inclination: -90° Bearing:	RL Surfa Datum:	ce: No s AHD	urvey Ope	rator: Mulligan Geotechnica
		Dril	ling l	nformat	ion			Rock Substance			F	Rock Mass Defects
Method	Water	TCR (%)	RQD (%)	Samples and Field Tests	RL (m)	Depth (m)	Graphic Log	Material Description ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteration	Weathering	Strength Is(50) ● - Axial O - Diametral	Defect Spacing (mm)	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
		30	0			- - 1— -		Continued from non-cored borehole sheet Gravelly CLAY/ Clayey GRAVEL: dark brown, low to medium plasticity, gravel is angular of argilite origin up to 50 mm CORE LOSS: 0.7 m				-CZ, RF
ol Lib: PSM 3.02.12019-03-06 Prj: PSM 3.02.12019-03-06 NML C	0% Water RETURN	50	0			- 2- - -		GYPSUM: Placed in attempt to seal casing, recovered during drilling GRAVELS and COBBLES: fill of majority argilite origin, sub-angular to rounded up to 100 mm CORE LOSS: 0.6 m				- CZ, RF - CZ, RF - JT, 7°, RF, ST, RF - JT, 18°, RF, IR, RF - JT, 24°, CN, ST, RF - CZ, RF
10.03.00.09 Datgel Fence and Map Tool	%0	35	0	Is(50) d=1.28 MPa		3		GRAVELS and COBBLES: fill of majority argilite origin, sub-angular to rounded up to 100 mm CORE LOSS: 0.22 m				- CZ, RF - CZ, RF - JT, 27°, CL, PR, RF - JT, 38°, CL, UN, RF
GINT BH.GPJ < <drawingfile>> 01/09/2023 15:49 ·</drawingfile>		100	0	Is(50) d=1.2 MPa		- 4- -		GRAVELS and COBBLES: fill of majority argilite origin, sub-angular to rounded up to 100 mm CORE LOSS: 0.27 m GRAVELS and COBBLES: fill of majority argilite origin, sub-angular to rounded up to 100 mm				- CZ, RF - CZ, RF - JT, 89°, RF, PR, RF - JT, 88°, RF, PR, RF - CZ, RF
PSMAU CORE BH (HLZ EDITED) GIN						-	·····	Hole Terminated at 4.58 m Difficult drilling due to boulder and cobble inclusions in fill				
M 3.02.2. LIB (HLZ).GLB Log	AD. WE HQ PQ SP PT WF	/T - Aug /V - Aug 3 - Wa 3- Wir 3- Wir T- Sta - Pus PT - Wa	ger drilli shbore eline co eline co ndard p sh tube ter pres	ng TC bit ng V bit	m) test	Gra	➤ Inflov ☐ Parti ☐ Com ☐ Core i ☐ indica — No co	Al Loss	FT - Fau SS - She SZ - She BP - Bed SM - See IS - Infill JT - Joir CO - Cor CZ - Cru VN - Vei FZ - Fra	ear Surface tear Zone diding parting im led Seam it stact shed Zone n cture Zone ding Shear	Infilling/Coa CN - Clean CN - Clean SN - Stain VN - Veneer CO - Coating RF - Rock fr G - Gravel S - Sand Z - Silt CA - Calcite CL - Clay FE - Iron QZ - Quartz X - Carbon	SL - Slickensided POL - Polished S - Smooth RF - Rough yagments VR - Very Rough Shape PR - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular





Coffs Harbour Jetty Revitalisation
Coffs Harbour, NSW
CORE PHOTOS BH05

(Core Photo 1 OF 1)

PSM4842-007R

Appendix A



BH06

Page 1 of 2

Engineering Log - Non Cored Borehole

Client: JBS&G Commenced: 02/08/2023 Coffs Harbour Jetty Revitalisation 02/08/2023 Project Name: Completed:

Hole Location: Refer to Figure 1 Logged By: KTL Hole Position: 513601 m E 6646621 m N MGA2020 Zone 56 Checked By: WP

Drill Model and Mounting: Comacchio Geo 205 Inclination: -90° RL Surface: No survey

Project No.:

PSM4842

L	Hole Diameter: 120 mm						Bearing:	Datum:		Αŀ	HD		C	perator:	Mulligan	Geotechnica				
				Drilli	ng Informatio	n					Soil Descrip	tion							Observa	tions
	Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behav particle characteristics of pri component, colour, secondary co additional observations	iour or mary mponents,	Moisture Condition	Consistency / Relative Density	Pen	Hand etron UCS (kPa	nete S)	r S	structure, Zor Additional Ob	ning, Origin, oservations
	Ab/r		Z								TOPSOIL: Silty SAND with gravel: medium grained, gravel is angular mm SAND with clay: brown, medium gr is low plasticity Gravelly SAND/ Sandy GRAVEL: bgrey, sand is medium grained, grav grained of argilite origin, angular up.	dark brown, up to 10 ained, clay ained, clay rown and rel is fine to 30 mm	M M				4 0	0.00: INF	ERRED FILL	
M 3.02.2. LIB (HLZ).GLB Log	S P A C	D/T - D/V - /B - PT - T - S -	Was Stan Push Auge Conf	er drill er drill hbore dard _I tube er scre inuou	penetration test	n lo		stance efusal mm dia	meter	>> Inflo <□ Par	ater Samples and U - Undisturbed S itial Loss SPT - Standard Pen nplete Loss ES - Environmenta TW - Thin Walled LB - Large Disturbe	ample nple etration Test I Sample	M	loistu D M W	re C	Ory Moist	ition		Sistency/Rei VS	stiff cose the state of the st



BH06

Page 2 of 2

Engineering Log - Cored Borehole

Client: JBS&G Coffs Harbour Jetty Revitalisation Project Name:

Refer to Figure 1 Hole Location:

Hole Position: 513601 m E 6646621 m N MGA2020 Zone 56 Project No.:

Commenced:

Completed:

Logged By:

Checked By:

PSM4842

02/08/2023

02/08/2023

KTL

WP

							Coma	cchio	Geo 205 Incli	ination: -9	0°	RL Surfa	ce: No s	urvey		
	Ва	arre	l Typ	e an	d Lengtl	h:			Bea	ring:		Datum:	AHD	Ope	rator:	Mulligan Geotechnical
			Drill	ing I	nformat	ion			Ro	ock Substan	ce			F	Rock M	lass Defects
	Method	Water	TCR (%)	RQD (%)	Samples and Field Tests	RL (m)	Depth (m)	Graphic Log	Material Des ROCK NAME: particle/g colour, fabric/texture, ir components, moisture, miner	rain characteris nclusions or mir	nor alteration	Weathering	Strength Is(50) - Axial - Diametral H H H H	Defect Spacing (mm)	Desc	t Descriptions / Comments ription, alpha/beta, infilling vating, shape, roughness, thickness, other
PSM AU CORE BH (HLZ EDITED) GINT BH GPJ < <drawningfile>> 01009/2023 15:49 10:03 00:09 Datgel Fence and Map Tool Lb: PSM 302.12019-03:06 Prj: PSM 3.02.12019-03:06</drawningfile>	NMLC	50% Water RETURN	35						Continued from non-cored be GRAVEL FILL: sub-angular talluvial origin up to 30 mm CORE LOSS: 0.36 m Hole Terminated at 2.50 m Difficult drilling due to boulder in fill	o rounded grav	clusions				fina	Doughness
AU COF		AD/		e thod er drilli	I ing TC bit		7		ater	Weatherin XW - Extremely V	Weathered	FT - Fau		Infilling/Coa CN - Clean	ting	Roughness SL - Slickensided
LZ).GLB Log PSM/		AD/ WB HQ3 PQ3	V-Aug - Was 3- Wire 3- Wire	er drilli shbore eline co eline co	ing V bit	m)	<			HW - Highly Wea MW - Moderately SW - Slightly We FR - Fresh Strength VL - Very Low	thered Weathered	SS - She SZ - She	ear Surface ear Zone dding parting am lled Seam	SN - Stain VN - Veneer CO - Coating RF - Rock fr G - Gravel S - Sand	agments	POL - Polished S - Smooth RF - Rough VR - Very Rough

SPT- Standard penetration test PT - Push tube

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Graphic Log/Core Loss Core recovered (hatching indicates material) No core recovery

 Strength

 VL
 - Very Low

 L
 - Low

 M
 - Medium

 H
 - High

 VH
 - Very High

 EH
 - Extremely High

JT - Joint
CO - Contact
CZ - Crushed Zone
VN - Vein
FZ - Fracture Zone
BSH - Bedding Shear
DB - Drilling Break

S - Graver

S - Sand

Z - Silt

CA - Calcite

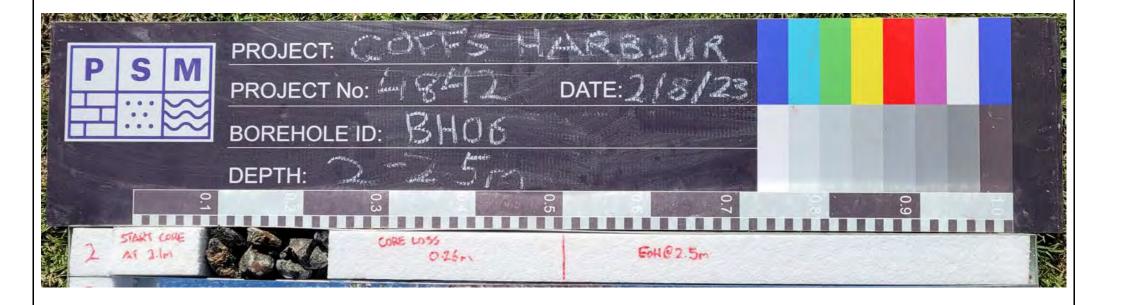
CL - Clay

FE - Iron

QZ - Quartz

X - Carbonace

Shape
PR - Planar
CU - Curved
UN - Undulating
ST - Stepped
IR - Irregular





JBS&G

Coffs Harbour Jetty Revitalisation
Coffs Harbour, NSW
CORE PHOTOS BH06
(Core Photo 1 OF 1)

PSM4842-007R

Appendix A

⊐ ∷:	\approx							Harbour Jetty Revitalisation o Figure 1	_			JOB NO: PSM4842 T:1 OF 1
						MG	A202	O Zone 56) SURFACE ELEVATION :				
			: 5 ton 6		tor			METHOD : E				NIECKED DV . MD
			: 04/08/ NSIONS		5 m	۱۸/۱۲)F	LOGGED BY: KTL				CHECKED BY: WP
0, (1, (1		RILLIN		. 0.10)	****		MATERIAL				
N O	ь	TER	% L	Ê	0		N O		шZ	<u>></u>	ģ.,	
E PENETRATION F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHI	FOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE	CONSISTENCY RELATIVE DENSITY	200 HAND 300 B PENETRO-	STRUCTURE & Other Observation
	N			0.0 -	\boxtimes	\bigotimes		Gravelly SAND: brown and grey, sand is fine to medium grained, gravel sub-angular to angular up to 70 mm of argilite origin				0.00: INFERRED FILL
i				-	₩	\bowtie			D			
				-	\boxtimes	\bowtie		0.40m				
				0.5	:8	:8		SAND: yellow, coarse grained				
				-				2.70	M	MD		
				-		Ш		0.70m _{0.80m} CLAY: brown, medium plasticity	— — M	St		
				_	:3:	:		SAND: brown, coarse grained				
			1.00m ES-1	1.0 —	ł							
				-	::	:9						
				-								
				-	::	:8		Becomes yellow only at 1.3 m.				
				1.5 —								
				-					М	MD		
				-	13	- 13						
				-	1							i
				2.0 -	13	19						
				-	1							
				-	:3:	:0						
	V			2.5				2.50m		L_I		
				-	-			Hole Terminated at 2.50 m Collapse				
				-								
1 				-	-							
Ηİ				3.0 —	1							
ı 				-	1							
				-								
				-	1							
				3.5	1							
				-	-							i
				-	1							
				4.0-	1							
					-							
				-	1							
					1							
				4.5	-							
				-	1							
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рн	I IOTO	RAPHS		J _{5.0} —	_		Щ.					<u> </u>
NC	TES			YES			L	NO				
ETHOD			PI	ENETRA		N		SAMPLES & FIELD TESTS CLASSIFIC SOIL	DESCRIPT		F	CONSISTENCY/ RELATIVE DENSITY
		posure		<u>~</u> ₩шшт	: >	— No	Res	stance U - Undisturbed Sample Based	d on Unified	d Soil	S	/S - Very Soft S - Soft
Back	khoe/E	cavati xcava			223			B - Bulk Disturbed Sample			F S V	
	lozer		E	ATER	فتت			MC - Moisture Content HP - Hand Penetrometer (UCS kPa)	MOISTURE Dry		H	l - Hard /L - Very Loose
				μ1			Wate	r VS - Vane Shear; P-Peak,	-	t	L M	- Loose MD - Medium Dense
	ering			▶	ater	inflo		PBT - Plate Bearing Test	v - vvet		D V C	/D - Very Dense C - Compact
	Shorin	1		— ■ w	ater	outfl	οw	ES - Environmental Sample				Ce - Cemented

P :	S M ∷ ⊗		PI	ROJEC	CT : Co	offs Harb	(CAVATION - GEOTECHNICAL LC)G		FILE / JO	O : TP02 DB NO : PSM4842 : 1 OF 1
POSITI	ON	E: 51	3451, N: (
			: 5 ton 6				METHOD : E				
DATE E	EXCA'	VATED	: 04/08/	2023			LOGGED BY: KTL			Cl	HECKED BY: WP
EXCAV	ATIO	N DIME	NSIONS	: 0.4	m WID	E					
		DRILLIN					MATERIAL				1
VE E PENETRATION F	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE	CONSISTENCY RELATIVE DENSITY	100 200 HAND 300 & PENETRO- 400	STRUCTURE & Other Observations
	N 	I	0.50m	- 0.0 0.5 -		0.50m	Sandy GRAVEL: dark brown, angular up to 100 mm, sand is coarse grained, minor amounts of deleterious materials (bricks, rubbish)	D			0.00: INFERRED FILL
	1		CBR-1	-		0.60m		 D			_
				-			CLAY: brown, high plasticity	D			-
			0.80m	1.0 —		0.80m	SAND: dark brown, coarse grained, significant presence of bark and timber	D			- - - - - - - - -
		,		2.0 —		2.70n	SAND: yellow, coarse grained	М	MD		2.00: INFERRED NATURAL
				3.0 —			Hole Terminated at 2.70 m Collapse				
iii	i			-						iiii	_
				-							_
				-							-
	PHOTO	OGRAPH:	s —	5.0							
	NOTES		<u> </u>	YES			NO				
METHOD PENETRATION				ATER 1 L	No Oct., 73 evel on Darater inflow	ate shown	SAMPLES & FIELD TESTS SOI	ELCATION SY IL DESCRIPT ed on Unified essification Sy: MOISTURE D - Dry M - Moist W - Wet	TION I Soil stem		- Soft - Firm - Stiff t - Very Stiff - Hard - Very Loose - Loose - Medium Dense - Dense - Very Dense - Compact

See Explanatory Notes for details of abbreviations & basis of descriptions.

P S	M ≈		PI	ROJEC	CT : C	Coffs	EXCAVATION - GEOTECHNICAL LOG				D :TP03 B NO : PSM4842
POOLETION	\sim	F 540					o Figure 1 SURFACE ELEVATION:			OHEET .	
EQUIPME						A202	0 Zone 56) SURFACE ELEVATION : METHOD : E				
DATE EX					.01		LOGGED BY : KTL			CH	ECKED BY: WP
EXCAVAT					5 m WII	DE	EGGGED BT . IVIE			011	LONED DT . WI
		RILLIN					MATERIAL				
VE E PENETRATION F	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE	CONSISTENCY RELATIVE DENSITY	100 200 HAND 300 B PENETRO- 400	STRUCTURE & Other Observations
	N			0.0 —			TOPSOIL: Silty SAND with gravel: dark brown, coarse grained, gravel is sub-angular to angular up to 20 mm Sandy GRAVEL: brown and grey, angular up to 150 mm, sand is medium to coarse grained SAND with gravel: yellow, coarse grained, gravel is sub-angular up to 30	D D			0.10: INFERRED FILL 0.50: INFERRED
				1.0 —			mm	D to M	MD		NATURAL -
				1.5 —	18 18 18 18		SAND: orange, coarse grained				-
				2.5 —			2.90m	M	MD		-
				3.0 —			Hole Terminated at 2.90 m Collapse				-
				-4.0 —							- -
PH	IOTOG	RAPHS	·	5.0 —	L						

MET	THOD	PENETRATION	
N X E B	Natural Exposure Existing Excavation Backhoe/Excavator Bulldozer Blade	No Resistance	
R	Ripper	WATER	
SUF	PPORT	10 Oct., 73 Water Level on Date shown	

water inflow ■ water outflow SAMPLES & FIELD TESTS U - Undisturbed Sample

D Disturbed Sample В Bulk Disturbed Sample MC HP Moisture Content
Hand Penetrometer (UCS kPa) Vane Shear; P-Peak,

R-Remouded (uncorrected kPa)

PBT - Plate Bearing Test

ES - Environmental Sample

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION CONSISTENCY/ RELATIVE DENSITY Based on Unified Soil

Classification System MOISTURE D - Dry M - Moist W - Wet

See Explanatory Notes for details of abbreviations & basis of descriptions.

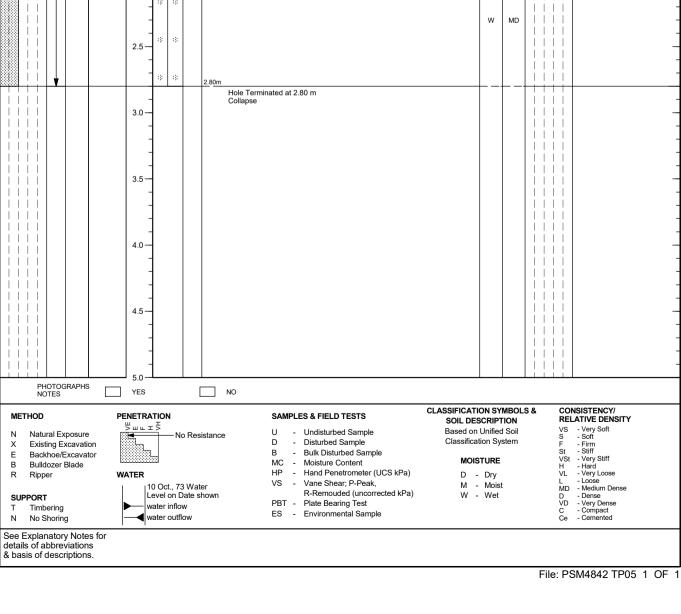
SUPPORT Timbering No Shoring

Ν

LIB (HLZ).GLB Log PSMIS AU TEST PIT 2 GINT TP.GPJ

P S M	DDC :===		VATION - GEOTECHNICAL LO)G	PIT NO :TP04 FILE / JOB NO : PSM4842
H∷∷ጅ		Coffs Harbour Je Refer to Figure 1	tty Revitalisation		SHEET: 1 OF 1
OSITION : E: 513382	,	MGA2020 Zone 56			
QUIPMENT TYPE : 5			METHOD : E		CHECKED BY : MB
ATE EXCAVATED: 03 XCAVATION DIMENSION		VIDE	LOGGED BY: KTL		CHECKED BY: WP
DRILLING			MATERIAL		
E PENETRATION H SUPPORT GROUND WATER LEVELS	DEPTH (m)	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION CONSISTENCY RELATIVE DENSITY	ON A STRUCTURE STRUCTURE & Other Observations
N R S		- I	OIL: Silty CLAY: dark brown, low to medium plasticity	D D	100 00 00 00 00 00 00 00 00 00 00 00 00
		 	/EL: grey, angular gravel up to 40 mm	-+	0.10: INFERRED FILL
		\otimes			
0.50m		\otimes			
CBR-2	0.5	0.60m			
		SANI): yellow, coarse grained		
0.80m					
	10 -	8			
	1.0				
		8			
	"				
	1.5			M MD	
		*			
	2.0				
	- - : :	8			
		2.30m			
		Hole Colla	Ferminated at 2.30 m ose		
	2.5—				
	-				
	3.0				
]				
	-				
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	3.5 —				
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	4.0				
]				
	4.5—				
	1				
PHOTOGRAPHS	5.0				
NOTES	YES	NO			
METHOD N Natural Exposure X Existing Excavation E Backhoe/Excavator B Bulldozer Blade R Ripper	WATER	-No Resistance	SAMPLES & FIELD TESTS U - Undisturbed Sample Bass D - Disturbed Sample Class B - Bulk Disturbed Sample MC - Moisture Content HP - Hand Penetrometer (UCS kPa) VS - Vane Shear; P-Peak,	ICATION SYMBOLS L DESCRIPTION ed on Unified Soil ssification System MOISTURE D - Dry M - Moist	RELATIVE DENSITY
SUPPORT T Timbering N No Shoring		n Date shown nflow	R-Remouded (uncorrected kPa) PBT - Plate Bearing Test ES - Environmental Sample	W - Wet	D - Dense VD - Very Dense C - Compact Ce - Cemented

P S	M		P	ROJE(CT : C	offs I	EXCAVATION - GEOTECHNICAL LOG Harbour Jetty Revitalisation to Figure 1	;		FILE / JO	O:TP05 DB NO: PSM4842 : 1 OF 1
POSITIO	N :	E: 513					0 Zone 56) SURFACE ELEVATION:				
EQUIPMI							METHOD : E				
DATE EX	CAVA	ATED	: 03/08/	2023			LOGGED BY: KTL			Cł	HECKED BY: WP
EXCAVA	TION	DIME	NSIONS	: 0.4	5 m WIE	DE					
	DF	RILLIN					MATERIAL				,
VE E PENETRATION F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE	CONSISTENCY RELATIVE DENSITY	100 200 HAND 300 & PENETRO- 400	STRUCTURE & Other Observations
	N			0.0		- -	0.10m TOPSOIL: Silty SAND with gravel: dark brown, coarse grained, gravel is sub-rounded to sub-angular up to 10 mm GRAVELS: grey and brown, gravel is angular up to 50 mm 0.30m CLAY: brown and orange, medium to high plasticity	D D	-		0.10: INFERRED FILL
				0.5			,	D			
				1.0			1.10m CLAY with sand: yellow and brown, medium plasticity, sand is coarse grained 1.30m	D			
				1.5 —			SAND: yellow, coarse grained Becomes orange at 1.6 m 1.80m	м	MD to		1.30: INFERRED NATURAL
				2.0 —		-	SAND: grey, coarse grained				
				2.5 —				W	MD		
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			3.0			2.80m Hole Terminated at 2.80 m Collapse				
				3.5							
				-							
				4.0							
				4.5							
]						



TEST PIT 2 GINT TP.GPJ

P S	M		P	ROJE(CT : C	offs	EXCAVATION - GEOTECHNICAL LOG Harbour Jetty Revitalisation to Figure 1			FILE / JC	O:TP06 DB NO: PSM4842 : 1 OF 1
POSITIO	V :	E: 513					0 Zone 56) SURFACE ELEVATION:				
EQUIPME	ENT 1	YPE	: 5 ton 6	excava	tor		METHOD : E				
DATE EX							LOGGED BY: KTL			CH	ECKED BY: WP
EXCAVA		DIME		: 0.4	5 m WII T	Œ	MATERIAL				
z						z	IVIATENIAL		>:	ó	
VE E PENETRATION F	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	, DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE	CONSISTENCY RELATIVE DENSITY	100 200 A HAND 300 B METER 400	STRUCTURE & Other Observations
	N			0.0			0_10m TOPSOIL: Silty CLAY trace sand: dark brown, low to medium plasticity, sand is coarse grained /	М		T	
				-			Sand is coarse grained / Gravelly SAND trace clay: brown, coarse grained, gravel is sub-angular to angular up to 30 mm, clay is low plasticity 0.40m	М			0.10: INFERRED FILL
				0.5			CLAY: brown and yellow, medium plasticity				
				-				D to N	1		
			1.00m ES-1	1.0			1.00m SAND: yellow, coarse grained		-		
				-	8 8			М	MD to D		
		-		1.5	8 8		1.70m SAND: grey, coarse grained				
				2.0				w	D		
				-				VV			
	*			-	18 18		2.40m Hole Terminated at 2.40 m	⊢-			
				2.5 -	-		Collapse				
				3.0							
				-							
				3.5							
				-							
				4.0							
				-	1						
				4.5 -	-						
				5.0	-						
P	HOTO(OTES	SRAPHS		YES			NO				
METHOD			Pi	ENETRA	ATION		SAMPLES & FIELD TESTS CLASSIFICATI SOIL DE			RE	NSISTENCY/ LATIVE DENSITY
N Nat	ural Ex	posure		>ш止]	<u>-</u> N	o Resi	stance U - Undisturbed Sample Based on		d Soil	VS S	- Very Soft - Soft

P	S	M		P	ROJEO	CT : C		EXCAVATION - GEOTECHNICAL LOG			FILE / JO	O :TP07 DB NO : PSM4842
1		\approx		L	CATI	ON : F	Refer t	o Figure 1			SHEET	: 1 OF 1
							A202	0 Zone 56) SURFACE ELEVATION :				
				: 5 ton 6		tor		METHOD : E LOGGED BY : KTL			CL	HECKED BY: WP
				NSIONS		5 m WII	DE	LOGGLD BT . KIL				ILCRED DI . WF
			RILLIN					MATERIAL				
N O		F	TER	s & STS	Ê	U	NOI.		ш Z	, F C V E C V	RO-	
VE E PENETRATION	LI	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTUR	CONSISTENCY RELATIVE DENSITY	100 HAND 200 A PENETRO- 300 W METER 400	STRUCTURE & Other Observations
		N			0.0 —		1 1	0.10m TOPSOIL: Sitty SAND trace gravel: dark brown, coarse grained, gravel is angular to sub-angular up to 20 mm GRAVEL: grey, angular up to 60 mm	D			0.10: INFERRED FILL
					-			0.50m				
					0.5			SAND: yellow and brown, coarse grained				0.50: INFERRED NATURAL
					-	18 18		Becomes yellow only at 0.8 m.				
					1.0 -							_
					- - 1.5—	8 8						_
					-				D to M	MD		
					2.0							_
					-							
					2.5—			2.60m				-
					-			Hole Terminated at 2.60 m Collapse				
	 				3.0							-
	 				-							
					3.5							-
	 				-							
					4.0 -							-
					-							
	i i I I				4.5 —							
 	 				-							
	PH NO	HOTOG OTES	RAPHS		5.0 —	L	 _	NO				1
						TICT		CI ASSIEICATIO	ON SY	MBOLS		NSISTENCY/
MET		. –			ENETRA ♥шцт	: -		SAMPLES & FIELD TESTS SOIL DES	CRIP	TION		LATIVE DENSITY
N X	Exis	ting E	posure cavation	on [→ N	o Resis	D - Disturbed Sample Classificati			S F	- Soft - Firm
E B		khoe/E lozer	xcavat Blade	or		335		B - Bulk Disturbed Sample MC - Moisture Content MOIS	TURE		St VSI H	- Stiff - Very Stiff - Hard
R	Ripp		-	W	ATER	0.0-4 -7) \\/	HP - Hand Penetrometer (UCS kPa) D - VS - Vane Shear; P-Peak, M -	•	t	VL L	- Very Loose - Loose
T	SUPPORT T Timbering										MD D VD C Ce	- Dense

PSM 3.02.2. LIB (HLZ).GLB Log PSM IS AU TEST PIT 2 GINT TP.GPJ << DrawingFile>>

See Explanatory Notes for details of abbreviations & basis of descriptions.

P S	M ≋		Pi L(ROJEC DCATIC	CT ON	: (: F	Coffs	EXCAV Harbour Jetty F o Figure 1		I - GEOTECHNI	CAL LOG			F	ILE / .	NO :TP08 JOB NO : PSM4842 Γ : 1 OF 1
OSITION	:	E: 513) Zone 56)		SURFACE ELE	EVATION :					
QUIPMEI	NT T	YPE	: 5 ton e	excavat	tor					METHOD : E						
ATE EXC	CAVA	ATED	: 03/08/2	2023						LOGGED BY:	KTL				С	CHECKED BY: WP
CAVAT					5 m	WI	DE									
		RILLIN			T					MA	TERIAL					
z		_		_			z						>-		d	
E PENETRATION F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC	POO	CLASSIFICATION SYMBOL	Soi	Type, Co	MATERIAL DESCRIPTION our, Plasticity or Particle Charac ndary and Minor Components	cteristic	MOISTURE	CONSISTENCY RELATIVE DENSITY	100 HAND	300 a METER 400	STRUCTURE & Other Observati
	N 			0.0 -	×		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		sand: brov	o: dark brown, coarse grained on and grey mottled red, medium	plasticity, sand is	M		<u> </u>		0.10: INFERRED FILL
				-	X	**	4).30m		low, coarse grained		+-		-		ı
				-	*	:0		SAND. DIC	wii and ye	low, coarse grained				-		
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			-					Hole Term Collapse	inated at 2	30 m	<u></u>		-	Ī	. 	
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				3.5 —]									-		
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IETHOD			PE	NETRA	TIO	N			SAMPL	ES & FIELD TESTS	CLASSIFICAT SOIL DE			s &		CONSISTENCY/ RELATIVE DENSITY
l Natur	ral Ex	posure	Ø	Ш >шцт Е	=	— N	o Resi	tance		Undisturbed Sample	Based or	n Unifie	d Soil		V: S	'S - Very Soft
Existi	ing Ex	cavatio	on 🖟			.,			D - B -	Disturbed Sample Bulk Disturbed Sample	Classifica	ation Sy	stem		F St	- Firm
Backl Bullde		xcavat Blade	or [222				MC -	Moisture Content	MOI	STURE				St - Very Stiff
Rippe			W	ATER					HP -	Hand Penetrometer (UCS kPa	-	- Dry			VI L	'L - Very Loose
LIDES = -			1	,1	0 00	ct., 7	3 Wate	r own	VS -	Vane Shear; P-Peak, R-Remouded (uncorrected kP		- Mois	t			1D - Medium Dense
UPPORT Timbe			ı			inflo		O+411		Plate Bearing Test	, vv	vvel			VI C	D - Very Dense
		9	li li	ام		outf			ES -	Environmental Sample					Č	

P S M						Coffs	EXCAVATION - GEOTECHNICAL L larbour Jetty Revitalisation o Figure 1	.OG		F	ILE / J	IO:TP09 OBNO:PSM4842 :1 OF 1
OSITION	<u>-</u> : E: 51						2 Zone 56) SURFACE ELEVATION :	:				
QUIPMENT	TYPE	: 5 ton e	excavat	tor			METHOD : E					
ATE EXCA							LOGGED BY: KTL				С	HECKED BY: WP
CAVATIO	n dime Drilli		: 0.45	5 m	WII	DE	MATERIAL					
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E PENETRATION H	GROUND WATER	SAMPLES & FIELD TESTS	O DEPTH (m)	GRAPHIC	POOT	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE	CONSISTENCY RELATIVE DENSITY		300 a METER 400	STRUCTURE & Other Observatio
	1	0.30m ES-1	-				TOPSOIL: Silty CLAY: dark brown, medium plasticity CLAY: brown, medium plasticity	D	_		 	0.10: INFERRED FILL
			0.5 —	*	*		SAND: yellow, coarse grained			 		
			- -	:	:8						 	
		1.00m CBR-1	1.0 — - -	:	8							
		1.50m	- - 1.5—	:	:8			М	D		 	
			- -	8	:8							
			2.0 —	- ::	:8						 	
			- -	- 8	:8							
	,		2.5 —	. ::	:8		L60m Hole Terminated at 2.60 m Collapse			 		
			3.0 —							 	 	
			- -								 	
			3.5									
			4.0—									
			- -								 	
			4.5 —								 	
			-									
PHOT NOTE	OGRAPH S	s	5.0 — YES	•		[NO	•				
IETHOD Natural Existing	Exposur Excavat	e [NETRA			o Res	SAMPLES & FIELD TESTS STAND	SIFICATION SY SOIL DESCRIP Based on Unifie Classification Sy	TION d Soil /stem	S &	RI VS S F St	- Soft - Firm - Stiff
B Bulldoze Ripper BUPPORT Timberi	er Blade	120	L		on [3 Wate		MOISTURE D - Dry M - Mois W - Wet	st		VS H VL L MI D VI	- Hard - Very Loose - Loose - Medium Dense - Dense

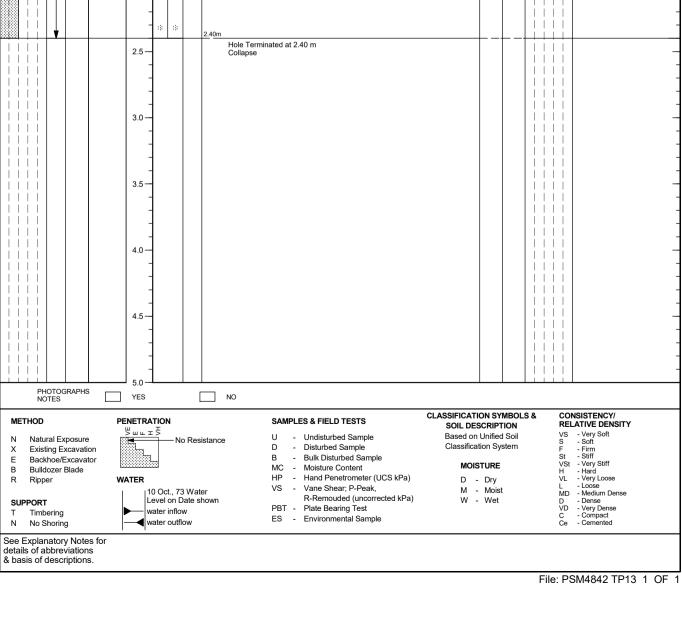
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ц∷.	\approx							Harbour Je to Figure 1	tty Revitalisation			T: 1 OF 1
SITIOI						MG	A202	20 Zone 56		TION :		
			: 5 ton e		tor				METHOD : E			CLIECKED BY . WD
			ENSIONS		5 m	WIE	DE		LOGGED BY : KT	IL		CHECKED BY: WP
57 (7)		RILLI		. 0. 10	<u> </u>	****			MATE	RIAL		
NOIL	ZT.	ATER	S & STS	(m)	೦		NOIT.		MATERIAL RECORDERION	S S S S S S S S S S S S S S S S S S S	/E RRO-	
E PENETRATION F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DЕРТН (m)	GRAPH	FOG	CLASSIFICATION SYMBOL		MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteris Secondary and Minor Components	MOISTURE CONDITION	RELATIVE DENSITY 100 200 G HAND 300 B METER	STRUCTURE & Other Observati
	N			0.0 -				<u> </u>	OIL: Silty CLAY: dark brown, medium plasticity	М	111	
ii				-	₩	\bowtie		up to	trace gravel: orange and brown, medium plasticity, g 10 mm	gravel is angular M	liii	0.10: INFERRED FILL
				-	X			0.30m 0.40m SAN		 M		
ii				0.5	X			0.00	: brown, medium plasticity			<u>i </u>
				-	:	:		SAN): yellow, coarse grained			¦
ii			0.80m ES-1	-	ł							<u> </u>
			ES-1	_	::	:8						¦
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		GRAPH	s	5.0	_		<u> </u>	<u> </u>				
	OTES			YES				NO		0.100:	2010	
ETHOD)			NETRA		N			SAMPLES & FIELD TESTS	CLASSIFICATION SYM SOIL DESCRIPTION	ON I	CONSISTENCY/ RELATIVE DENSITY
		xposur Excava	e 🛚	<u>₹</u> 	7	— No	Res	istance	U - Undisturbed SampleD - Disturbed Sample	Based on Unified S Classification Syst		VS - Very Soft S - Soft F - Firm
Bac	khoe	/Excava			222				B - Bulk Disturbed Sample MC - Moisture Content	MOISTURE	,	St - Stiff VSt - Very Stiff
Bull Rip _l		Blade	W	ATER	_				HP - Hand Penetrometer (UCS kPa)	D - Dry	i V	H - Hard VL - Very Loose L - Loose
JPPOR	т						3 Wat		VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)	M - Moist W - Wet	1	MD - Medium Dense D - Dense
Tim	berin		ļ	> ─ w	<i>l</i> ater	inflo	w		PBT - Plate Bearing Test ES - Environmental Sample		(VD - Very Dense C - Compact
INO :	Shori	ıy	ľ	- W	alCí	outil	J V V		•		(Ce - Cemented

P	S	M						EXCAVA	TIOI	N - GE	OTECHNIC	CAL LO	G) :TP11	
Ħ	:::	≋						Harbour Jetty F to Figure 1									B NO : PSM4842 1 OF 1	
POSI	ΓΙΟΝ	1 :	E: 51					20 Zone 56)			SURFACE ELE	VATION:						
EQUI	PME	NT 1	YPE	: 5 ton	excava	tor					METHOD : E							
				: 03/08		5 m WIE					LOGGED BY:	KTL				СН	ECKED BY: WP	
EXCA	VAI		RILLIN		3 . 0.4	T	<u>/_</u>				MAT	TERIAL						
N O		ZT.	TER	S & STS	Ê	ပ	NOL -						₩ K	≻ Su V U V	RQ-	~		
: PENETRATION		SUPPORT	SROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	Soi	Type, Co	lour, Plasticit	ESCRIPTION y or Particle Charact inor Components	teristic	MOISTURE	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-	METE	STRUCTURE & Other Observation	s
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		N 			-			<u> </u>		Y: dark brown - — — — n, medium pla	low to medium plast	ticity 	_ D	-			0.10: INFERRED FILL	_
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		V			0.5			0.60m										
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		OTES			YES		[NO				A	ATION	MES: -		•	IOIOTENO:	
MET					ENETRA					ES & FIELD			DESCRIPT	TION	· &		ISISTENCY/ ATIVE DENSITY - Very Soft	
			cposure xcavati			— No	Res c	istance	D -		Sample		d on Unified dification Sy			S F	- Soft - Firm	
Е	Back	khoe/E	Excava Blade						MC -	Bulk Distur Moisture C	ontent		MOISTURE			St VSt H	- Stiff - Very Stiff - Hard	
	Ripp			V	VATER	10 Oct., 73	3 Wat	er		Vane Shea		N	D - Dry M - Mois	t		VL L MD	- Very Loose - Loose - Medium Dense	
SUPI		r pering				evel on D	ate s		PBT -	Plate Bear			V - Wet			D VD	- Dense - Very Dense	
		Shorin			1.	vater outfl			ES -		ntal Sample					C Ce	- Compact - Cemented	

See Explanatory Notes for details of abbreviations & basis of descriptions.

P S	M ≈					offs	EXCAVA Harbour Jetty R			OTECH	NICAL I	_OG			FIL	E/JC	D:TP12 BNO:PSM4842 1 OF 1	
DOSITION		E: 513					to Figure 1			SLIBEACE	ELEVATION.							
EQUIPME						A202	20 Zone 56)			METHOD :	ELEVATION F	•						
DATE EXC										LOGGED B						CH	ECKED BY: WP	
EXCAVAT					5 m WII	DE												
	DF	RILLIN	IG								MATERIAL							
VE E PENETRATION F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	Soil	Type, Co	olour, Plastici	ESCRIPTION ty or Particle Ch linor Componer	aracteristic ts		MOISTURE	CONSISTENCY RELATIVE DENSITY	100 200 HAND 39 PENETRO-	W METER	STRUCTURE & Other Observatio	ıns
	N 			0.0			TOPSOIL: angular up 0.20m			dark brown, me	dium plasticity, g	ravel is	М					
				-				gravel: or	range, high pl	asticity, gravel is	angular up to 10) mm	М					- -
				0.5 — - -				gnificant	presence of o	ed, coarse grain deleterious mater			<u> </u>					-
			1.00m ES-1	1.0									М					-
				1.5 —			_	— — – irey, angi	 ular up to 150	 mm of argilite o	 rigin				 	 		- -
	V			-			1.70m 1.80m SAND: yello	— — – oiw, coars	- — — — - se grained								1.70: INFERRED	-
				_			Hole Termi Collapse	nated at	1.80 m					T - I	ii	H	NATURAL	
				2.0 —	-		Collapse											_
1111				-	-										ii	ii		-
				-	-													-
				-											11			_
				2.5 —											i i	İİ		_
				-														-
				-														-
iiii				-	-										Ϊİ	Ϊİ		-
				-														-
				3.0 —														
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				-											1.1			_
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iiii				3.5 —	-										i i	ii		-
				-	-										11			-
				-														-
iiii				_											Тi	Ϊİ		
				4.0 —											11			_
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iiii				-	-										iί	Ϊİ		-
				-	-													-
				- ا	-											 		-
iiii				4.5 —]										i i	Ϊİ		
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				-														-
iiii				-	-										Ϊİ	Ϊİ		-
PH	OTOG	RAPHS		5.0 —														
	TES			YES		L	NO											
METHOD			PE	NETRA	TION			SAMP	LES & FIELD	TESTS		SIFICATION			8 &		NSISTENCY/ _ATIVE DENSITY	
	ral Fv	posure		Ш > Ш ц I	: -	n Reci	stance		- Undisturbe			Based on				VS	- Very Soft	
X Exist	ing Ex	cavati	on [-14	. 100		D -	 Disturbed 	Sample	(Classificat	ion Sy	stem		S F St	- Soft - Firm - Stiff	
	hoe/E ozer l	xcava Blade	tor						 Bulk Disture C 	rbed Sample Content		MOIS	TURE				- Sun - Very Stiff - Hard	
R Rippe		-	W	ATER					 Hand Pen Vane Shea 	etrometer (UCS	kPa)	D -	,			VL L	- Very Loose - Loose	
SUPPORT					0 Oct., 70 evel on E				R-Remoud	ded (uncorrected	d kPa)	M - W -	Mois Wet	τ		MD D	- Medium Dense	
T Timb	ering			> — v	ater inflo	w		PBT -	- Plate Bear	ing Test ental Sample						VD C	- Dense - Very Dense - Compact	
	horing			w	ater outfl	ow				Jumple						Се	- Cemented	
See Explandetails of all & basis of controls	bbrev	/iation	S															

P S	M		P	ROJEC	CT : (Coffs	EXCAVATION - GEOTECHNICAL LOG	i		FILE / J	IO :TP13 OB NO : PSM4842 : 1 OF 1
POSITION	<u> </u>	E: 513					to Figure 1 0 SURFACE ELEVATION :				
EQUIPME							METHOD : E				
DATE EXC	CAVA	TED	: 04/08/	2023			LOGGED BY: KTL			С	HECKED BY: WP
EXCAVAT				: 0.4	5 m WII	DE					
	DF	RILLIN				-	MATERIAL		I. I		T
VE E PENETRATION F	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE	CONSISTENCY RELATIVE DENSITY	100 HAND 300 A PENETRO- 300 W METER 400	STRUCTURE & Other Observations
	N I			0.0	8 8		TOPSOIL: Clayey SAND with silt: dark brown, coarse grained, clay is low plasticity	М			
				1.0			plasticity SAND with gravel: dark brown, coarse grained, gravel is rounded to sub-rounded up to 40 mm 1.10m SAND: yellow, coarse grained Localised pocket of argilite gravel present at 2.0 m	M	MD		1.10: INFERRED NATURAL
				-	3 3		2.40m				-
				2.5 —			Hole Terminated at 2.40 m Collapse				
PH	OTOG TES	RAPHS		5.0 — YES			NO	•			
-							01 400151043				ONIGIOTENOW!



PSM IS AU TEST PIT 2 GINT TP.GPJ <-DrawingFile>> 01/09/2023 16:05 10:03:00.09 Datgel Fence and Map Tool | Lib: PSM 3.02.1 2019-03-06 Prj: PSM 3.02.1 2019-03-06

P S	M ≋					offs	EXCAVATION - GEOTECHNICAL LOG			FILE / JC	O:TP14 DB NO: PSM4842 : 1 OF 1
POSITION		E · 513					to Figure 1 0 Zone 56) SURFACE ELEVATION:				
EQUIPME						A202	METHOD: E				
DATE EXC							LOGGED BY : KTL			CH	IECKED BY: WP
EXCAVAT					5 m WIE	DE .					
	DR	RILLIN	IG				MATERIAL				
VE E PENETRATION F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	, DЕРТН (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE	CONSISTENCY RELATIVE DENSITY	100 200 HAND 300 B PENETRO- 400	STRUCTURE & Other Observations
	N 			0.0 -	8 8		TOPSOIL: Silty SAND: dark brown, coarse grained	М			-
				-	8 8		SAND: yellow, coarse grained				-
			0.50m ES-1	0.5	3 3			М	MD		_
				-			0.70m	М	St		-
				1.0 —			Sandy CLAY with gravel: orange, low to medium plasticity, sand is coarse grained, gravel is sub-angular up to 5 mm	м	St		- - -
				- 1.5 — - -			CLAY with gravel: orange, medium plasticity, gravel is sub-angular of argilite origin up to 60 mm, minor ironstaining observed, minor structure observed within CLAY				- - - -
				2.0				D	St		- - - -
				2.5 —			Becomes brown at 2.4 m.				-
				3.0 —			Hole Terminated at 2.90 m Machine Limit				- - - -
				3.5 —							
				4.0 —							- - - -
				4.5—							-
	0705	RAPHS		5.0							-

NOTES YES ____ NO CLASSIFICATION SYMBOLS & SOIL DESCRIPTION CONSISTENCY/ RELATIVE DENSITY METHOD PENETRATION SAMPLES & FIELD TESTS Ä⊓r∓<u>¥</u> U Based on Unified Soil - Undisturbed Sample Natural Exposure -No Resistance D Disturbed Sample Classification System Existing Excavation В Bulk Disturbed Sample Е Backhoe/Excavator Moisture ContentHand Penetrometer (UCS kPa) MOISTURE MC Bulldozer Blade HP D - Dry M - Moist W - Wet Ripper WATER Vane Shear; P-Peak, 10 Oct., 73 Water Level on Date shown R-Remouded (uncorrected kPa) SUPPORT PBT - Plate Bearing Test ES - Environmental Sample water inflow Timbering No Shoring ■ water outflow Ν See Explanatory Notes for details of abbreviations & basis of descriptions. File: PSM4842 TP14 1 OF 1

<<DrawingFile>> 01/09/2023 16:05 10:03:00:09 Datgel Fence and Map Tool | Lib: PSM 3:02.1 2019-03-06 Prj: PSM 3:02.1 2019-03-06

PSMIS AU TEST PIT 2 GINT TP.GPJ

PS	M								EOTECHNIC	AL LOG	j) : TP15 B NO : PSM4842
T :::	\approx					fs Harbour J er to Figure		lisation							1 OF 1
SITIO	N :	E: 513				2020 Zone 5			SURFACE ELEV	ATION :					
QUIPME	ENT 1	YPE	: 5 ton e	xcava	tor				METHOD : E						
TE EX	CAV	ATED:	04/08/2	023					LOGGED BY: K	TL				CHI	ECKED BY: WP
CAVA				: 0.4	5 m WIDE										
_	DF	RILLIN			l lz				MATE	ERIAL	1	k. I	4		
E PENETRATION F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	SYMBOL		, Colour, Pla	AL DESCRIPTION sticity or Particle Character nd Minor Components	ristic	MOISTURE	CONSISTENCY RELATIVE DENSITY	100 200 HAND 30 G PENETRO-	a I	STRUCTURE & Other Observat
	N			0.0		TOF	SOIL: Silty C	CLAY with sai	nd with gravel: dark brown, l oarse grained, gravel is and	low to medium	М				
				-		0.20m mm Gra	velly SAND/ S	 Sandy GRAV	EL: yellow and brown, cora		+-	-	ii		
				_		0.40m	el is angular — — — —				М]	ii		
				0.5		0.00111			dium plasticity		M_		1.1		
				-		plas	ey GRAVEL/ ticity, gravel i	Gravelly CL s sub-angula	AY: orange and grey, clay is r to sub-rounded up to 100	s low to medium mm					
i i				-									i i	i	
				-											
				1.0-											
				-									Ţİ		
				-											
				-											
				4.5									Ţİ		
				1.5 —							м				
											IVI		ii		
				-									1.1		
				-											
				2.0									ii		
				-									11		
				_											
				_									ii		
				2.5									11		
				-		0.70									
					\sim		e Terminated	at 2.70 m							
]	Coll	apse								
				3.0 —									ii		
				-									1.1		
				-	-										
				-	1								ii		
				2.5	1								11		
 				3.5 —]										
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				-]								11		
				_											
				5.0 —											
	HOTO(OTES	RAPHS		YES		NO NO									
				NET	TION			MDI 50 2 5::	I D TESTS	CLASSIFICA	TION SY	MBOL	S &		NSISTENCY/
ETHOD			PE	NETRA > ⊔ ∟ ⊐	: -			MPLES & FIE		SOIL DI	ESCRIP	TION		REL	ATIVE DENSITY - Very Soft
		posure xcavatio			No F	tesistance	U D		urbed Sample oed Sample	Based o Classific				S F	- Soft - Firm
Bac	khoe/E	excavato			333		В	- Bulk D	isturbed Sample		ISTURE			St	- Stiff - Very Stiff
Bull Ripp	ldozer per	Blade	W	TER			MC HP		re Content Penetrometer (UCS kPa)		- Dry			H VL	- Hard - Very Loose
				μ1	0 Oct., 73 V		VS	- Vane S	Shear; P-Peak,	M	- Mois			L MD	- Loose - Medium Dense
UPPOR Timi	T bering				evel on Dat ater inflow	e snown	PB	R-Ren Γ - Plate E	nouded (uncorrected kPa) Bearing Test	W	- Wet			D VD	- Dense - Very Dense
	Shorin	_			ater outflow		ES	- Enviro	nmental Sample					C Ce	CompactCemented

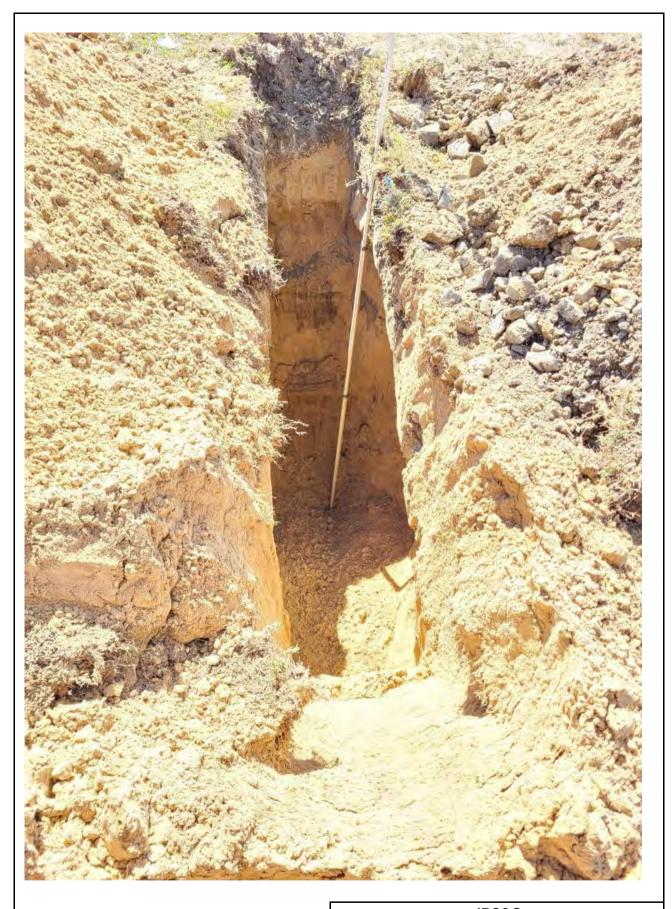
P	S	M						EXCAVATION - GEOTECHNICAL LOG				O :TP16 DB NO : PSM4842
		\approx						Harbour Jetty Revitalisation to Figure 1				: 1 OF 1
						•	A202	0 Zone 56) SURFACE ELEVATION :				
				: 5 ton 6		lOI		METHOD : E LOGGED BY : KTL			CH	HECKED BY: WP
		ION	DIME	NSIONS		5 m WII	DE					
7		DF	RILLIN		1		z	MATERIAL	T	 ≻	d	
VE E PENETRATION F	н	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	, DЕРТН (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE	CONSISTENCY RELATIVE DENSITY	100 200 A HAND 300 B METER 400	STRUCTURE & Other Observations
		N —			0.0	8 8		TOPSOIL: Silty SAND wih gravel: dark brown, coarse grained, gravel is angular up to 40 mm	М			
				0.20m CBR-1	0.5 —			Sandy GRAVEL/ Gravelly SAND: browna nd grey, sand is coarse grained, gravel is sub-angular to sub-rounded up to 50 mm	м	-		-
				1.00m ES-1	1.0			0.80m SAND with gravel: dark brown, coarse grained, gravel is sub-angular to sub-rounded up to 50 mm		-		- - -
					1.5 —				М			-
					2.5 —			2.20m CLAY with gravel: orange and grey, high plasticity, gravel is sub-angular up to 40 mm Becomes grey only at 2.6 m	м	-		-
		•			3.0			3.00m Hole Terminated at 3.00 m Target depth	<u> </u> 			
					3.5 —	- - -						-
					4.0							-
					4.5 —	-						-
					:	1						
					5.0	<u> </u>						
	PH NO	OTOG	RAPHS	·	YES			NO				
X E B R P T T T T T T T T T	Natur Existi Back Bulld Rippe PORT	ing Exhoe/E ozer I er ering	posure ccavati Excava Blade	on tor	▶	0 Oct., 73 evel on E	3 Wate oate sh	HP - Hand Penetrometer (UCS kPa) D VS - Vane Shear; P-Peak, M	SCRIP Unifie	TION d Soil ystem	RE VS S F St VSt H VL MD D VD C	- Hard - Very Loose - Loose - Medium Dense - Dense - Very Dense - Compact
N	No S	horin	g		 ■\v	ater outfl	ow	Lo - Linvironiniental Gample			Ce	- Cemented

PSM 3.02.2. LIB (HLZ).GLB Log PSM IS AU TEST PIT 2 GINT TP.GPJ << DrawingFile>>

See Explanatory Notes for details of abbreviations & basis of descriptions.

Appendix B Test Pit Photos



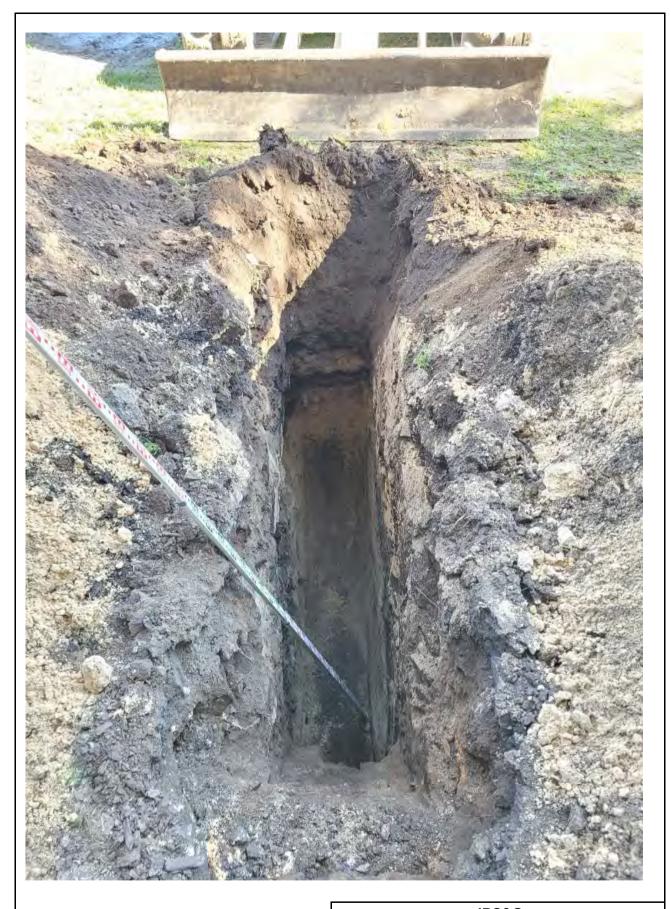




JBS&G

Coffs Harbour Revitalisation
Coffs Harbour Jetty and Foreshore
TEST PIT PHOTOS
TEST PIT 01

PSM4842-007R





JBS&G

Coffs Harbour Revitalisation
Coffs Harbour Jetty and Foreshore
TEST PIT PHOTOS
TEST PIT 02

PSM4842-007R

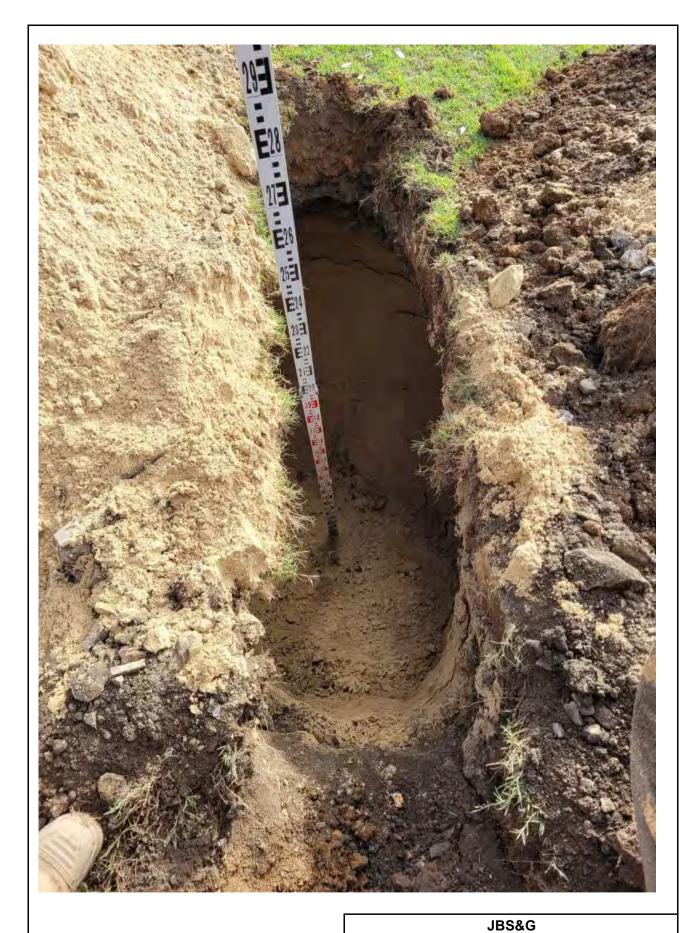




Coffs Harbour Revitalisation
Coffs Harbour Jetty and Foreshore

TEST PIT PHOTOS
TEST PIT 03

PSM4842-007R



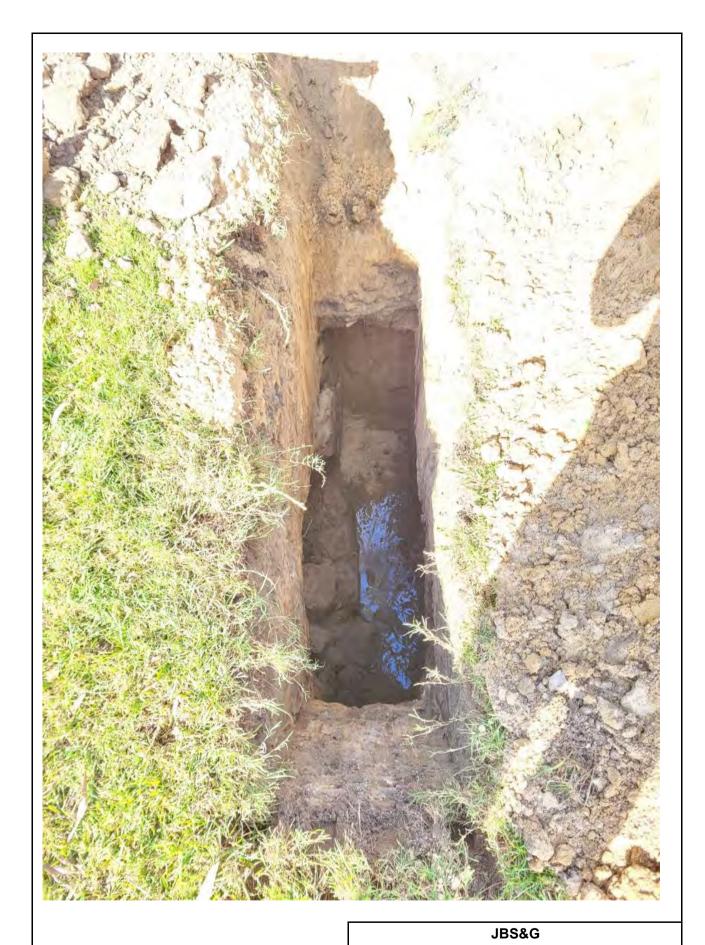


Coffs Harbour Revitalisation
Coffs Harbour Jetty and Foreshore

TEST PIT PHOTOS

TEST PIT 04

PSM4842-007R

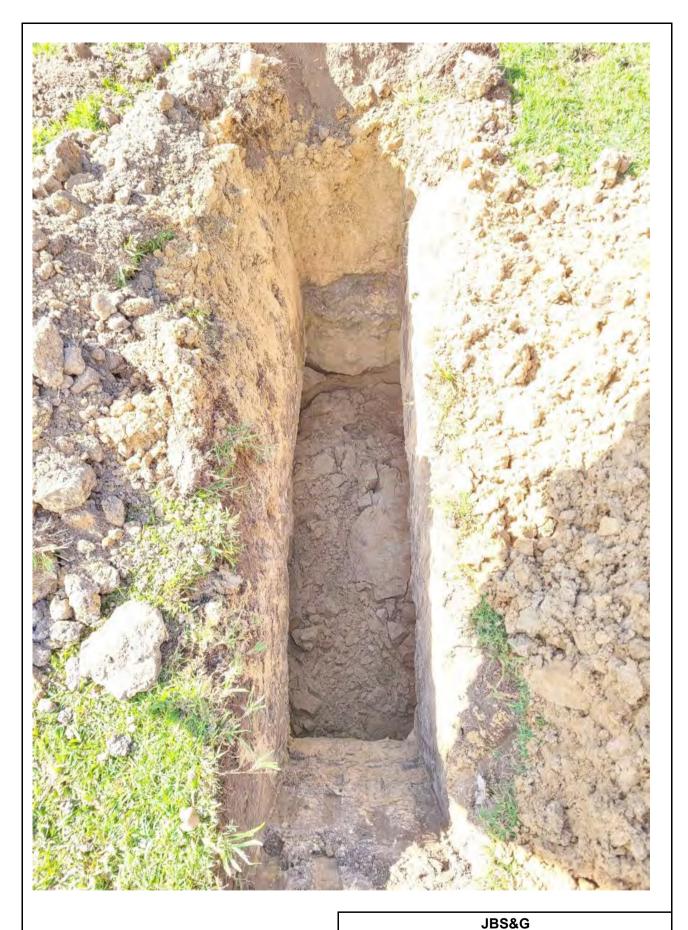




Coffs Harbour Revitalisation
Coffs Harbour Jetty and Foreshore

TEST PIT PHOTOS
TEST PIT 05

PSM4842-007R





Coffs Harbour Revitalisation
Coffs Harbour Jetty and Foreshore
TEST PIT PHOTOS
TEST PIT 06

PSM4842-007R





Coffs Harbour Revitalisation
Coffs Harbour Jetty and Foreshore
TEST PIT PHOTOS

TEST PIT 07

PSM4842-007R





JBS&G

Coffs Harbour Revitalisation
Coffs Harbour Jetty and Foreshore
TEST PIT PHOTOS
TEST PIT 08

PSM4842-007R





JBS&G

Coffs Harbour Revitalisation

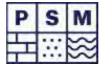
Coffs Harbour Jetty and Foreshore

TEST PIT PHOTOS

TEST PIT 09

PSM4842-007R

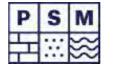




JBS&G Coffs Harbour Revitalisation Coffs Harbour Jetty and Foreshore TEST PIT PHOTOS TEST PIT 10

PSM4842-007R





JBS&G Coffs Harbour Revitalisation Coffs Harbour Jetty and Foreshore TEST PIT PHOTOS TEST PIT 11

PSM4842-007R

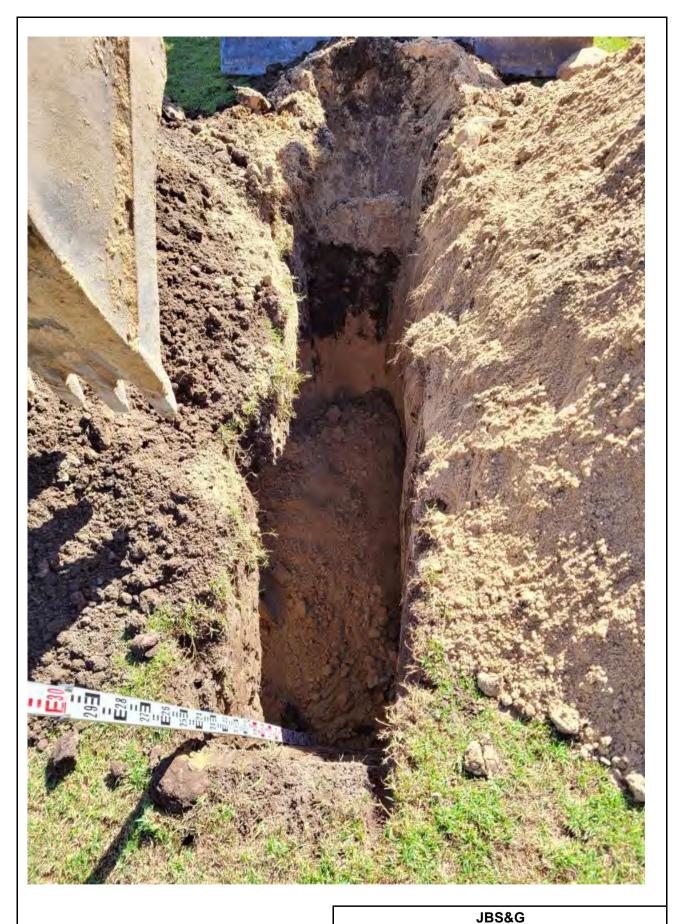




JBS&G

Coffs Harbour Revitalisation
Coffs Harbour Jetty and Foreshore
TEST PIT PHOTOS
TEST PIT 12

PSM4842-007R





Coffs Harbour Revitalisation
Coffs Harbour Jetty and Foreshore
TEST PIT PHOTOS
TEST PIT 13

PSM4842-007R





Coffs Harbour Revitalisation

Coffs Harbour Jetty and Foreshore
TEST PIT PHOTOS
TEST PIT 14

PSM4842-007R





JBS&G

Coffs Harbour Revitalisation

Coffs Harbour Jetty and Foreshore

TEST PIT PHOTOS

TEST PIT 15

PSM4842-007R





Coffs Harbour Revitalisation Coffs Harbour Jetty and Foreshore TEST PIT PHOTOS TEST PIT 16

PSM4842-007R

Appendix C Point Load Testing





Pells Sullivan Meynink

POINT LOAD STRENGTH INDEX TEST RESULTS

Job No.	PSM4842													Sheet	1	of	1
Project	Coffs Harbour Jetty	Revitalisat	tion														
Test Method Test Machine Calibration Date	AS 4133.4.1-2007 Metho Determination of point lo GSA 6510-0704 14/1/2021			r engine	ering pı	vurposes - Sampling Technique NLMC Storage History North Ryde office sto Moisture Condition Natural Loading Rate < 30 seconds			storage	rtorage			1 3		23 - 02/08/202 23 - 02/08/202		
		Б. (1				Diame	etral T					Axial	Tests				1
Rock Ty	/pe Location	Depth (m)	D (mm)	L (mm)	P (kN)		I _{s(50)} (MPa)	Failure Mode	W (mm)	D (mm)	P (kN)	I _s (MPa)	I _{s(50)} (MPa)	Fa	ailure M	lode	AS 1726:2017 Strength Class
ARGILI ARGILI ARGILI ARGILI ARGILI ARGILI ARGILI	TE BH02 TE BH02 TE BH02 TE BH02 TE BH02 TE BH04 TE BH05	6.73 7.48 8.90 9.85 16.09 11.31 12.06 3.35 4.25	50 50 50 50 50 50 50 50	65 150 100 60 162 60 290 170 250	> 3.6 > 5.8 > 2.9 > 5.7 > 3.3 > 5.9 > 3.3 > 3.0	3	1.2 2.3 1.1 2.1 1.3 1.1 2.4 1.3 1.2	Bad break Bad break Bad break Bad break Bad break Bad break Bad break Bad break Bad break	50 50 50 50 50 50	45 50 30 37 42 50	3.2 1.3 1.0 1.2 1.1 2.6	1.1 0.4 0.5 0.5 0.4 0.8	1.2 0.4 0.5 0.5 0.4 0.9	Along Along Along Along Along	defect defect defect defect defect		H M/H M/H M/H M/H
By:	KTL		Checke	d:			WP							Date:		22/8/202	 23

Appendix D PSP Testing





DYNAMIC CONE PENETROMETER TEST RESULTS

 Job No.
 PSM4842
 Sheet
 1
 of
 3

 Project
 Coffs Harbour Jetty Revitalisation
 Date
 31/07/2023 - 04/08/2023

	AS 1289.6.3.3 Purposes - Perth		of Testing Soils for eter test	Engineering	Drop Height Hammer Mass Tip Type	510 mm 9 kg FLAT
Test Depth	DCP	DCP	DCP	DCP	DCP	DCP
LOCATION	TP01	TP02	TP03	TP04	TP05	TP06
	14	2	20+	2	2	2
0.10	20+	6	EOH R/HB	5	6	6
0.20	EOH R/HB	5		9	20	6
0.30 —		7		14	6	5
0.40		5		20+	8	4
0.50		5		EOH R/HB	9	4
0.60 —		4			8	4
0.70		3			9	6
0.80		2			12	8
0.90 —		2			9	6
1.00		2			10	6
1.10		1			9	12
1.20 —		1			11	10
1.30		2			8	9
1.40		1			7	9
1.50 —		2			9	9
1.60		4			5	11
1.70		5			13	10
1.80 —		5			7	10
1.90		6			5	11
2.00		6			EOH	EOH
2.10 —		6			_	
2.20		EOH				
2.30						
2.40 —						
2.50						
2.60						
2.70 —						
2.80						
2.90						
3.00 —						
3.10						
3.20						
3.30 —			1			
3.40						
3.50						
3.60 —			†			
3.70						
3.80						
3.90 —						+

Comments: R/HB - Refusal and hard bouncing

EOH - End of Hole



DYNAMIC CONE PENETROMETER TEST RESULTS

 Job No.
 PSM4842
 Sheet
 2
 of
 3

 Project
 Coffs Harbour Jetty Revitalisation
 Date
 31/07/2023 - 04/08/2023

Test Method	AS 1289.6.3.3	1997 Methods of		Engineering	Drop Height	510 mm
	Purposes - Perth			Engineening	Hammer Mass	9 kg
Tested by	1				Tip Type	FLAT
Test Depth	DCP	DCP	DCP	DCP	DCP	DCP
LOCATION	TP07	TP08	TP09	TP10	TP11	TP12
0.10	8	2	6	2	4	8
0.20	10+	4	8	4	7	8
0.30 —	EOH R/HB	7	11	6	10	10
0.40		10	13	8	9	8
0.50		8	14	8	8	5
0.60 -		10	14	6	11	10
0.70		10	19	7	12	13
0.80		11	14	6	18	12
0.90 —		9	20	8	12	8
1.00		9	15	10	12	8
1.10		7	15	10	11	10
1.20 -		8	13	10	12	7
1.30		9	EOH	8	12	6
1.40		7		8	15	6
1.50 —		7		8	EOH	9
1.60		7		8		10
1.70		9		6		19
1.80 -		10		8		9
1.90		10		9		17
2.00		8		8		25
2.10 -		EOH		EOH		EOH
2.20						
2.30						
2.40 —						
2.50						
2.60						
2.70 -						
2.80						
2.90						
3.00 -						
3.10						
3.20						
3.30 -						
3.40						
3.50						
3.60 -						
3.70						
3.80						
3.90 -						
4.00 –						

Comments: R/HB - Refusal and hard bouncing

EOH - End of Hole



DYNAMIC CONE PENETROMETER TEST RESULTS

 Job No.
 PSM4842
 Sheet
 3 of 3

 Project
 Coffs Harbour Jetty Revitalisation
 Date
 31/07/2023 - 04/08/2023

Test Method Tested by	AS 1289.6.3.3 Purposes - Perth			Engineering	Drop Height Hammer Mass Tip Type	510 mm 9 kg FLAT
Test Depth	DCP	DCP	DCP	DCP	DCP	DCP
LOCATION	TP13	TP14	TP15	TP16	DOI	DOI
	3	3	2	3		
0.10	6	3	4	5		
0.20	9	5	4	9		
0.30 -	6	5	7	22+		
0.40	6	5	9	EOH R/HB		
0.50	5	5		EUH KIND		
0.60 -			8 7			
0.70	14	4				
0.80	11	5	10			
0.90 -	9	9	8			
1.00	10	11	11			
1.10	7	6	11			
1.20 -	7	6	18			
1.30	6	4	11			
1.40	8	8	9			
1.50 —	7	14	10			
1.60	8	8	12			
1.70	8	12	11			
1.80 -	8	25+	10			
	8	EOH R/HB	11			
1.90	EOH		9			
2.00			EOH			
2.10 -						
2.20						
2.30						
2.40 —						
2.50						
2.60						
2.70 -						
2.80						
2.90						
3.00 -						
3.10						
3.20						
3.30 -						
3.40						
3.50						
3.60 -						
3.70						
3.80						
3.90 -						
4.00 -						

Comments: R/HB - Refusal and hard bouncing

EOH - End of Hole

Appendix E CBR Results



115 Wicks Road

Macquarie Park, NSW 2113 **Telephone:** 02 9888 5000 **Facsimile:** 02 9888 5001



FOUR DAY SOAKED CALIFORNIA BEARING RATIO TEST REPORT

Client: PSM Admin Pty Ltd Report No.: L4926 - 1

PSM Job No.: PSM4842 Report Date: 17/08/2023

Page 1 of 1

TEOTOIT NUMBER	<u> </u>	TD 00	TD 04	TD 00	TD 10	
TESTPIT NUMBER	ĸ	TP 02	TP 04	TP 09	TP 16	
DEPTH (m)		0.50 - 0.80	0.50 - 0.80	1.00 - 1.50	0.20 - 0.60	
Surcharge (kg)		4.5	4.5	4.5	4.5	
Maximum Dry Den	nsity (t/m³)	1.29 STD	1.48 STD	1.44 STD	1.75 STD	
Optimum Moisture	Content (%)	32.0	7.2	6.3	13.4	
Moulded Dry Dens	sity (t/m³)	1.26	1.45	1.41	1.72	
Sample Density R	atio (%)	98	98	98	98	
Sample Moisture F		100	102	102	97	
Moisture Contents	· · · · · · · · · · · · · · · · · · ·					
Insitu (%)		29.3	4.4	3.8	9.3	
Moulded (%))	31.9	7.4	6.4	13.0	
After soaking	g and					
After Test, T	op 30mm(%)	35.3	25.5	26.5	16.0	
	Remaining Depth (%)	29.1	23.7	23.7	14.8	
Material Retained	on 19mm Sieve (%)	4*	0	0	22*	
Swell (%)	(11)	0.0	1.0	1.0	0.5	
	005		•			
C.B.R. value:	@2.5mm penetration		6			
	@5.0mm penetration	11		16	25	

NOTES: Sampled and supplied by client. Samples tested as received.

- Refer to appropriate Test Pit logs for soil descriptions
- Test Methods: AS 1289 6.1.1, 5.1.1 & 2.1.1.
- Date of receipt of sample: 08/08/2023.

NATA Accredited Laboratory Number:1327

Accredited for compliance with ISO/IEC 17025 - Testing. This document shall not be reproduced except In full without approval of the laboratory. Results relate only to the items tested or sampled.

17/08/2023

All services provided by STS are subject to our standard terms and conditions. A copy is available on request.

Appendix F Aggressivity and Salinity Testing Results





Client

CERTIFICATE OF ANALYSIS

Work Order : **ES2326799**

: PELLS SULLIVAN MEYNINK T/A PSM Admin PTY LTD

Contact : Ken Tong Lee

Address : G3, 56 DELHI ROAD

NORTH RYDE NSW, AUSTRALIA 2113

Telephone : ---

Project : PSM4842

Order number : ---C-O-C number : ----

Sampler : Ken Tong Lee

Site : ----

Quote number : EN/333

No. of samples received : 8
No. of samples analysed : 8

Page : 1 of 4

Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555

Date Samples Received : 09-Aug-2023 18:45

Date Analysis Commenced : 15-Aug-2023

Issue Date : 17-Aug-2023 16:34



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories Position Accreditation Category

Franco Lentini LCMS Coordinator Sydney Inorganics, Smithfield, NSW Wisam Marassa Inorganics Coordinator Sydney Inorganics, Smithfield, NSW

Page : 2 of 4
Work Order : ES2326799

Client : PELLS SULLIVAN MEYNINK T/A PSM Admin PTY LTD

Project : PSM4842

General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCI Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



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Client : PELLS SULLIVAN MEYNINK T/A PSM Admin PTY LTD

Project : PSM4842

Analytical Results



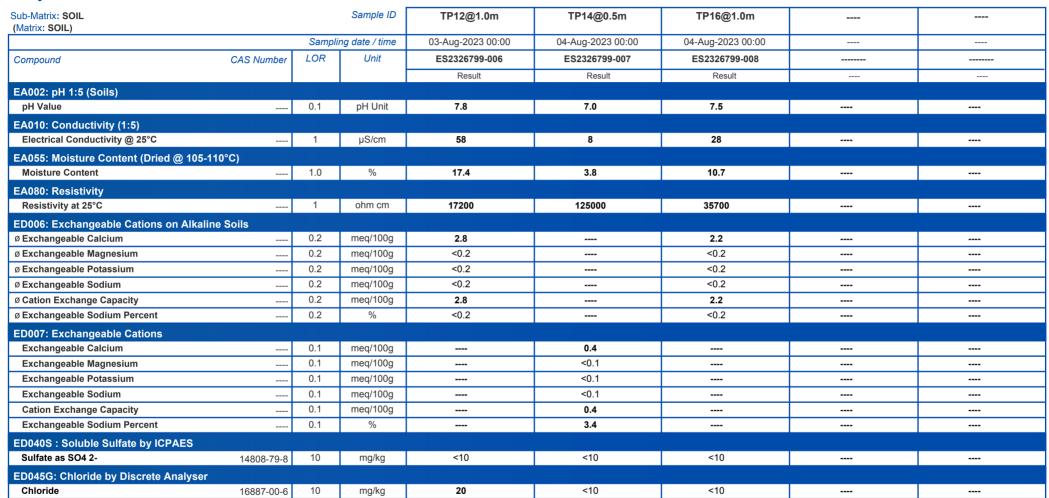


Page : 4 of 4 Work Order : ES2326799

Client : PELLS SULLIVAN MEYNINK T/A PSM Admin PTY LTD

Project : PSM4842

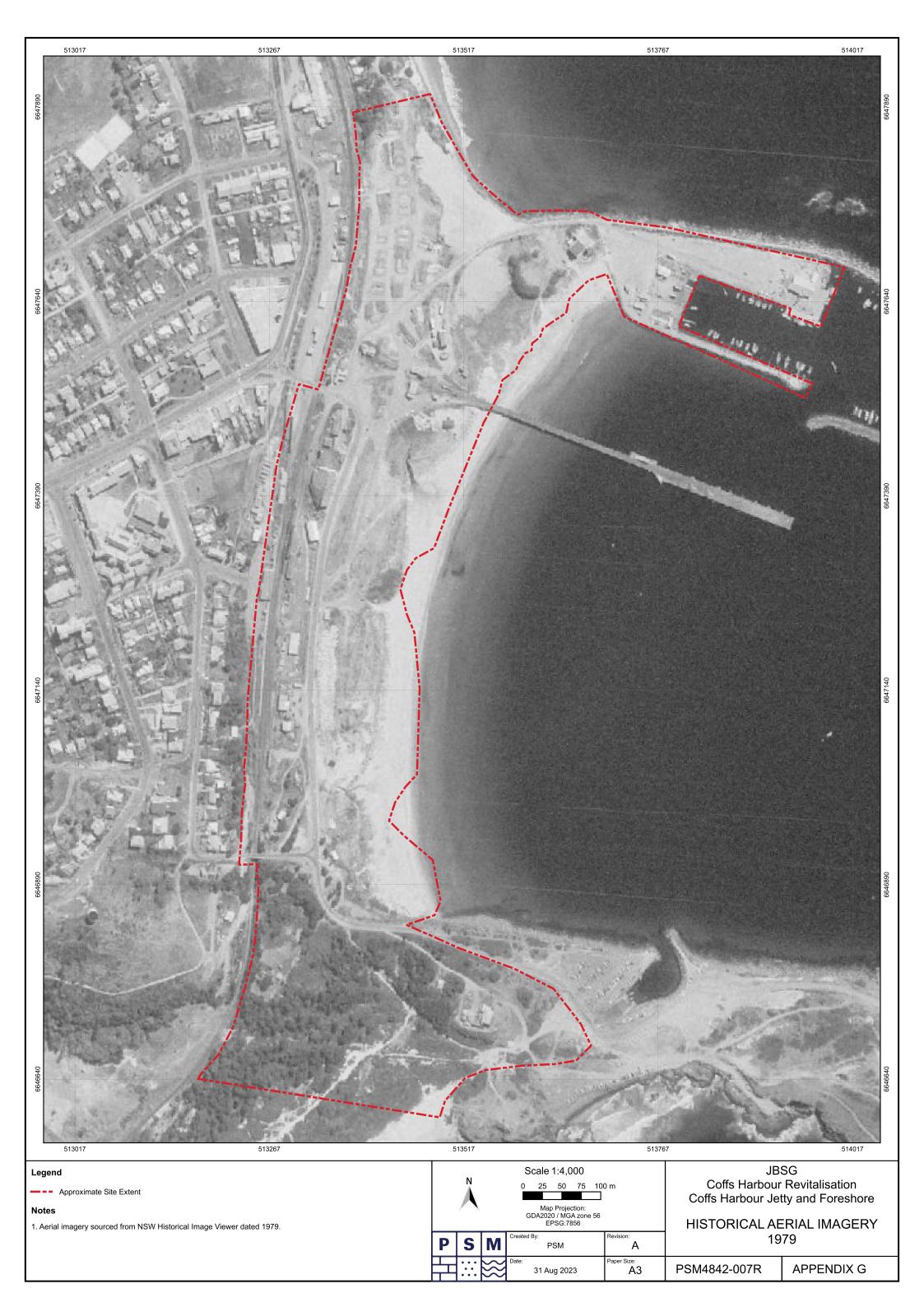
Analytical Results





Appendix G Historical Aerial Photographs

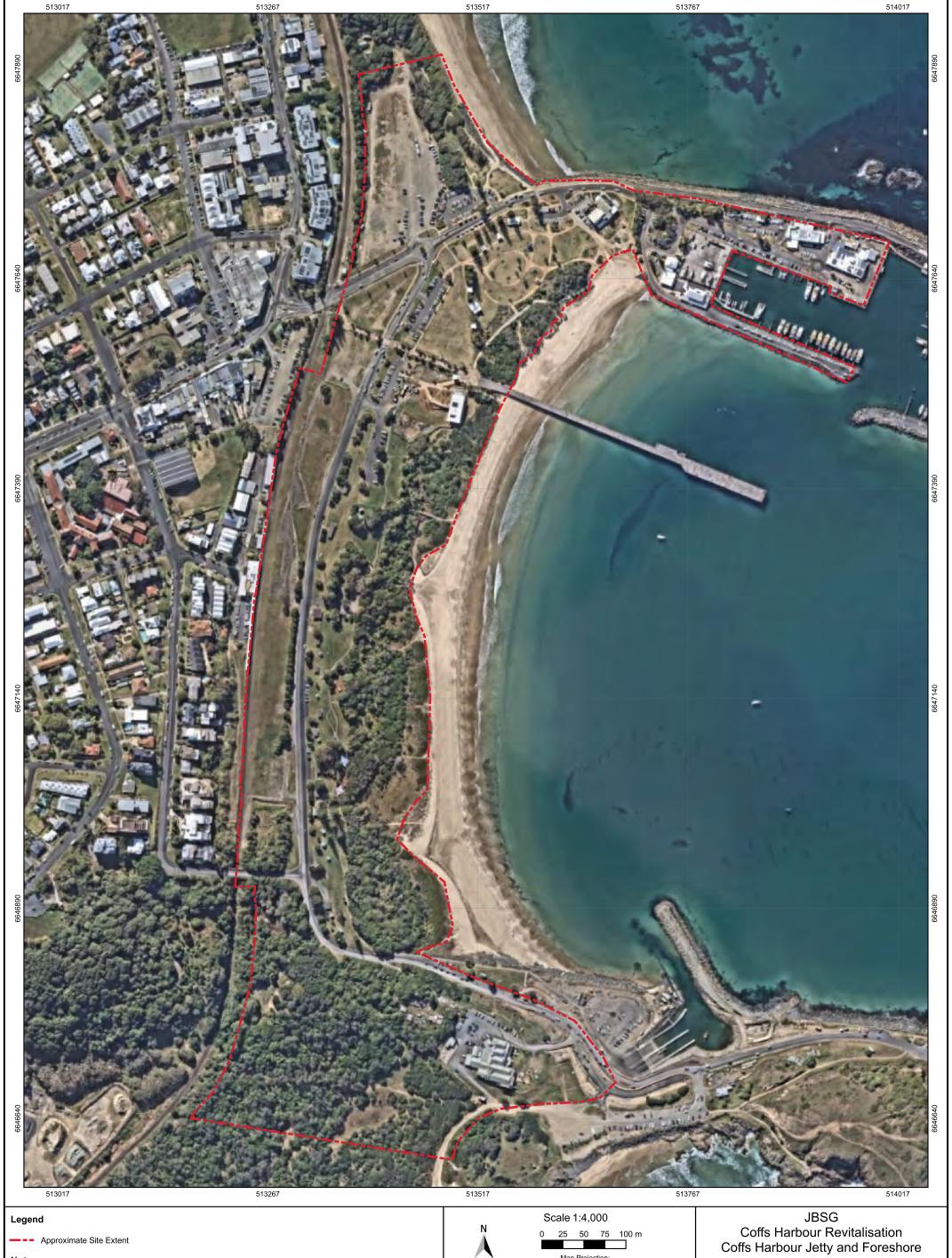






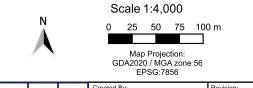






Notes

1. Aerial imagery sourced from Nearmap.com dated 26 February 2023.



PSM

31 Aug 2023

Α Paper Size:

HISTORICAL AERIAL IMAGERY 2023

PSM4842-007R

APPENDIX G