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Geotechnical Factual Report

Bundaberg East Levee

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1 Introduction

1.1 Project Background

In January 2013 ex-Tropical Cyclone Oswald caused devastating flooding to Bundaberg and surrounding regions. The Burnett River peaked at +9.53m (AHD) at the Targo Street gauge in the Bundaberg CBD. This was a record level for Bundaberg. Significant inundation of commercial and residential property in Bundaberg North, Bundaberg South (including the CBD) and Bundaberg East occurred.

Following the flood event, Bundaberg Regional Council (BRC) and the State Government undertook consultation with the Bundaberg community and independent experts to identify potential works that could provide flood mitigation solutions for the people of Bundaberg, their homes, businesses and the local economy.

In 2019, a Business Case was finalised for the BEL project. This included a levee concept design, founded on flood studies (hydrological and hydraulic), geotechnical investigations, desktop studies and community engagement. The primary aim of the levee is to reduce the impacts of flooding from the Burnett River on Bundaberg East and Bundaberg South.

The Bundaberg East Levee (BEL) design will feature approximately 1.6 kilometres of levee near the Burnett River's southern bank, a flood gate and pump station at the outlets of both Saltwater Creek and the unnamed "Distillery Creek." These floodgates will be closed during regional flood events to prevent backwater flooding from the Burnett River, safeguarding the Bundaberg CBD and East/South Bundaberg areas. This system is designed to protect against a flood event comparable to the 2013 event, with approximately 150mm of freeboard.

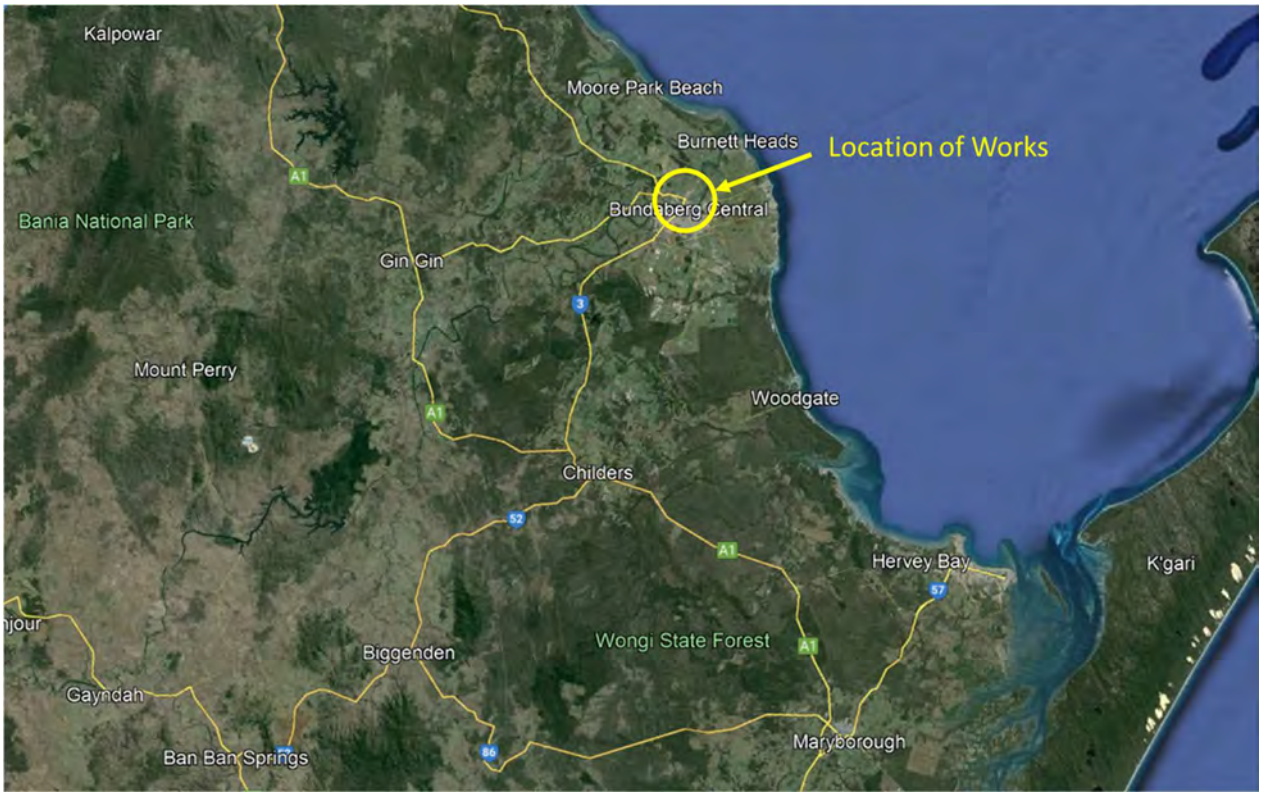

Figure 1–1: Locality Plan of Project Site

1.2 Purpose of this Report

SMEC Australia Pty Ltd (SMEC) has been commissioned by the Queensland Department of Housing, Local Government Planning and Public Works (DHLGPPW) to undertake the Preliminary design of a flood levee wall, large flood gates and pump stations to protect East Bundaberg from flooding. As part of the Preliminary Design phase, SMEC is required to carry out geotechnical investigation in two phases to collect adequate geological / geotechnical data for the Detailed Design Stage for the geotechnical aspects of the project comprising:

- Phase 1 – Intrusive geotechnical site investigation
- Phase 2 – Non-intrusive investigation using geophysics

The purpose of this Report is to document details on the geotechnical investigation carried out up to date, including the details of the field work, in situ testing and laboratory testing.

1.3 Report Scope and Structure

The scope of geotechnical investigation works covered in this Report includes:

- Synopsis of the overall investigations
- Description of the site conditions, geology and topography
- Summary of fieldwork
- Summary of in situ and laboratory tests undertaken
- Laboratory testing certificates
- Engineering logs of boreholes
- As-built investigation layout plan(s)
- Site photographs
- Photographs of soil samples

2 Site Description

The BEL Project site is located in a commercial, residential and mixed-use area adjacent to the southern bank of the Burnett River in Bundaberg, Queensland. The Bundaberg East Levee will run parallel to the southern bank of the Burnett River and across Saltwater Creek and Distillery Creek. The levee will consist of two segments i.e. the City Levee Alignment and the Distillery Levee Alignment as shown in Figure 2–1.

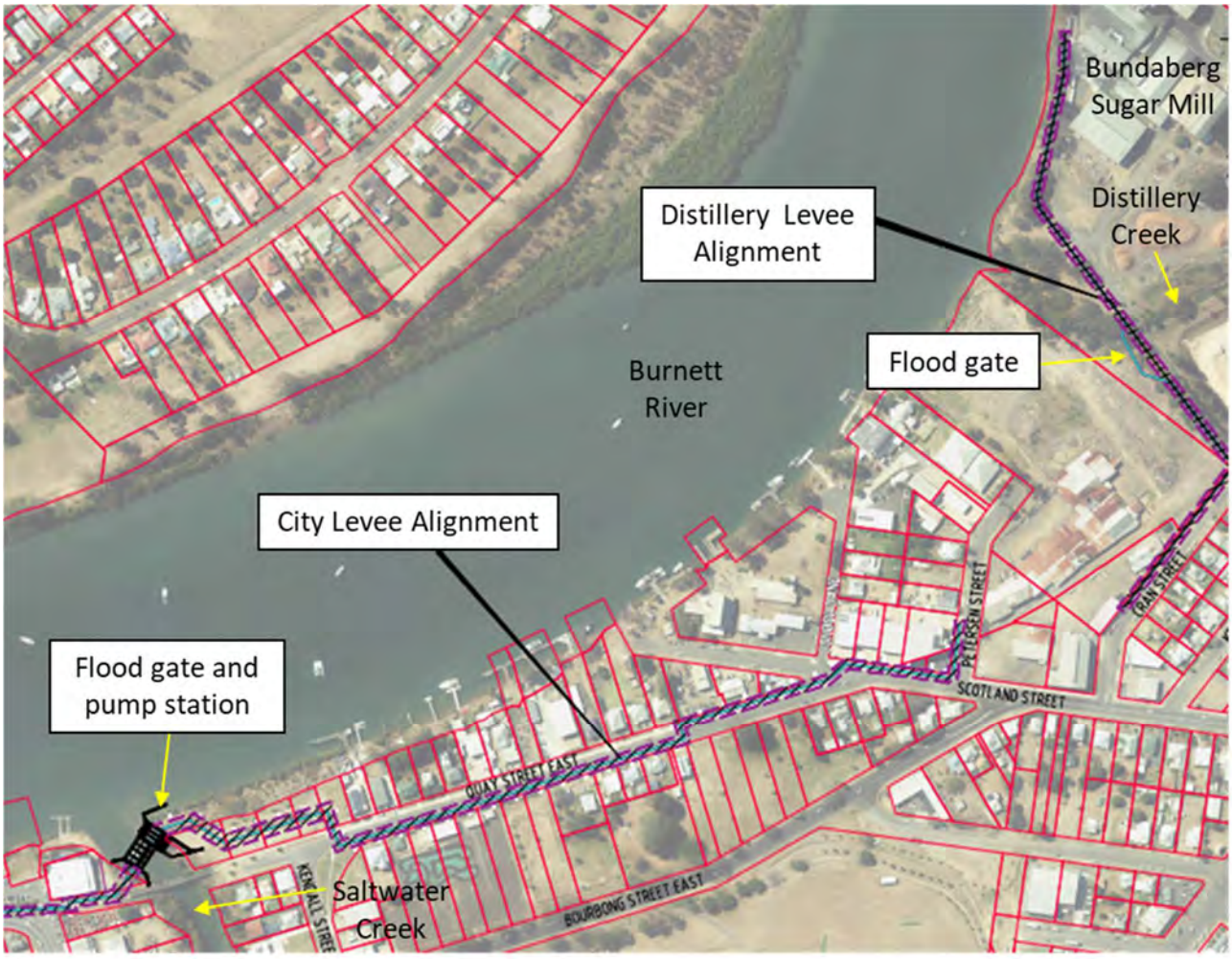

Figure 2–1: Location Plan of Project Site

The City Levee alignment is located in the south-western section of the project site, bounded by Quay Street to the south, pedestrian footpath and crossing over the Saltwater Creek and Scotland Street to the south, Peterson Street to the east, and the Burnett River to the north. Large flood gate and pump station structures will be constructed at the Saltwater Creek crossing and connected to the levee at both sides of the structures i.e. Rowing Club and 1E Quay Street. The City Levee length approximates around 1000m.

The Bundaberg Rowing Club and carpark are situated in the low-lying area near the Saltwater Creek and bounded by the existing block wall (approximately 3m high) and concrete footpath connecting to the 1E Quay Street through the existing pedestrian bridge. The 1E Quay Street area is located in a relatively elevated area and covered by grass. Significant slope instability due to toe scouring of the southern riverbank during a flood event were reported by Bundaberg Regional Council (BRC) in this area. The area from Quay Street to Peterson Street is used for commercial and residential purposes and located generally flat ground with some elevation. Overhead power lines are present along the Quay Street in close proximity to the proposed levee alignment.

Figure 2–2: City Levee Alignment Site

The Distillery Levee alignment is located in the north-eastern section of the site, bounded by Crane Street to the south, crossing over the unnamed creek near the distillery (Distillery Creek) and the Bundaberg Sugar Mill site to the east and the Burnett River to the north. The flood gate will be constructed parallel to the existing bridge at the Distillery Creek crossing and connected to the levee at both side of the structures i.e. northern end of Cran Street and south-west of Bundaberg Sugar Mill site. The Distillery Levee length is approximately 570 m.

Cran Street is connected to the Distillery Creek bridge entering into the Bundaberg Sugar Mill (BSM) site. Various sized boulders and rock blocks were observed in the creek bed with an evidence of scour at the bridge approach embankments. The proposed alignment within the BSM site is generally located in a grassed area until it starts running parallel to the southern bank of the Burnett River.

Figure 2–3: Distillery Levee Alignment Site

3 Geology and Topography

3.1 Geology

The State of Queensland Department of Natural Resources and Mines, GeoResGlobe Version 2.14 (2022) indicates that the project site is situated within areas of Quaternary age alluvial deposits (listed as a mixture of clay, silt, sand and gravel with local coarse cobbles and boulders), and of Eocene - Miocene age sedimentary rocks of the Elliot Formation (sandstone, conglomerate, mudstone, siltstone, and shale).

The Elliot Formation is a significant geological unit in the Bundaberg region and generally experienced periods of deep weathering during Cenozoic Era, resulting in distinct features including reddish-brown colour, mottling, iron-oxide rich patches and a unique duricrust appearance, and zones of increased permeability. The formation typically comprises of a few meters of moderate plasticity clays above a weakly cemented sandstone cap overlying a 20 m to 30 m thick gravelly and clayey sand layer. The top of bedrock is typically encountered at a depth of around 60 m below existing ground surface in the vicinity of Saltwater Creek (based on an advice from a local drilling contractor).

The published surface geology of the project site is shown in Figure 3–1, and the published descriptions of the corresponding geological formations are provided in Table 3–1.

Figure 3–1: Published Geology of the Project Site

Table 3–1: Published Descriptions of Geological Formations present within the Site Area

Label	Unit	Age	Description
Te	Elliot Formation	Eocene - Miocene	Sedimentary Rock - Quartzose to sublabile sandstone, conglomerate, siltstone, mudstone, shale
Qa-QLD	Alluvium	Quaternary	Clay, silt, sand and gravel; flood-plain alluvium

3.2 Topography

The topography of the project site comprises a relatively flat, occasionally undulating terrain with meandering creeks. The ground surface elevation excluding creek channels generally ranges from between approximately 2 m Australian Height Datum (AHD) to 11 m AHD across the site.

Dense vegetation comprising mangroves and marine plants is generally present in low-lying areas located along the Burnett River and the Saltwater Creek. A historical road bridge crossing the Saltwater Creek at Daphne Geddes park is situated between Quay Street and Bourbong Street near Kendall Flat sport ground. Settling ponds are located in the north-eastern side of Cran Street and within the Bundaberg Sugar Ltd site.

The published topography map for the Bundaberg East area is provided in Figure 3–2.

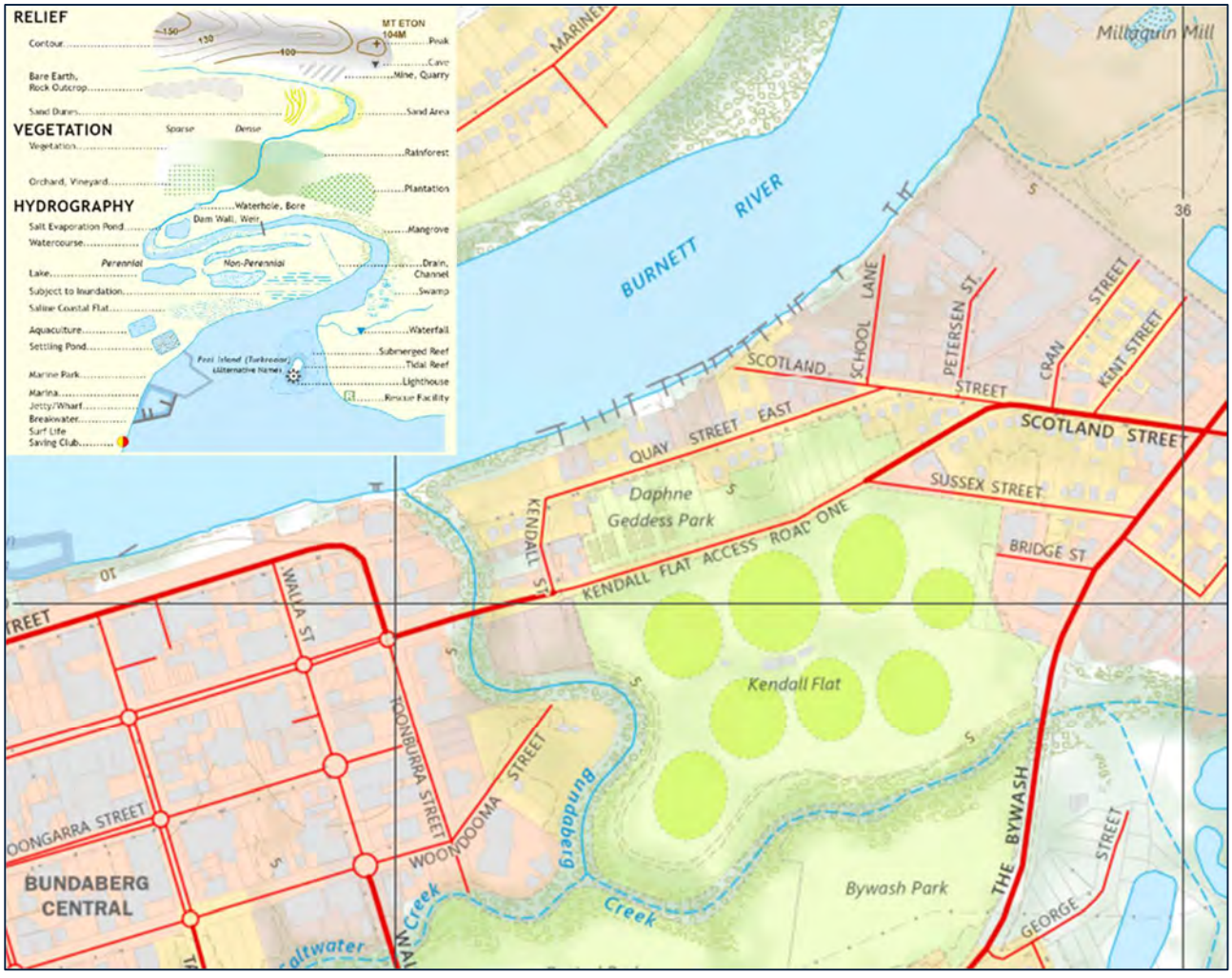

Figure 3–2: Published Topography of the Project Site

4 Geotechnical Site Investigation

4.1 Scope of the Work

The scope of the Geotechnical Site Investigation work to be undertaken at the preliminary design (PD) stage including:

- **Phase 1 - Intrusive site investigation** comprising drilling boreholes to log the soil and rock strata, piezo-cone penetration testing (CPTu) with pore pressure dissipation and vane shear tests, in-situ permeability testing (focusing on existing fill layers), disturbed and undisturbed soil sampling and a suite of laboratory tests.
- **Phase 2 - Non-intrusive site Investigation** comprising underwater and land-based seismic refraction survey within the footprint of the flood gate and pump station structures at Saltwater Creek and levee alignments along the Quay Street and Cran Street.

The results of the geotechnical investigation will be used to characterise site specific subsurface conditions and to establish representative ground models with geotechnical design parameters for detailed design for the levee embankment/wall, flood gate and pump station structures.

4.2 Method of Investigation

The standards and specifications adopted in developing the scope for the geotechnical investigation are:

- AS1726 (2017) Geotechnical Site Investigations
- AS1289 Testing of Soils for Engineering Purposes
- Department of Transport and Main Roads (DTMR) Geotechnical Design Standard – Minimum Requirements.

4.3 Health and Safety

The investigation was performance under a Health and Safety Management Plan (HSMP) prepared by SMEC. The HSMP helps ensure compliance with applicable legislation, regulation, company policies and procedures. investigation Contractors provided training and competency records for personnel involved in the investigation and evidence of any operational and documented workplace health and safety policies in conformance with the Workplace Health and Safety Act, Regulations and Codes of Practice. Task specific Safe Work Method Statements (SWMS) detailing all site activities and associated hazard identification and mitigation were provided to the DHLGPPW prior to commencement of the investigation.

4.4 Environmental and Cultural Heritage

Geotechnical investigation was carried out with regard to DHLGPPW requirements and relevant state and federal environmental and cultural heritage regulations. Mitigation measures implemented as part of the site investigation involved:

- Assessment of the location and extent of any vegetation clearance requirement during a site walkover prior to the commencement of any investigation work. Based on the assessment, no vegetation clearance was conducted at proposed investigation locations.
- Reducing the actual ground disturbance footprint at investigation sites as much as practicable.
- Where any environmental or cultural heritage issues, e.g. marine plants, threatened/ endangered plant species, fauna habitat, the existing historical pedestrian bridge etc., were identified, these locations were avoided from the investigation in consultation with a SMEC environmental team on site.

- Actual borehole and CPT locations were relocated outside the influence zone of Environmental and Cultural Heritage during a site walkover.
- Heavy duty ground protection mats were used to minimise any disturbance if necessary.
- Drilling mud (comprising biodegradable drilling fluid and fine drill cuttings) was disposed of off-site by using an approved method at completion of drilling.
- Health, Safety and Environmental and Cultural Heritage Management Plan relevant to this investigation was submitted to the Client prior to the commencement of any investigation work.

4.5 Underground Service and Utilities

Prior to commencement of the proposed field works, all proposed investigation locations were checked for underground services using a Before You Dig Australia (BYDA) and accredited service locator. Service locating was also undertaken via electronic wand and ground penetrating radar (GPR). The final borehole and CPT locations were set out with a safe distance away from any identified services.

4.6 Traffic Management

Minor traffic control was provided to ensure safety of workers and public during daytime hours for the investigation works. The traffic management plan was subject to change following receipt of the traffic management permit and traffic guidance scheme (TGS) prepared by the traffic management subcontractor depending on the specific requirements of the permit.

4.7 Phase 1 - Intrusive Site Investigations

4.7.1 Boreholes

As part of the Phase 1 investigation, drilling of nine (9) boreholes (designated BH01 to BH06 and BH08 to BH10) was completed under the supervision of a SMEC Geotechnical Engineer from 17 April to 29 April 2024.

The boreholes were advanced using a Comacchio Geo 405 drilling rig using solid flight auger and rotary wash boring techniques in soil material until practical refusal or nominated target depth was achieved. In situ testing comprised standard penetration tests (SPTs) at typical spacing of either 1 m or 1.5 m based the observed material type. Pocket penetrometer readings in cohesive materials were conducted. On completion of drilling, the boreholes were backfilled with a cementitious and bentonite grout mixture to match existing surface levels.

Each SPT sample was inspected, logged and photographed on-site, then placed in a sample bag and correctly labelled for further laboratory testing if required. Relatively undisturbed soil samples were collected using 90mm diameter thin-walled (U90) tubes which were labelled, inspected, logged and immediately sealed on site.

Open standpipes were installed at three (3) borehole locations to monitor variation in groundwater level with time. Falling head percolation testing was also carried out within the surficial fill or natural soil layers to a depth of 2.5m below ground surface at four (4) borehole locations.

All disturbed or undisturbed soil samples were transported to laboratories to carry out soil testing.

The location of each borehole was surveyed by a registered surveyor after completion of investigation works.

All geotechnical investigations were carried out in the full-time presence of a qualified and suitably experienced geotechnical professionals in accordance with the relevant sections of AS1726 – Geotechnical Site Investigation

The borehole investigation locations are detailed in Table 4–1.

Engineering logs of each borehole and explanatory notes are presented in Appendix B, and SPT photographs are shown in Appendix C.

Table 4–1: As built Borehole Investigation Details

Bore ID	Location	Coordinates		Surface Level (m AHD)	Terminated Depth (m)	Target Structure	Remark
		Easting	Northing				
BH01	Quay Street	435335.68	7250162.02	4.28	20.75	Levee	Relocated due to overhead power lines
BH02	Rowing Club	435018.32	7250106.63	5.03	22.95	Levee and flood gate / pump station	Relocated due to refusal within rock and boulder fills at 1m BGL. Terminated due to refusal at new location
BH03(*)	Quay Street	435577.61	7250229.57	3.79	25.45	Levee	Relocated due to refusal within rock and boulder fills at 1m BGL. Terminated due to hammer bounce at new location
BH04(*)	1E Quay Street	435089.96	7250122.78	7.25	25.10	Levee and flood gate / pump station	Terminated due to hammer bounce
BH05	1E Quay Street	435062.03	7250140.03	6.66	25.10	Levee and flood gate / pump station	Terminated due to hammer bounce
BH06	Intersection between Scotland St and Petersen St	435707.86	7250276.28	8.98	16.95	Levee	-
BH07	Distillery Creek	435855.22	7250566.56	5.70	-	Levee and flood gate	Unable to do service locating
BH08(*)	Distillery Creek	435793.39	7250636.95	5.81	29.95	Levee and flood gate	-
BH09	Sugar Mill site	435797.51	7250732.49	8.15	19.95	Levee	-
BH10	Sugar Mill site	435335.68	7250162.02	4.89	19.95	Levee	-

Notes:
1. BGL: Blow Ground Level
2.
3. (*) Standpipe installation

4.7.2 Piezocone Penetration Testing (CPTu)

Six (6) piezocone penetration tests (CPTu) were carried out at the locations shown in Table 4–1, focusing on the soft soil area identified in available geotechnical information (Concept Engineering Report, 2019) . Soil type and engineering characteristics of soft soils such as shear strength, deformation and consolidation characteristics, and permeability will be assessed based on interpretation of CPTu results. The following requirements for CPTu tests were considered:

- CPTu testing to be undertaken with pore water pressure measurement for the full depth.
- Pore Pressure Dissipation testing (PPDT) to be undertaken for a duration adequate for reaching 50% of the initial excess pore water pressure or to a state of equilibrium.

- Pore pressure dissipation test at selected locations.
- In situ vane shear testing to be undertaken at selected locations.

The output of CPTu, PPDT and vane shear testing are presented in Appendix D to Appendix F.

Table 4–2: As built CPT Investigation Details

Borehole ID	Location	Coordinates		Target Depth (m)	Target Structure	Remark
		Easting	Northing			
CPT01	Rowing Club	435019.19	7250106.66	15.49	Levee and flood gate / pump station	Pore pressure dissipation / vane shear testing
CPT02	1E Quay Street	435098.92	7250145.12	24.26	Levee and flood gate / pump station	Pore pressure dissipation / vane shear testing
CPT03	1E Quay Street	435168.12	7250146.11	23.18	Levee	Pore pressure dissipation testing
CPT04	Quay St	435213.89	7250124.52	29.48	Levee	Relocated due to overhead power lines
CPT05	Quay St	435335.19	7250159.99	20.22	Levee	Pore pressure dissipation / vane shear testing
CPT06	Sugar Mill site	435818.04	7250601.51	26.43	Levee	Pore pressure dissipation testing

Notes:

1. BGL: Below Ground Level

4.8 Phase 2 - Non-Intrusive Site Investigation

Underwater and land-based geophysics survey was performed using seismic refraction method to assess subsurface profile along the proposed alignment under the supervision of a SMEC Geotechnical Engineer from 13 May to 14 May 2024.

Underwater seismic refraction survey was carried out using a vessel connecting source of shock waves and hydrophone array as receivers to calculate seismic velocities and layer depths within the footprint of flood gate structure at Saltwater Creek. Land-based seismic refraction survey was also carried out at both banks of Saltwater Creek, along the Quay Street and Cran Street. An accelerated weight drop was utilised as the seismic energy source to assist the achieve a certain depth of penetration below ground level.

Actual depth of penetration of the investigation will be limited by the signal strength provided by the seismic source, the geometry of the source positions and the geophone array and the geological conditions. The fieldwork was undertaken by engineers or scientists from SMEC subcontractor under the supervision of a SMEC site representative.

Output of geophysics survey will be updated in Appendix F for the next submission.

4.9 Laboratory Testing

Laboratory testing was conducted by a NATA Accredited Laboratory in accordance with applicable Australian or DTMR Standards including:

- AS1289 - Methods of Testing Soils for Engineering Purposes

- AS4133 – Methods of Testing Rocks for Engineering Purposes
- DTMR Materials Testing Manual, Edition 5, Amendment 6

Soil laboratory testing conducted by Trilab and CMT Laboratory based in Brisbane. The laboratory testing schedule is summarised in Table 4–3.

Table 4–3: Soil Laboratory Testing Schedule

Test Description	Quantity	Test Methods
Particle Size Distribution	18	AS1289 3.6.1 & 3.6.3
Atterberg Limits and Linear Shrinkage	25	AS1289.3.9.1, 3.9.2, 3.2.1, 3.4.1
Moisture Content	22	AS1289.2.1.1, 2.1.2, 2.1.4, 2.1.5, 2.16, 5.8.1
Emerson Class	5	AS1289 3.8.1
Oedometer	5	AS1289.6.6.1
Consolidation Undrained Triaxial Test with pore water pressure measurement	5	AS 1289.6.4.2
Falling or Constant Head Permeability	3	AS1289.6.7.2
Organic Content	5	AS1289.4.1.1
Standard compaction	3	AS1289.5.1.1
California Bearing Ratio with swell measurement (4 days soaked)	3	AS1289.6.1.1
Soil aggressivity Suite (pH, EC, chloride, sulphate, Major Cations/Anions, Total Acidity)	21	AS 1289.4.2.1, 4.3.1, Q130A, Q130B and Q131B

5 Geotechnical Investigation Results

5.1 Subsurface and Groundwater Conditions

The subsurface conditions encountered across the proposed project site generally comprises surficial layers of granular or cohesive fill underlain by alluvial soils, which in-turn, overly the Elliott Formation. This can be summarised as follows:

- Fill was encountered from the ground surface in six (6) boreholes to various depths between 1.6m and 4.5m below ground surface, comprising of silty/clayey sand or sandy/silty clay.
- Alluvial soils were generally encountered at various depths across the project site, comprising loose silty sand, very soft to soft silty clay, sandy clay or clay of dark grey colour. The alluvial soils present in an upwards fining sequence. Some gravels are present adjacent to Saltwater Creek and near the Distillery which are overlain by progressively finer grained materials. Highly compressible marine clay was encountered with thickness ranging from 4 m to 12 m.
- Elliott Formation (inferred residual soils) were encountered below alluvial soils in all boreholes, comprising of medium dense to dense silty/clayey sand with some gravels or stiff to hard sandy/silty clay. The formation was generally encountered at deep depths i.e. > 10 m near the Saltwater Creek and the Distillery Creek. Hard indurated / cemented gravel, sand and clay layers were possibly in localised areas, likely resulting in auger and rock roller bits refusal during drilling holes. Bedrock was not encountered.

Standing water levels were measured with a frequency of twice a day in the standpipe piezometers installed in BH03, BH04 and BH08 during the investigation period. The observed groundwater levels are summarised in Figure 5–1.

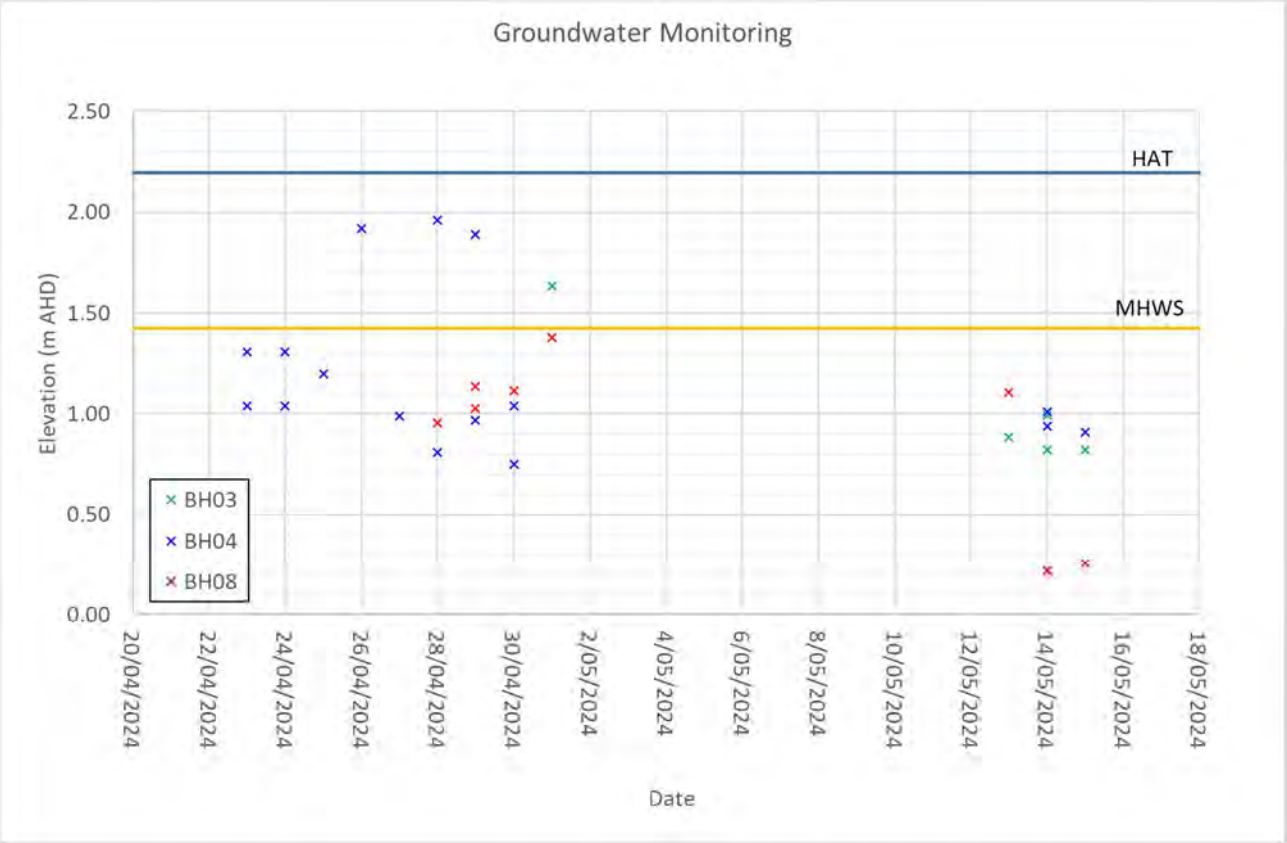

Figure 5–1: Groundwater Level Variation

5.2 In Situ Testing

5.2.1 Standard Penetration Testing (SPT)

Standard Penetration Tests (SPT) were carried out during the drilling of each of the boreholes. Retrieved SPT samples were logged and photographed by experienced geotechnical personnel. SPT results are presented on the boreholes logs in Appendix B along with photographs in Appendix C.

5.2.2 Pore Pressure Dissipation Testing (PPDT)

Pore pressure dissipation testing (PPDT) was carried out in fine grained materials to estimate field permeability of soft clays during the investigation of CPT01, CPT02, CPT03, CPT05 and CPT06. Output of PPDT is presented in Appendix E.

Table 5–1: PPDT results

Test ID	Depth (m)	Material Type	Origin	Peak Pore Pressure (kPa)	Final Pore Pressure (kPa)	Time for 50% dissipation (min)
CPT01	6.5	CLAY	Alluvium	286.5	141.6	83.1
	10.5	CLAY	Alluvium	468.5	129.2	128.8
CPT02	8.5	CLAY	Alluvium	303.8	154.3	45
	14	CLAY	Alluvium	521.7	300.6	185.6
	19.4	Silty CLAY / Sandy SILT	Elliot Formation	1231.5	140.0	0.89
CPT03	7	CLAY	Alluvium	209.4	110.1	145
	15	CLAY	Alluvium	504.9	154.3	149.8
	17.49	Silty CLAY / Silty SAND	Elliot Formation	623.8	127.6	0.87
CPT05	9.2	CLAY	Alluvium	251	99.7	369.3
CPT06	9.5	Silty CLAY	Elliot Formation	271.7	96.1	6.22

5.2.3 Vane Shear Testing

Vane shear testing was carried out by direct-push methods to measure the shear strength of soft soils at locations of CPT01, CPT02 and CPT05. Output of vane shear testing are presented in Appendix F.

Table 5–2: Vane shear test results

Test ID	Depth (m)	Material Type	Origin	Peak Shear Stress (kPa)	Residual Shear Stress (kPa)
CPT01	3.5	Sandy CLAY	Fill	48.7	29.3
	5.0	CLAY	Alluvium	46.5	20.6
	7.0	CLAY	Alluvium	46.4	24.9
	9.0	CLAY	Alluvium	37.4	14.4
	11.0	CLAY	Alluvium	49.7	23.2

Test ID	Depth (m)	Material Type	Origin	Peak Shear Stress (kPa)	Residual Shear Stress (kPa)
	12.0	CLAY	Alluvium	59.4	29.3
CPT02	5.0	Silty CLAY	Alluvium	77.9	39.2
	7.0	CLAY	Alluvium	67.5	27.0
	8.5	CLAY	Alluvium	49.5	26.5
	11.2	CLAY	Alluvium	47.9	21.4
	13.0	CLAY	Alluvium	71.1	32.5
	14.5	CLAY	Alluvium	56.0	21.6
CPT05	4.5	CLAY	Alluvium	44.0	22.5
	6.0	CLAY	Alluvium	41.2	19.2
	7.5	CLAY	Alluvium	47.8	15.5
	10.0	CLAY	Alluvium	73.5	28.6
	11.0	CLAY	Alluvium	50.9	20.1

5.2.4 Falling Head Percolation Testing

Field falling head percolation testing was carried out in four of the levee alignment boreholes i.e. BH01, BH04, BH05 and BH09. Auger drilling was firstly undertaken to a depth of 1.5m - 2.5m below ground surface and then the drilled hole was fully filled with water. Variation of water head level with time was measured by using a dip meter. The test results are used to estimate a field saturated hydraulic permeability of near surface fill or natural materials using an empirical correlation proposed by Reynolds et al (2015). Results of the testing are presented in Figure 5–2.

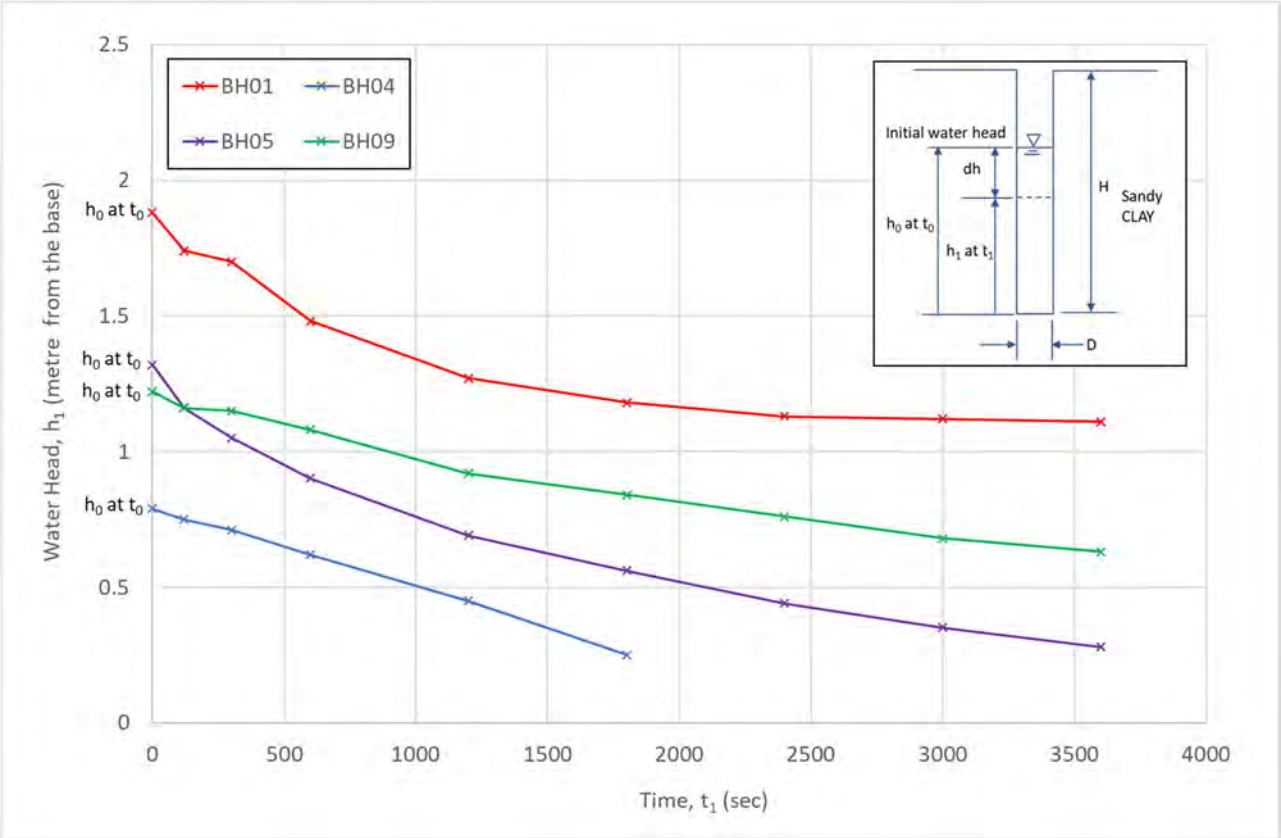

Figure 5–2: Falling Head Percolation Test Results

5.3 Laboratory Testing

A suite of soil laboratory testing was carried out for soil classification and characteristics of strength and consolidation of soft soils. Aggressivity testing was also conducted to assess the aggressiveness of the soils/water to concrete and steel for durability design. Results of laboratory testing are summarised in the following table.

Laboratory testing certificates will be updated in Appendix G for the next submission.

6 Limitations and Assumptions

6.1 General

The contents of the report are for the sole use of the Department of Housing, Local Government, Planning and Public Works. No responsibility or liability will be accepted to any third party. Data or opinions contained within the report may not be used in other contexts or for any other purposes without prior review and agreement with SMEC.

The recommendations in this report are based on data collected at specific locations using suitable investigation techniques. Only a certain amount of information has been collated to meet the specific financial and technical requirements and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it must be appreciated that actual conditions could vary from any extrapolated models.

The contractor or client can make their own interpretation of the provided factual data. They should perform any additional tests as necessary for their own purpose. Subsurface conditions, such as groundwater levels, can change over time and this should be borne in mind, particularly if the findings and/or recommendations contained within this report are used after a protracted delay.

It is strongly recommended that any plans and specifications prepared by others and relating to the contents of this report, or any amendments to the original plans and specifications, are reviewed by SMEC to verify that the intent of any recommendations are properly reflected in the design. During construction, we request the opportunity to review our interpretations if the encountered site conditions are significantly different from those inferred in this report. If the report is reproduced, it must be in full. Should there be any queries concerning this report please do not hesitate to contact SMEC.

6.2 Notes Relating to Geotechnical Factual Reports

This geotechnical factual report is prepared by qualified personnel on the information supplied or obtained and are based on current engineering standards of interpretation and assessments.

Information may be gained from limited subsurface testing, surface observations, and previous work, and is supplemented by knowledge of the local geology and experience of the range of properties that may be exhibited by the materials present. For this reason, geotechnical reports should be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely on.

Where the report has been prepared for a specific purpose (e.g. design of a three-storey building), the information and interpretation may not be appropriate if the design is changed (e.g. a twenty-storey building). In such areas, the report and the sufficiency of the existing work should be reviewed by SMEC in the light of the new proposal.

Every care is taken with the report content; however, it is not always possible to anticipate or assume responsibility for the following conditions:

- Unexpected variation in ground conditions. The potential for this depends on the amount of investigative work undertaken.
- Changes in policy or interpretation by statutory authorities.
- The actions of contractors responding to commercial pressures.

If these occur, SMEC would be pleased to resolve the matter through further investigation, analysis or advice.

6.3 Unforeseen Conditions

Should conditions encountered on site differ markedly from those anticipated from the information contained in this report, SMEC should be notified immediately. Early identification of the anomalies generally results in any

problems being more readily resolved and allows re-interpretation and assessment of the implications for future work.

6.4 Subsurface Information

Logs of a borehole, recovered core, test pit, excavated face, or cone penetration tests are an engineering and/or geological interpretation of the subsurface conditions. The reliability of the logged information depends on the drilling/testing method, sampling/observation spacing's and the ground conditions. It is not always possible or economic to obtain continuous high-quality data. It should also be recognised that the volume of material observed or tested is only a fraction of the total subsurface profile.

Interpretation of subsurface information and application to design and construction must take into consideration the spacing of the test locations, the frequency of observations and testing, and the possibility that geological boundaries may vary between observation points.

Groundwater observations and measurements outside of specially designed and constructed piezometers should be treated with care for the following reasons:

- In low permeability soils, groundwater may not seep into an excavation or bore in the short time it is left open.
- A localised perched water table may not represent the true water table.
- Groundwater levels vary according to rainfall events or season.
- Some drilling and testing procedures mask or prevent groundwater inflow.
- The installation of piezometers and long-term monitoring of groundwater levels may be required to adequately identify groundwater conditions.

Appendix A **As built Geotechnical Investigation Plan**

Legends

- Boreholes (CDM, 2018)
- Boreholes (Core Consultant, 2019)
- Boreholes (SMEC, 2024)
- Cone Penetration Tests (SMEC, 2024)
- Geophysics Survey (SMEC, 2024)

0 100 200 m

PAGE SIZE	A3
FIGURE TITLE	GI Plan
PROJECT TITLE	Bundaberge East Levee (BEL)
PROJECT NO.	
DRAWING NO.	1
DATE	17-05-2024
CREATED BY	BY
SOURCES	QLD GLOBE

SMEC
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SMEC AUSTRALIA PTY LTD
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Filepath: C:\Project_working\1047746 Bundaberg East Levee DD\12 Geotechnical Investigation\09 QGIS\BEL.qgz

Legends

- Boreholes (CDM, 2018)
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- Boreholes (SMEC, 2024)
- Cone Penetration Tests (SMEC, 2024)
- Geophysics Survey (SMEC, 2024)

0 25 50 m

PAGE SIZE	A3
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0 50 100 m

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Appendix B **Explanatory Notes and Borehole Logs**

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Explanatory Notes of Abbreviations and Terms

Used on Borehole and Excavation Logs

General

Information obtained from site investigations is recorded on log sheets. The “Engineering Log – Borehole or Non Cored Borehole” presents data from drilling operations where a core barrel has not been used to recover material, and information is based on a combination of regular sampling and in-situ testing. The material penetrated in non-core drilling is commonly soil but may include rock. The “Engineering Log – Cored Borehole” presents data from drilling operations where a core barrel has been used to recover material – commonly rock. The “Engineering Log - Excavation” presents data obtained on the subsurface profile from observations of excavations, either natural or man-made. It may contain a scaled, graphical presentation of the typical excavation profile. Refusal of the excavation plant is noted should it occur.

As far as is practicable, the data contained on the log sheets is factual. Some interpretation is inevitable in the assessment of material boundaries in areas of partial sampling, the location of areas of core loss, description and classification of material, estimation of strength and identification of drilling induced fractures. Material description and classification is generally based on AS1726-2017.

Drilling Method

Code	Description
ADT	Auger drilling with TC-bit
ADV	Auger drilling V-bit
AS	Auger screwing
AT	Air track
CA	Casing advancer
CC	Concrete core
CTR	Cable tool rig
DB	Wash bore drag bit
HA	Hand auger
HAND	Hand methods
HF	Hollow flight auger
HMLC	Diamond core 62mm diameter
HQ	Wire line core barrel 64mm diameter
HQ3	Wire line core barrel 62mm diameter
NDD	Non destructive drilling
NMLC	Diamond core 52mm diameter
NQ	Wire line core barrel 47mm diameter
NQ3	Wire line core barrel 45mm diameter
PT	Continuous push tube
PQ	Wire line core barrel 85mm diameter
RAB	Rotary air blast
RC	Reverse circulation
RD	Rotary blade or drag bit
RR	Rock roller
RT	Rotary tricone bit
SD	Sonic drilling
TBX	Tube-X
VC	Vibro-core drilling
WB	Wash bore drilling

Drilling Penetration

Ease of penetration in non-core drilling

VE	Very easy
E	Easy
F	Firm
H	Hard
VH	Very hard

Support and Casing

Code	Description	Code	Description
C	Casing	Hw	114.3 mm
M	Mud	NW	88.9 mm
W	Water	PVC	150 mm

Core Run

Core lifts are identified by a line and depth with core loss per run as a percentage. Core loss is shown in the core run unless otherwise indicated.

Defect Spacing

The average distance between defects is measured parallel to the core axis in mm and may be expressed as a range or average.

Angle / Orientation

Angle from horizontal and orientation to magnetic north.

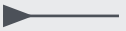
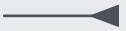
For inclined cored boreholes the Alpha and Beta angles are presented for orientated core. Alpha (α) is measured relative to the core axis, whilst Beta (β) is measured clockwise from the reference line looking down the core axis in the direction of drilling.

Excavation Method

N	Natural exposure
X	Existing excavation
BB	Tractor mounted backhoe bucket
EX	Hydraulic excavator
EH	Hydraulic excavator with hammer
B	Bulldozer blade
R	Ripper

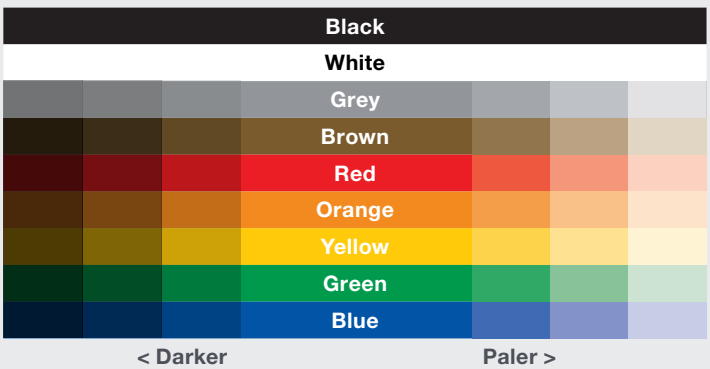
Water / Drilling Fluid

The drilling fluid used is identified and loss of return to the surface is estimated as a percentage, generally of each core lift.

Symbol	Description
	Water inflow
	Water outflow
	Water level: during drilling or immediately after completion of drilling
	Groundwater level with date observed prior to introduction of fluids or after standpipe construction
Not observed	The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole / test pit.
Not encountered	The borehole / test pit was dry soon after excavation, however groundwater could be present in less permeable strata. Inflow may have been observed had the borehole / test pit been left open for a longer period.

Colour

The colour of a soil or rock is described in a moist/wet condition using simple terms, such as black, white, grey, red, brown, orange, yellow green or blue. These are modified as necessary by 'pale', 'dark' or 'mottled'. Borderline colours are described as a combination of these colours (e.g. orange-brown). Where a soil or rock consists of a primary colour with a secondary mottling it is described as (primary colour) mottled (first colour) and (secondary colour).



Description of Soil

i. Soil name (BLOCK LETTERS)

ii. Plasticity or particle size of soil

iii. Colour

iv. Secondary soil components names & estimated proportions, including their plasticity / particle characteristics, colour

v. Minor soil components name, estimated proportions, including their plasticity / particle characteristics, colour

vi. Other minor soil components

vii. Moisture condition

viii. Consistency / density

ix. Structure of soil, geological origin

x. Additional observations

Particle Size

Term		Grain Size
Clay		< 2 µm
Silt		2 – 75 µm
Sand	Fine	0.075 – 0.21 mm
	Medium	0.21 – 0.6 mm
	Coarse	0.6 – 2.36 mm
Gravel	Fine	2.36 – 6.7 mm
	Medium	6.7 – 19 mm
	Coarse	19 – 63 mm
Cobbles		63 – 200 mm
Boulders		> 200 mm

Fine Grained and Coarse Grained Soils

Term	Description
Fine Grained Soil (cohesive)	More than 35% of the material less than 63 mm is smaller than 0.075 mm (silts and clays)
Coarse Grained Soil	More than 65% of the material less than 63 mm is larger than 0.075 mm (sands, gravels and cobbles)

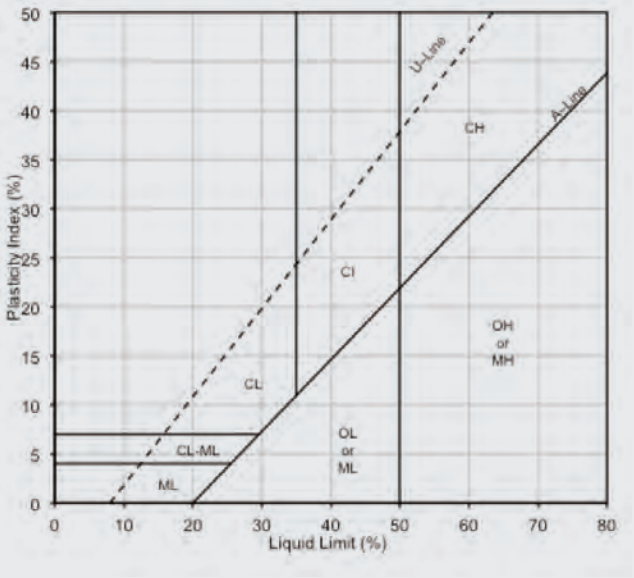
Descriptive Terms for Secondary and Minor Components

Designation of Components	In coarse grained soils				In fine grained soils	
	% Fines	Terminology	% Accessory coarse fraction	Terminology	% Sand / Gravel	Terminology
Minor	≤5	trace	≤15	trace	≤15	trace
	>5, ≤12	with	>15, ≤30	with	>15, ≤30	with
Secondary	>12	prefix	>30	prefix	>30	prefix

Plasticity – Fine Grained Soils

Liquid Limit (LL) %	Description
≤ 35	Low plasticity (L)
>35 to ≤ 50	Medium plasticity (I)
> 50	High plasticity (H)

Plasticity Chart– Fine Grained Soils



Consistency Terms – Fine Grained Soils

Term	Undrained shear strength (kPa)	Indicative SPT (N) Blow Count	Field Guide to Consistency
Very Soft (VS)	<12	0 – 2	Easily penetrated several centimetres by fist, exudes between fingers when squeezed in fist
Soft (S)	12 – 25	2 – 4	Easily penetrated several centimetres by thumb, easily moulded by light finger pressure
Firm (F)	25 – 50	4 – 8	Can be penetrated several centimetres by thumb with moderate effort, and moulded between the fingers by strong pressure
Stiff (St)	50 – 100	8 – 15	Readily indented by thumb but penetrated only with difficultly. Cannot be moulded by fingers
Very Stiff (VSt)	100 – 200	15 –30	Readily indented by thumb nail, still very tough
Hard (H)	>200	>30	Indented with difficulty by thumb nail, brittle
Friable (Fr)	-		Can be easily crumbled or broken into small pieces

Density Terms – Coarse Grained Soils

Term	Density Index (%)	SPT (N) Blow Count
Very Loose (VL)	< 15	0 – 4
Loose (L)	15 – 35	4 – 10
Medium Dense (MD)	35 – 65	10 – 30
Dense (D)	65 – 85	30 – 50
Very Dense (VD)	> 85	>50

Particle Characteristics – Coarse Grained Soils

Term	Description
Well Graded	Having good representation of all particle sizes
Poorly graded	With one or more intermediate size poorly represented
Gap graded	With one or more intermediate sizes absent
Uniform	Essentially of one size

Angularity – Coarse Grained Soils

	Rounded
	Sub-rounded
	Angular
	Sub-angular

Origin of Soil

Fill	Formed by humans
Aeolian	Formed by wind
Alluvial	Formed by streams and rivers
Colluvial	Formed on slopes (talus)
Estuarine	Formed in marine environments
Lacustrine	Formed in lakes
Residual	Formed by weathering insitu

Soil Moisture

	Term	Code	Description
Coarse Grained	Dry	D	Looks and feels dry and free running
	Moist	M	Soil feels cool, darkened in colour, soils tend to stick together, soil grains do not run freely through fingers and no visible free water
	Wet	W	Soil feels cool, darkened in colour, soils tend to stick together, free water on remoulding
Fine Grained	Moist, Less than Plastic Limit	W < PL	Hard and friable or powdery, moisture content well below Plastic Limit
	Moist, Near Plastic Limit	W ≈ PL	Soil feels cool, darkened in colour, can be moulded, near Plastic Limit
	Moist, Wet of Plastic Limit	W > PL	Soil feels cool, dark, usually weakened, free water, moisture content well above Plastic Limit
	Wet, Near Liquid Limit	W ≈ LL	Soil exudes easily
	Wet, Wet of Liquid Limit	W > LL	Soil behaves as a liquid

Boundary Classifications

Soils possessing characteristics of two groups are designated by combinations of group symbols. For example, GW-GC, well graded gravel-sand mixture with clay binder.

Graphic Symbols

	Asphalt		MH
	CH		ML
	CI		OH
	CL		OL
	Concrete		PT
	Fill		SC
	GC		SM
	GM		SP
	GP		SW
	GW		

Soil Classification

Soils are described in general accordance with AS1726-2017 as shown below.

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 63 mm and basing fractions on estimated mass)						GROUP SYMBOL	PRIMARY NAME
COARSE GRAINED SOILS More than 65% of the material is less than 63 mm and is larger than 0.075 mm	A particle size of 0.075 is about the smallest size distinguishable to the naked eye	**GRAVELS** More than half of coarse fraction is larger than 2.36 mm	**CLEAN GRAVELS** (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes, not enough fines to bind coarse grains, no dry strength; ≤ 5% fines		GW	GRAVEL
				Predominantly one size or a range of sizes with more intermediate sizes missing, not enough fines to bind coarse grains, no dry strength; ≤ 5% fines		GP	GRAVEL
			GRAVELS w/ FINES (Appreciable amount of fines)	'Dirty' materials with excess of non-plastic fines, none to medium dry strength; ≥ 12% silty fines		GM	SILTY GRAVEL
				'Dirty' materials with excess of plastic fines, medium to high dry strength; ≥ 12% clayey fines		GC	CLAYEY GRAVEL
		SANDS More than half of coarse fraction is smaller than 2.36 mm	**CLEAN SANDS** (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes, not enough fines to bind coarse grains, no dry strength; ≤ 5% fines		SW	SAND
				Predominantly one size or a range of sizes with more intermediate sizes missing, not enough fines to bind coarse grains, no dry strength; ≤ 5% fines		SP	SAND
			SANDS w/ FINES (Appreciable amount of fines)	'Dirty' materials with excess of non-plastic fines, none to medium dry strength; ≥ 12% silty fines		SM	SILTY SAND
				'Dirty' materials with excess of plastic fines, medium to high dry strength; ≥ 12% clayey fines		SC	CLAYEY SAND
FINE GRAINED SOILS More than 35% of the material less than 63 mm is less than 0.075 mm		**IDENTIFICATION PROCEDURES ON FRACTIONS** < 0.075 mm					
		SILTS AND CLAYS Liquid Limit < 50%	**DRY STRENGTH**	**DILATANCY**	**TOUGHNESS**	**GROUP SYMBOL**	**PRIMARY NAME**
			None to low	Slow to rapid	Low	ML	SILT
			Medium to high	≥ 12% clayey fines	Medium	CL, CI	CLAY
			Low to medium	Slow	Low	OL	ORGANIC SILT
		SILTS AND CLAYS Liquid Limit > 50%	Low to medium	None to slow	Low to medium	MH	SILT
			High to very high	None	High	CH	CLAY
			Medium to high	None to very slow	Low to medium	OH	ORGANIC CLAY
HIGHLY ORGANIC SOILS: readily identified by colour, odour, spongy feel and frequently fibrous texture						PT	PEAT

Description of Rock

i. Rock name (BLOCK LETTERS)

ii. Grain size and mineralogy

iii. Colour

iv. Fabric and texture

v. Features, inclusions, minor components, moisture content and durability

vi. Strength

vii. Weathering and/or alteration

viii. Rock mass properties – discontinuities and structure of rock

ix. Interpreted stratigraphic unit

x. Additional observations including geological structure

Simple rock names are used to provide a reasonable engineering description, rather than a precise geological classification. The rock name is chosen by considering the nature and shape of the grains or crystals, the texture and fabric of the rock material, the geological structure and setting, and information from the geological map of the area. Further guidance on the naming of rocks can be found in AS1726-2017, Tables 15, 16, 17 and 18. Typical rock types are described below, though subject to site specific variations.

Rock Type	Description	Example of Rock Name
Sedimentary	Formed by deposited beds of sediments, have grains that are cemented together and often rounded. Significant porosity	COMMON: Conglomerate, Breccia, Sandstone, Mudstone, Siltstone, Claystone ≥90% CARBONATE: Limestone, Dolomite, Calcirudite, Calcarenite, Calcisiltite, Calcilutite PYROCLASTIC: Agglomerate, Volcanic Breccia, Tuff
Igneous	Formed from molten rock and have a crystalline texture. Typically massive and low porosity. Rock types are from coarse to fine grained.	HIGH QUARTZ CONTENT: Granite, Microgranite, Rhyolite MODERATE QUARTZ CONTENT: Diorite, Microdiorite, Andesite LOW QUARTZ CONTENT: Gabbro, Dolerite, Basalt
Metamorphic	Formed when rocks are subject to heat and/or pressure and have typically have directional fabric. Typically have low porosity and crystalline structure. Rock types are from coarse to fine grained	FOLIATED: Gneiss, Schist, Phyllite, Slate NON-FOLIATED: Marble, Quartzite, Serpentinite, Hornfels
Duricrust	Formed as part of a weathering profile and show evidence of being cemented in situ. Cementation is typically irregular and exhibits replacement textures.	Ferricrete (Iron oxides and hydroxides) Silicrete (Silica) Calcrete (Calcium carbonate) Gypcrete (Gypsum)

Note: ( ) denotes dominant cementing mineralogy

Grain Size

Terms describing dominate grain size in sedimentary rocks.

Term	Grain size
Coarse	Mainly 0.6 mm to 2 mm
Medium	Mainly 0.2 mm to 0.6 mm
Fine	Mainly 0.06mm (just visible) to 0.2 mm

Terms describing dominate grain size in igneous and metamorphic rocks

Term	Grain size
Coarse	Mainly greater than 2 mm
Medium	0.06 mm to 2 mm
Fine	Mainly less than 0.06 mm (just visible) to 0.2mm

Texture and Fabric

Sedimentary rocks

Thickness	Bedding Term
< 6 mm	Thinly laminated
6 – 20 mm	Laminated
20 – 60 mm	Very thinly bedded
60 – 200 mm	Thinly bedded
0.2 – 0.6 m	Medium bedding
0.6 – 2 m	Thickly bedded
> 2 m	Very thickly bedded

Igneous rocks

Term	Definition
Amorphous	Indicates that the rock has no obvious crystalline structure
Crystalline	A regular molecular structure, showing crystal structure and symmetry.
Cryptocrystalline	The texture comprises crystals that are too small to recognise under an ordinary microscope. Indistinctly crystalline.
Porphyritic	Indicates the presence of phenocrysts (relatively large crystals in a fine grained ground mass) in igneous rocks.
Flow banded	Indicates visible flow lines in volcanic rocks and some intrusive rocks
Glassy	Entirely glass like. No crystalline units and without crystalline structure.
Vesicular	A texture of volcanic rocks that indicates the presence of vesicles (small gas bubbles). Where the vesicles are filled with a mineral substance they are termed Amygdales and the texture is Amygdaloidal.

Metamorphic

Term	Definition
Foliation	The parallel arrangement of minerals due to metamorphic process, which shall be defined by the terms in weak, moderate and strongly foliated.
Porphyroblastic	A texture indicating the presence of porphyroblasts (larger crystals formed by recrystallization during metamorphism, such as garnet or staurolite in a mica schist).
Cleavage	A type of foliation developed in fine grained metamorphic rocks such as slates.

Bedding and Fabric Development

Type	Definition
Massive	No obvious development of bedding – rock appears homogeneous
Poorly Developed	Bedding is barely obvious as faint mineralogical layering or grain size banding, but bedding planes are poorly defined.
Well Developed	Bedding is apparent in outcrops or drill core as distinct layers or lines marked by mineralogical or grain size layering.
Very Well Developed	Bedding is often marked by a distinct colour banding as well as by mineralogical or grain size layering.
Indistinct fabric	There is little effect on strength properties
Distinct Fabric	The rock may break more easily parallel to the fabric

Rock Strength

Term (Code)	UCS (MPa)	$Is_{(50)}$ (MPa)	Field Guide to Strength
Very Low (VL)	0.6 – 2	> 0.03 to ≤0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 3 cm thick can be broken by finger pressure.
Low (L)	2 - 6	> 0.1 to ≤ 0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blow of the pick point; has dull sound under hammer. A piece of core 150 mm long 50 mm in diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium (M)	6 - 20	> 0.3 to ≤ 1.0	Readily scored with a knife; a piece of core 150 mm long by 50 mm in diameter can be broken by hand with difficulty.
High (H)	20 - 60	> 1 to ≤ 3	A piece of core 150 mm long by 50 mm in diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High (VH)	60 -200	> 3 to ≤ 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High (EH)	>200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Rock strength is assessed by laboratory Uniaxial Compressive Strength (UCS) testing and/or Point Load Strength Index (PLT) testing to obtain the $Is_{(50)}$ the strength table implies a 20 times correlation between $Is_{(50)}$ and UCS used for classification. Note however, multiplier may range from 4 (e.g. some carbonated and low strength rocks) to 40 (e.g. some igneous rocks and/or some high strength rocks). A site specific correlation based on testing, previous investigation or literature may be used where available. These terms refer to the strength of the rock material and not to the strength of the rock mass which may be considered weaker due to the effect of rock defects.

Visual Log

A diagrammatic plot of defects showing type, spacing and orientation in relation to the core axis.

- Defects open in situ or clay sealed
- Defects closed in-situ
- Drill induced fractures or handling breaks
- Infilled seam

Rock Weathering and or Alteration Classification

Term (Code)		Definition	
Residual soil (RS)		Soil developed on extremely weathered rock. The rock mass structure and substance fabric are no longer evident but the soil has not been significantly transported.	
Extremely weathered (EW) Extremely altered (XA)		Rock is weathered to such an extent that it has 'soil' properties, i.e, it either disintegrates or can be remoulded in water, but the texture of original rock is still evident.	
Highly weathered (HW) Highly Altered (HA)	Distinctly weathered (DW)*	Whole rock material is discoloured usually by extent that iron staining or bleaching and other signs of chemical or physical decomposition are evident. Porosity and strength may be increased or decreased compared to the fresh rock usually as a result of iron leaching or deposition. The colour and strength of the original rock substance is no longer recognisable	*Where is it not practical to distinguish between 'HW' and MW'. Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores
Moderately weathered (MW) Moderately Altered (MA)	Distinctly Altered (DA)	Whole rock material is discoloured usually by staining that original colour of the fresh rock is no longer recognisable	
Slightly weathered (SW) Slightly altered (SA)		Rock is slightly discoloured but shows little or no change of strength from fresh rock	
Fresh rock (F)		Rock shows no sign of decomposition or staining.	

Rock Core Recovery

TCR = Total Core Recovery (%)

$$\frac{\textbf{Length of Core Recovered}}{\textbf{Length of Core run}} \times 100$$

SCR = Solid Core Recovery (%)

$$\frac{\textbf{Sum Length of Cylindrical Core Recovered}}{\textbf{Length of Core run}} \times 100$$

RQD = Rock Quality Designation (%)

$$\frac{\textbf{Sum Length of Sound Core Pieces > 100mm in length}}{\textbf{Length of Core run}} \times 100$$

Types of Discontinuities

Term	Code	Description
Parting	Pt	A defect parallel or sub-parallel to a layered arrangement of mineral grains or micro-fractures, which has caused planar anisotropy in the rock substance.
Joint	Jt	A defect across which the rock substance has little tensile strength, but that is not related to textural or depositional features within the rock substance.
Sheared Zone	SZ	A zone with roughly parallel planar boundaries of rock substance consisting of closely spaced joints with smooth slickensided surfaces often curved. The joints divide the rock mass into unit blocks usually of lenticular or wedge shape.
Crushed Zone	CZ	A zone or seam with roughly parallel planar boundaries of rock substance composed of disoriented, usually angular, fragments of the host rock substance
Seam	Se	A zone or seam with roughly parallel boundaries, infilled by soil (IS) or decomposed rock (DS)
Fault	F	A fracture (defect) in rock along which there has been an observable amount of displacement.
Vein	Ve	A zone of minerals intruded into a joint or fissures.

Type of Structures

Term	Code	Description
Bedding	Bg	A layered arrangement of minerals parallel to the surface of deposition which has caused planar anisotropy in the rock substance.
Cleavage	C	An alignment of fine grained minerals caused by deformation.
Schistosity	SH	A layered arrangement of minerals to each other
Foliation	Fo	A planar alignment of minerals caused by deformation.
Void	Vo	A completely empty space
Dyke	DK	Sheet-like bodies of igneous rock that cut across sedimentary bedding or foliations in rocks. They may be single or multiple in nature
Sill	SI	A sill is an intrusion of magma that spreads underground between the layers of another kind of rock
Contact	Cn	A contact between intrusive and stratigraphic units.
Boundary	Bd	A distinct boundary between two stratigraphic units

Note: Drill breaks (DB) and handling breaks (HB) are not included as natural discontinuity.

Discontinuity Spacing

Spacing (mm)	Description
>6000	Extremely Widely Spaced
2000 - 6000	Very Widely Spaced
600 - 2000	Widely Spaced
200 - 600	Medium Spaced
60 - 200	Closely Spaced
20 - 60	Very Closely Spaced
<20	Extremely Closely Spaced

Discontinuity Planarity

Code	Description
Cu	Curved – A defect with a gradual change in orientation
Ir	Irregular – A defect with many sharp changes in orientation
Pl	Planar – Defect forms a continuous plane without variation in orientation
St	Stepped – A defect with distinct sharp steps or step
Un	Undulose – A defect with undulations
Vu	Vuggy – An open void with crystallisation
Wv	Wavy – A wavy defect surface

Discontinuity Roughness

Abbreviation	Description
Ro	Rough – Many small surface irregularities generally related to the grain size of the parent rock
Sm	Smooth – Few or no surface irregularities related to the grain size of the parent rock
Po	Polished – Planes have a distinct sheen or a smoothness
Sl	Slickensided – Planes have a polished, grooved or striated surface consistent with differential movement of the parent rocs along the plane
VR	Very rough – many large surface irregularities, amplitude generally more than 1mm

Infill Material

Code	Name	Code	Name
Ca	Calcite	Gp	Gypsum
Ch	Chlorite	Mn	Manganese
Cl	Clay	MS	Secondary mineral
Co	Coal	Py	Pyrite
Fe	Limonite / Ironstone	Um	Unidentified mineral
Fe Cl	Iron oxide clay	Qz	Quartz
Fl	Feldspar	X	Carbonaceous

Discontinuity Observation

Term	Code	Description
Clean	CN	No visible coating or infill
Stain	SN	No visible coating or infill but surfaces are discoloured by mineral staining
Veneer <1 mm	VNR	A visible coating or soil or mineral substance but usually unable to be measured. If discontinuous over the plane, patchy veneer.
Coating >1 mm to <10 mm	CT	A visible coating or infilling of soil or mineral substance. Describe composition and thickness.
Filling (Filled) >10 mm	FLD	A visible filling of soil or mineral substance. Describe composition and thickness.

Samples and Field Tests

Code	Description
B	Bulk disturbed sample
BLK	Block sample
C	Core sample
DS	Small disturbed sample
ES	Soil sample for environmental testing
EW	Water sample for environmental testing
FP	Pressuremeter
G	Gas sample
H	Hydraulic fracturing
HP	Hand penetrometer test
I	Impression device
$Is_{(50)}$	Point Load Index
K	Permeability
LB	Large bulk disturbed sample
N	Standard penetration test result (N* denotes SPT sample recovery)
O	Core orientation
P	Piston sample
PID	Photoionisation detector reading in ppm
R	Hammer bouncing / refusal
SPT	Standard Penetration Test
U	Undisturbed push in sample
UCS	Uniaxial Compressive Strength
U50	Undisturbed tube sample (50 mm diameter)
U75	Undisturbed tube sample (75 mm diameter)
VS	Vane shear test
● (A)	Axial Test
○ (D)	Diametral Test
□	Irregular Lump test

Laboratory Tests

Code	Description
ACM	Asbestos Containing Material
CD	Consolidated Drained
CU	Consolidated Undrained
LL	Liquid Limit
LS	Linear Shrinkage
MC	Moisture Content
MDD	Maximum Dry Density
OMC	Optimum Moisture Content
PBT	Plate Bearing Test
PI	Plasticity Index
PL	Plastic Limit
PSD	Particle Size Distribution
ρ_b	Bulk Density
ρ_p	Particle Density
ρ_d	Dry Density
UU	Undrained Unconsolidated

Backfill / Standpipe Detail

Symbol	Description	Symbol	Description
	Cement seal		Filter pack: sand filter
	Grout backfill		Filter pack: gravel filter
	Blank pipe		Bentonite seal
	Slotted pipe		Cutting – excavated material backfill
	Surface Completion: Monument Above Ground		Surface Completion: Gatic Ground Monument

Completion Details

Type	Description
Collapse	Exploratory hole collapsed before reaching planned depth
Equipment Failure	Boring or excavator equipment operational failure
Flooding	Flooding of excavation
Machine Limit	Limit of machine capability reached
Obstruction	Obstruction preventing further advancement
Possible services	Indication of possible services below
Services present	Services encountered during exploratory hole
Squeezing	Hole squeezing boring equipment
Target Depth	Depth reached as planned
Target Depth Instrumentation Installed	Depth reached as planned instrumentation installed
Target Depth Standpipe Installed	Depth reached as planned open standpipe constructed
Material Refusal	Material preventing further advancement

Geological & Engineering Log

Project	Bundaberg East Levee	East	435335.7 m	Start Date	21/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250162.0 m	End Date	21/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	4.28 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH01**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
AD/T	PW			0.50m SPT 3,6,7 N=13 (0.45m REC) 0.95m		0.60m PP=320kPa 0.70m PP=300kPa		0.0 *4.3*			*4.28*	FILL Sandy CLAY: medium to high plasticity, brown to dark brown, sand is fine to medium grained; trace rootlets.	w<PL					FILL	
				1.50m SPT 1,2,4 N=6 (0.45m REC) 1.95m		1.80m PP=150kPa 1.90m PP=150kPa		1.0 *3.3*			1.20 *3.08*	Sandy CLAY: high plasticity, dark brown and grey, sand is fine to medium grained; trace fine grained gravel; trace rootlets.	w≈PL	St				ALLUVIAL SOIL	
				2.50m SPT 2,2,7 N=9 (0.45m REC) 2.95m		2.70m PP=150kPa 2.80m PP=150kPa		2.0 *2.3*		CH		2.30: Becoming brown, dark brown and black							
				3.50m SPT 2,3,7 N=10 (0.45m REC) 3.95m		3.70m PP=230kPa 3.80m PP=230kPa		3.0 *1.3*			3.20 *1.08*	CLAY: high plasticity, orange-brown and grey, trace fine grained sand.	w<PL						
WB				4.50m SPT HW/450mm (0.45m REC)		4.50m VS=43kPa 4.70m PP=80kPa 4.80m PP=80kPa		4.0 *0.3*		CH									
				5.50m SPT HW/450mm (0.45m REC)		5.70m PP=60kPa 6.00m VS=41kPa		5.0 *-0.7*			4.50 *-0.22*	CLAY: low to medium plasticity, dark grey to grey.		F				MARINE SOIL	
						7.50m VS=47kPa		6.0 *-1.7*		CL -CI									
								7.0 *-2.7*											
								8.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435335.7 m	Start Date	21/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250162.0 m	End Date	21/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	4.28 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH01**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					8.50m SPT HW/450mm (0.45m REC)		8.70m PP=110kPa 8.80m PP=110kPa		8.0 -3.7				CLAY: low to medium plasticity, dark grey to grey. *(continued)*	w<PL	St				MARINE SOIL	
					10.00m SPT HW/450mm (0.45m REC)		10.00m VS=73kPa 10.30m PP=110kPa 10.40m PP=100kPa 11.00m VS=51kPa		9.0 -4.7		CL -Cl									9.0
					11.50m SPT HW/450mm (0.45m REC)		11.60m PP=40kPa 11.70m PP=60kPa		10.0 -5.7											10.0
									11.0 -6.7			11.20 -6.92	Sandy CLAY: low to medium plasticity, dark grey to dark brown, sand is fine to coarse grained.		S to F					11.0
					13.00m SPT 5,7,2 N=9 (0.45m REC) 13.45m				12.0 -7.7		CL -Cl	12.50 -8.22	CLAY: low to medium plasticity, dark grey, with fine to coarse grained sand.							12.0
					14.50m SPT 3,5,5 N=10 (0.45m REC) 14.95m				13.0 -8.7		CL -Cl	13.20 -8.92	Gravelly SAND: fine to medium grained, grey to pale grey, gravel is fine to medium grained, sub-angular to sub-rounded; trace low plasticity clay.	W	L				ELLIOT FORMATION	13.0
					16.00m				14.0 -9.7		SP	14.50 -10.22	Clayey SAND: fine to coarse grained, dark grey, clay is low plasticity; with fine to medium grained, sub-angular to sub-rounded gravel.							14.0
									15.0 -10.7		SC								15.51: Losing water	15.0
									16.0											

Observations and Comments

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435335.7 m	Start Date	21/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250162.0 m	End Date	21/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	4.28 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH01**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					SPT HW/150mm,3,6 N=9 (0.45m REC) 16.45m		16.20m PP=130kPa 16.30m PP=110kPa		16.0 -11.7		SC	16.30 -12.02	Clayey SAND: fine to coarse grained, dark grey, clay is low plasticity; with fine to medium grained, sub-angular to sub-rounded gravel. *(continued)*	W	L				ELLIOT FORMATION	
													Sandy CLAY: low to medium plasticity, dark grey and red-brown, with fine to medium grained, sub-angular to sub-rounded gravel.	w>PL	St					
									17.0 -12.7		CL -Cl									17.0
					17.50m SPT 1,2,2 N=4 (0.00m REC) 17.95m							17.40 -13.12	Gravelly SAND: fine to coarse grained, pale grey, pale brown and orange, gravel is fine to coarse grained, sub-angular to sub-rounded.	W	L					
									18.0 -13.7											18.0
					19.00m SPT 2,4,4 N=8 (0.45m REC) 19.45m				19.0 -14.7		SP									19.0
									20.0 -15.7											20.0
					20.50m SPT 11,20/100mm HB N=R (0.25m REC) 20.75m							20.50 -16.22	EXTREMELY WEATHERED MATERIAL							
												20.75	Clayey SAND: fine to coarse grained, orange-brown and brown, clay is low plasticity; with fine to coarse grained, sub-angular to sub-rounded gravel; (Extremely Weathered material).							
									21.0 -16.7				Hole Terminated at 20.75 m Refusal							21.0
									22.0 -17.7											22.0
									23.0 -18.7											23.0
									24.0											

Observations and Comments

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435018.3 m	Start Date	28/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250106.6 m	End Date	28/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	5.03 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH02**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
AD/T	PW			D	1.50m SPT 2,2,3 N=5 (0.45m REC) 1.95m			Not Observed	0.0 *5.0*			0.20 *4.83*	FILL Sandy CLAY: medium to high plasticity, dark brown, sand is fine to medium grained; trace fine grained, sub-angular to sub-rounded gravel; trace rootlets.	w<PL					FILL	
													FILL Sandy CLAY: medium to high plasticity, dark brown, sand is fine to medium grained; trace fine to medium grained, sub-angular to sub-rounded gravel.							
					3.00m SPT HW/150mm,1,3 N=4 (0.45m REC) 3.45m		3.30m PP=150kPa 3.50m VS=48kPa		1.0 *4.0*											
									2.0 *3.0*			2.80 *2.23*	FILL Sandy CLAY: medium to high plasticity, dark brown, sand is fine to medium grained; trace rootlets.	w≈PL						
									3.0 *2.0*			3.80 *1.23*	CLAY: medium plasticity, dark brown and grey, with fine to medium grained sand.		F				MARINE SOIL	
WB					4.50m SPT HW/450mm (0.45m REC)		4.70m PP=110kPa 5.00m VS=47kPa		4.0 *1.0*											
									5.0 *0.0*		CI									
					6.00m SPT HW/450mm (0.45m REC)		6.30m PP=70kPa 6.40m PP=70kPa		6.0 *-1.0*			5.80 *-0.77*	CLAY: low to medium plasticity, dark grey to grey, trace fine to medium grained sand.	w>PL						
							7.00m VS=45kPa		7.0 *-2.0*		CL -CI									
				U90					8.0											

Observations and Comments

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435018.3 m	Start Date	28/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250106.6 m	End Date	28/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	5.03 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH02**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB							8.10m PP=120kPa 8.20m PP=120kPa	Not Observed	8.0 -3.0				CLAY: low to medium plasticity, dark grey to grey, trace fine to medium grained sand. *(continued)*	w>PL	F				MARINE SOIL	
					9.00m SPT HW/450mm (0.45m REC)		9.00m VS=37kPa 9.20m PP=70kPa 9.30m PP=70kPa		9.0 -4.0				9.00: Trace fine to medium grained, sub-rounded gravel							9.0
					10.50m SPT HW/450mm (0.45m REC)		10.70m PP=70kPa 11.00m VS=50kPa		10.0 -5.0		CL -Cl									10.0
					12.00m SPT HW/450mm (0.45m REC)		12.00m VS=59kPa 12.30m PP=70kPa 12.35m PP=70kPa		11.0 -6.0											11.0
									12.0 -7.0											12.0
					13.50m SPT 2,4,4 N=8 (0.45m REC) 13.95m				13.0 -8.0			13.50 -8.47	Clayey SAND: fine to coarse grained, dark grey to grey, clay is low plasticity; with fine to coarse grained, sub-angular to sub-rounded gravel.	W	L				ELLIOT FORMATION	13.0
									14.0 -9.0		SC									14.0
					15.00m SPT 6,8,10 N=18 (0.45m REC) 15.45m				15.0 -10.0		SP	14.80 -9.77	Gravelly SAND: fine to coarse grained, grey to pale grey, gravel is fine to medium grained, sub-angular to sub-rounded; with low plasticity clay.		MD					15.0
									16.0											

Observations and Comments

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435018.3 m	Start Date	28/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250106.6 m	End Date	28/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	5.03 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH02**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					16.50m SPT 3,10,15 N=25 (0.45m REC) 16.95m			Not Observed	16.0 *-11.0*		SP	16.85	Gravelly SAND: fine to coarse grained, grey to pale grey, gravel is fine to medium grained, sub-angular to sub-rounded; with low plasticity clay. *(continued)*	W	MD				ELLIOT FORMATION	
									17.0 *-12.0*		GP	*-11.87*	Sandy GRAVEL: fine to coarse grained, pale grey, red-brown and white, sand is fine to coarse grained.							
											SP		Gravelly SAND: fine to coarse grained, red-brown, gravel is fine to coarse grained, sub-angular to sub-rounded; with low plasticity clay.							
					18.00m SPT 4,8,15 N=23 (0.45m REC) 18.45m				18.0 *-13.0*		GP	18.00 *-12.97*	GRAVEL: fine to coarse grained, sub-angular to sub-rounded, grey, red-brown and white, with fine to coarse grained sand.							
											SC	18.40 *-13.37*	Clayey SAND: fine to coarse grained, red-brown and pale grey, clay is low plasticity; with fine to coarse grained, sub-angular to sub-rounded gravel.							
					19.50m SPT 15,10,16 N=26 (0.45m REC) 19.95m		19.70m PP=480kPa 19.80m PP>500kPa		19.0 *-14.0*			19.10 *-14.07*	CLAY: high plasticity, pale grey and pale red-brown, trace fine grained sand.	w<PL	VSt - H				RESIDUAL SOIL	
					21.00m SPT 7,16,21 N=37 (0.45m REC) 21.45m		21.30m PP>500kPa 21.40m PP>500kPa		20.0 *-15.0* 21.0 *-16.0*		CH								
					22.50m SPT 10,18,20 N=38 (0.45m REC) 22.95m		22.70m PP>500kPa 22.80m PP>500kPa		22.0 *-17.0* 23.0 *-18.0*										
					24.00m				24.0										

Observations and Comments

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435018.3 m	Start Date	28/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250106.6 m	End Date	28/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	5.03 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH02**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) Elevation	Graphic Log	USCS Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB				SPTLS	SPT 30/70mm N=R (0.07m REC) 25.50m			Not Observed	24.0 -19.0			-19.04	Sandy CLAY: medium to high plasticity, pale grey, sand is fine to medium grained; (Extremely Weathered).	w<PL	VSt - H				EXTREMELY WEATHERED MATERIAL RESIDUAL SOIL	
				SPTLS	SPT 10,19,25 N=44 (0.45m REC) 25.95m		25.70m PP=450kPa 25.80m PP=450kPa		25.0 -20.0				CLAY: high plasticity, pale grey, trace fine grained sand.							25.0
									26.0 -21.0											26.0
				SPTLS	SPT 8,12,18 N=30 (0.45m REC) 27.45m		27.30m PP>500kPa 27.40m PP>500kPa		27.0 -22.0		CH									27.0
				SPTLS	SPT 9,15,21 N=36 (0.45m REC) 28.95m		28.60m PP=420kPa 28.70m PP=480kPa		28.0 -23.0											28.0
									29.0 -24.0											29.0
				SPTLS	SPT 6,8,11 N=19 (0.45m REC) 30.45m				30.0 -25.0			30.45								30.0
													Hole Terminated at 30.45 m Target Depth							
									31.0 -26.0											31.0
									32.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435577.6 m	Start Date	30/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250229.6 m	End Date	30/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	3.79 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH03**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
AD/T	PW				0.50m SPT 5,7,7 N=14 (0.45m REC) 0.95m		0.20m PP>500kPa 0.40m PP>500kPa	Not Observed	0.0 *3.8*			*3.79*	TOPSOIL Sandy CLAY: medium to high plasticity, dark brown to brown, sand is fine to medium grained; trace fine to coarse grained, sub-angular to sub-rounded gravel; trace rootlets.	w<PL					TOPSOIL	BH03
					1.50m SPT 1,3,3 N=6 (0.45m REC) 1.95m		1.60m PP=300kPa 1.70m PP=200kPa		0.50 *3.29* 1.0 *2.8*			*3.29*	FILL Sandy CLAY: medium to high plasticity, dark brown, sand is fine to medium grained.						FILL	1.0
					2.50m SPT 9,13,16 N=29 (0.45m REC) 2.95m				1.70 *2.09* 2.0 *1.8*		CH	1.70	CLAY: high plasticity, red-brown and grey, with fine to medium grained sand.		F				ALLUVIAL SOIL	2.0
					4.00m SPT 30 HB N=R (0.15m REC) 4.15m				2.50 *1.29* 3.0 *0.8*		Cl -CH	2.50	Sandy CLAY: medium to high plasticity, red-brown and grey, sand is fine to medium grained.		VSt - H					3.0
WB									3.20 *0.59* 4.0 *-0.2*		SP	3.20	Gravelly SAND: fine to coarse grained, grey and red-brown, gravel is fine to coarse grained, sub-angular to sub-rounded; with low plasticity clay.	M	D					4.0
												4.00 *-0.21*	Sandy CLAY: medium to high plasticity, pink-grey, sand is fine to medium grained; (Extremely Weathered mudstone).						EXTREMELY WEATHERED MATERIAL	
					7.00m SPT 9,14,10 N=24 (0.45m REC) 7.45m		7.30m PP=300kPa 7.40m PP=340kPa		5.0 *-1.2* 6.0 *-2.2* 7.0 *-3.2*		Cl -CH	7.00 *-3.21*	Sandy CLAY: medium to high plasticity, grey mottled white, sand is fine to coarse grained; trace fine to medium grained, sub-angular to sub-rounded gravel.	w≈PL	VSt				ALLUVIAL SOIL	5.0 6.0 7.0
									8.0		CH	7.40 *-3.61*	CLAY: high plasticity, grey to pale grey, trace fine grained sand.							

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435577.6 m	Start Date	30/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250229.6 m	End Date	30/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	3.79 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH03**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					8.50m SPT 3,4,6 N=10 (0.45m REC) 8.95m		8.70m PP=410kPa 8.80m PP=440kPa	Not Observed	8.0 *-4.2*				CLAY: high plasticity, grey to pale grey, trace fine grained sand. *(continued)*	w≈PL	VSt				ALLUVIAL SOIL	
					10.00m SPT 3,5,6 N=11 (0.45m REC) 10.45m		10.30m PP=340kPa 10.40m PP=420kPa		9.0 *-5.2*		CH									9.0
					11.50m SPT 3,5,7 N=12 (0.45m REC) 11.95m		11.70m PP=450kPa 11.80m PP=450kPa		10.0 *-6.2*			10.00 *-6.21*	CLAY: high plasticity, grey to pale grey, pale red-brown mottled white, trace fine to medium grained sand.							10.0
					13.00m SPT 4,3,5 N=8 (0.45m REC) 13.45m		13.40m PP=120kPa		11.0 *-7.2*		CH	11.50 *-7.71*	CLAY: high plasticity, grey to pale grey mottled white, trace fine grained sand.							11.0
					14.50m SPT 7,6,5 N=11 (0.45m REC) 14.95m		14.60m PP=110kPa		12.0 *-8.2*											12.0
					16.00m				13.0 *-9.2*		CH				St					13.0
									14.0 *-10.2*			14.50 *-10.71*	Sandy CLAY: medium plasticity, brown to pale brown, sand is fine to coarse grained; trace fine to coarse grained, sub-rounded gravel.	w>PL					ELLIOT FORMATION	14.0
									15.0 *-11.2*		CI									15.5 16.0
									16.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435577.6 m	Start Date	30/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250229.6 m	End Date	30/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	3.79 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH03**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					SPT 5,6,6 N=12 (0.45m REC) 16.45m		16.30m PP=110kPa 16.35m PP=150kPa	Not Observed	16.0 -12.2		CI		Sandy CLAY: medium plasticity, brown to pale brown, sand is fine to coarse grained; trace fine to coarse grained, sub-rounded gravel. *(continued)*	w>PL	St				ELLIOT FORMATION	
					SPT 9,13,12 N=25 (0.45m REC) 17.95m		17.70m PP=230kPa 17.80m PP=220kPa		17.0 -13.2			17.50 -13.71	Sandy CLAY: medium to high plasticity, pale brown, white, grey and brown, sand is fine to coarse grained; with fine to coarse grained, sub-angular to sub-rounded gravel.	w≈PL						
					SPT 4,6,17 N=23 (0.45m REC) 19.45m		19.30m PP=110kPa 19.40m PP=150kPa		18.0 -14.2		CI -CH									
					SPT 5,7,11 N=18 (0.45m REC) 20.95m		20.70m PP=240kPa 20.80m PP=260kPa		19.0 -15.2											
					SPT 7,12,18 N=30 (0.45m REC) 22.45m		23.70m PP=420kPa 23.80m		20.0 -16.2											
					SPT 5,10,14 N=24 (0.45m REC) 23.95m				21.0 -17.2											
									22.0 -18.2			22.00 -18.21	CLAY: high plasticity, grey to pale grey, trace fine grained sand.		H				RESIDUAL SOIL 22.00: Not enough sample to take pocket penetrometer test	
									23.0 -19.2		CH									
									24.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435577.6 m	Start Date	30/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250229.6 m	End Date	30/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	3.79 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH03**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB							PP=430kPa	Not Observed	24.0 -20.2		CH		CLAY: high plasticity, grey to pale grey, trace fine grained sand. *(continued)*	w≈PL	H				RESIDUAL SOIL	
					25.00m SPT 6,11,11 N=22 (0.45m REC) 25.45m		25.30m PP=420kPa 25.40m PP=400kPa		25.0 -21.2			25.45								25.5
									26.0 -22.2				Hole Terminated at 25.45 m Target Depth							
									27.0 -23.2											
									28.0 -24.2											
									29.0 -25.2											
									30.0 -26.2											
									31.0 -27.2											
									32.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435090.0 m	Start Date	19/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250122.8 m	End Date	21/4/2021	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	7.25 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH04**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
AD/T					2.50m SPT 3,6,7 N=13 (0.45m REC) 2.95m		2.80m PP>500kPa 2.90m PP>500kPa	Not Observed	0.0 *7.2*		CI	0.20 *7.05*	TOPSOIL Sandy CLAY: medium plasticity, dark brown, sand is fine to coarse grained; with fine to medium grained, sub-angular to sub-rounded gravel.	w<PL	St				TOPSOIL	BH04
	PW												Sandy CLAY: medium to high plasticity, dark brown, sand is fine to medium grained.						ALLUVIAL SOIL	1.0
					3.50m SPT 4,7,11 N=18 (0.45m REC) 3.95m		3.80m PP=410kPa 3.90m PP=400kPa		1.0 *6.2*		CI -CH									
									2.0 *5.2*						VSt					2.0
									3.0 *4.2*			3.10 *4.15*	Sandy CLAY: medium to high plasticity, brown mottled black, sand is fine to medium grained; with fine to coarse grained, sub-angular to sub-rounded gravel.	w≈PL						3.0
					4.50m SPT 6,8,12 N=20 (0.45m REC) 4.95m				4.0 *3.2*				4.20: Becoming red-brown and brown, mottled dark brown							4.0
WB											CI -CH									
					5.50m SPT 3,5,5 N=10 (0.45m REC) 5.95m		5.80m PP>500kPa 5.90m PP=310kPa		5.0 *2.2*											5.0
									6.0 *1.2*											6.0
					7.00m SPT HW/150mm,1,3 N=4 (0.45m REC) 7.45m		7.30m PP=180kPa 7.40m PP=110kPa		7.0 *0.2*		CI	6.90 *0.35*	CLAY: medium to high plasticity, dark grey to grey, trace fine grained sand.		S - F				MARINE SOIL 7.10: Water loss, case installation down to 6.8m	7.0
									8.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435090.0 m	Start Date	19/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250122.8 m	End Date	21/4/2021	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	7.25 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH04**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB				U90			9.10m PP=130-140kPa	Not Observed	8.0 -0.8		CI		CLAY: medium to high plasticity, dark grey to grey, trace fine grained sand. *(continued)*	w≈PL	S - F				MARINE SOIL	
					10.00m SPT HW/450mm (0.45m REC)		10.20m PP=60kPa 10.30m PP=50kPa		9.0 -1.8				10.00: Trace fine to medium grained sand							
					11.50m SPT HW/450mm (0.45m REC)		11.70m PP=50kPa 11.80m PP=30kPa		10.0 -2.8											
					13.00m SPT HW/450mm (0.45m REC)		13.30m PP=60kPa 13.40m PP=60kPa		11.0 -3.8			11.50 -4.25	CLAY: low to medium plasticity, dark grey to grey.	w>PL	S					
				U90					12.0 -4.8		CL -CI									
					16.00m				13.0 -5.8											
									14.0 -6.8											
									15.0 -7.8											
									16.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435090.0 m	Start Date	19/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250122.8 m	End Date	21/4/2021	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	7.25 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH04**

Depth (m) / Elevation	Graphic Log	USCS Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
16.0 -8.8			16.20	CLAY: low to medium plasticity, dark grey to grey. *(continued)*	w>PL	S				MARINE SOIL	
		CI		CLAY: medium plasticity, black to dark grey.							
		CI	-9.05	Sandy CLAY: medium plasticity, black to dark grey, sand is fine to coarse grained.							
				CLAY: medium plasticity, black to dark grey.							
17.0 -9.8		CI									
			17.70								
			-10.45	Clayey SAND: fine to coarse grained, grey to pale grey, clay is low plasticity; with fine grained, sub-angular to rounded gravel.	W	L				ELLIOT FORMATION	
18.0 -10.8		SC									
19.0 -11.8			19.30								
			-12.05	CLAY: medium to high plasticity, pale grey to pale red-brown.	w≈PL	VSt				RESIDUAL SOIL	
20.0 -12.8											
21.0 -13.8		CI -CH									
22.0 -14.8											
23.0 -15.8			23.50								
		SW	-16.35	Gravelly SAND: fine to coarse grained, grey to pale grey, gravel is fine to medium grained, sub-angular to sub-rounded; trace low plasticity clay.	W	VD				EXTREMELY WEATHERED MATERIAL	
24.0				CLAY: high plasticity, pale grey and mottled red-brown, (Extremely Weathered).							

Method: WB

Testing

Sampling	SPT (Recovered length)	DCP	PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow
	SPT HW/450mm (0.45m REC) 17.50m		16.20m PP=150kPa 16.40m PP=150kPa	Not Observed
	SPT 2,2,4 N=6 (0.45m REC) 19.00m			
	SPT 3,9,13 N=22 (0.45m REC) 19.45m		19.30m PP>500kPa 19.40m PP=450kPa	
	SPT 5,10,14 N=24 (0.45m REC) 20.95m		20.80m PP=150kPa 20.90m PP=150kPa	
	SPT 6,13,19 N=32 (0.45m REC) 22.45m		22.30m PP>500kPa 22.35m PP>500kPa	
	SPT 11,18,27 N=45 (0.45m REC) 23.95m			

Casing | Progress Water (Loss/Return) | Run (TCR) RQD

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435090.0 m	Start Date	19/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250122.8 m	End Date	21/4/2021	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	7.25 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH04**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					25.00m SPT 30/100mm HB N=R (0.10m REC) 25.10m			Not Observed	24.0 -16.8 25.0 -17.8			25.10	CLAY: high plasticity, pale grey and mottled red-brown, (Extremely Weathered). *(continued)*						EXTREMELY WEATHERED MATERIAL	25.1 25.0
									26.0 -18.8				Hole Terminated at 25.10 m Refusal							26.0
									27.0 -19.8											27.0
									28.0 -20.8											28.0
									29.0 -21.8											29.0
									30.0 -22.8											30.0
									31.0 -23.8											31.0
									32.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435062.0 m	Start Date	17/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250140.0 m	End Date	18/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	6.66 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH05**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
AD/T					0.50m SPT 4,4,4 N=8 (0.45m REC) 0.95m				0.0 *6.7*		SC	0.20 *6.46*	TOPSOIL Clayey SAND: fine to medium grained, dark brown, clay is low plasticity; trace fine to coarse grained, sub-angular to sub-rounded gravel.	D	L				TOPSOIL	
													Clayey SAND: fine to coarse grained, dark brown, clay is low plasticity.						ALLUVIAL SOIL	
					1.50m SPT 1,3,6 N=9 (0.45m REC) 1.95m				1.0 *5.7*		SC									1.0
					2.50m SPT 2,3,4 N=7 (0.45m REC) 2.95m				2.0 *4.7*			2.30 *4.36*	SAND: fine to coarse grained, brown, trace fine to coarse grained, sub-angular to sub-rounded gravel; trace low plasticity clay.							2.0
	PW								3.0 *3.7*		SW									3.0
					3.50m SPT 3,4,3 N=7 (0.45m REC) 3.95m							3.50 *3.16*	Clayey SAND: fine to coarse grained, brown, clay is low plasticity.							
					4.40m SPT 2,3,3 N=6 (0.45m REC) 4.85m				4.0 *2.7*		SC									4.0
					5.50m SPT 1,1,1 N=2 (0.45m REC) 5.95m		5.60m PP=90-100kPa		5.0 *1.7*		CL -CI	5.50 *1.06*	Sandy CLAY: low to medium plasticity, brown to dark brown, sand is fine to coarse grained.	w>PL	S					5.0
WB													CLAY: medium to high plasticity, brown to dark brown, with fine to medium grained sand.							
									6.0 *0.7*		CI -CH									6.0
					7.00m SPT HW/450mm (0.45m REC)		7.20m PP=30kPa 7.45m PP=40kPa		7.0 *-0.3*		CI -CH	7.00 *-0.34*	CLAY: medium to high plasticity, dark grey, trace fine grained sand.						MARINE SOIL	7.0
									8.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435062.0 m	Start Date	17/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250140.0 m	End Date	18/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	6.66 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
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Borehole Identifier: **BH05**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB				U90			9.10m PP=100-110kPa	Not Observed	8.0 -1.3				CLAY: medium to high plasticity, dark grey, trace fine grained sand. *(continued)*	w>PL	S				MARINE SOIL	
					10.00m SPT HW/450mm (0.45m REC)		10.30m PP=60kPa 10.45m PP=90kPa		9.0 -2.3		CI -CH									9.0
									10.0 -3.3		CI -CH	10.20	Sandy CLAY: medium to high plasticity, dark grey, sand is fine to coarse grained.							10.0
												-3.64	CLAY: medium to high plasticity, dark grey.							
					11.50m SPT HW/450mm (0.45m REC)		11.30m PP=60kPa 11.40m PP=90kPa		11.0 -4.3		CI -CH									11.0
									12.0 -5.3											12.0
					13.00m				13.0 -6.3			13.00 -6.34	CLAY: medium to high plasticity, dark brown and dark grey, trace fine grained sand.	w≈PL						13.0
					SPT HW/300mm,1 N=1 (0.45m REC) 13.45m		13.30m PP=100kPa 13.40m PP=110kPa		14.0 -7.3		CI -CH									14.0
				U90			15.50m PP=90-110kPa		15.0 -8.3											15.0
					16.00m				16.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435062.0 m	Start Date	17/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250140.0 m	End Date	18/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	6.66 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH05**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					SPT HW/450mm (0.45m REC)		16.20m PP=100kPa 16.45m PP=110kPa	Not Observed	16.0 -9.3		CI -CH	16.20 -9.54	CLAY: medium to high plasticity, dark brown and dark grey, trace fine grained sand. *(continued)*	w≈PL	S				MARINE SOIL	
					17.50m SPT 10,10,8 N=18 (0.45m REC) 17.95m								CLAY: medium to high plasticity, dark grey and grey, with fine to medium grained sand.							
									17.0 -10.3			17.10 -10.44	Gravelly SAND: fine to coarse grained, grey and pale grey, gravel is fine to coarse grained sub-angular to sub-rounded; trace low plasticity clay.	M	MD				ELLIOT FORMATION	17.0
					19.00m SPT 2,5,1 N=6 (0.45m REC) 19.45m				18.0 -11.3		SW									18.0
									19.0 -12.3			19.20								19.0
											CI	19.40 -12.74	Sandy CLAY: medium plasticity, grey, sand is fine to coarse grained; with fine to coarse grained sub-angular to sub-rounded gravel.	w≈PL	F					
													Sandy GRAVEL: fine to coarse grained, sub-angular to sub-rounded, brown and grey, sand is fine to coarse grained; with low plasticity clay.	M	L - MD					
					20.50m SPT 7,13,17 N=30 (0.45m REC) 20.95m		20.10m PP>500kPa 20.80m PP>500kPa		20.0 -13.3		GW	20.60 -13.94	CLAY: high plasticity, pale brown and grey.	w≈PL	H				RESIDUAL SOIL	20.0
									21.0 -14.3		CH									21.0
					22.00m SPT 9,16,21 N=37 (0.45m REC) 22.45m		22.30m PP=300kPa 22.45m PP>500kPa		22.0 -15.3		GW	22.00 22.20 -15.54	Sandy GRAVEL: fine to coarse grained, sub-angular to sub-rounded, grey, sand is fine to coarse grained.	M	D					22.0
													CLAY: high plasticity, orange-brown and pale grey, with fine grained sand.	w≈PL	H					
									23.0 -16.3		CH									23.0
					23.50m SPT 11,18,26 N=44 (0.45m REC) 23.95m		23.80m PP>500kPa				GW	23.50 -16.94	Sandy GRAVEL: fine to coarse grained, sub-angular to sub-rounded, grey, sand is fine to coarse grained.	M	D					
									24.0		CH		CLAY: high plasticity, orange-brown and grey, trace fine grained sand.	w≈PL	H					

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435062.0 m	Start Date	17/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250140.0 m	End Date	18/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	6.66 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
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Borehole Identifier: **BH05**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB							23.90m PP>500kPa	Not Observed	24.0 -17.3		CH	24.70 -18.04	CLAY: high plasticity, orange-brown and grey, trace fine grained sand. *(continued)*	w≈PL	H				RESIDUAL SOIL	
RR					25.00m SPT HB N=R (0.10m REC) 25.10m				25.0 -18.3			25.10	CLAY: medium to high plasticity, orange-brown and grey, trace fine grained sand; (Extremely Weathered).						EXTREMELY WEATHERED MATERIAL	25.0
													Hole Terminated at 25.10 m Refusal							
									26.0 -19.3											26.0
									27.0 -20.3											27.0
									28.0 -21.3											28.0
									29.0 -22.3											29.0
									30.0 -23.3											30.0
									31.0 -24.3											31.0
									32.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435707.9 m	Start Date	29/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250276.3 m	End Date	29/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	8.98 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH06**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) Elevation	Graphic Log	USCS Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
AD/T					0.50m SPT 1,2,3 N=5 (0.45m REC) 0.95m		0.70m PP=200kPa 0.80m PP=210kPa	Not Observed	0.0 9.0		CI -CH	0.20 8.78	TOPSOIL Sandy CLAY: medium to high plasticity, dark brown, sand is fine to medium grained; trace rootlets.	w≈PL	F				TOPSOIL ALLUVIAL SOIL	
	PW				1.50m SPT HB N=R (0.10m REC) 1.60m		1.50m PP=250kPa 1.51m PP>500kPa		1.0 8.0		CI -CH		Sandy CLAY: medium to high plasticity, dark brown to brown, sand is fine to coarse grained. 1.50: Colour changes to pale grey							1.0
					2.50m SPT 30/100mm N=R (0.10m REC) 2.60m		2.70m PP>400kPa 2.80m PP>500kPa				SC	1.70 7.18	Clayey SAND: fine to coarse grained, grey to pale grey, clay is low plasticity. Sandy CLAY: medium plasticity, pale grey and brown, sand is fine to medium grained; (Extremely Weathered).	M	VD				EXTREMELY WEATHERED MATERIAL	
					4.00m SPT 10,30/140mm N=R (0.29m REC) 4.29m		4.30m PP>500kPa 4.40m PP>500kPa		2.0 7.0											2.0
									3.0 6.0											3.0
									4.0 5.0											4.0
WB									5.0 4.0			5.50 3.48	Sandy CLAY: high plasticity, dark brown to brown, sand is fine to coarse grained; trace fine to coarse grained, sub-angular to sub-rounded gravel; (Extremely Weathered).							5.0
					5.50m SPT 14,20,30/130mm N=R (0.43m REC) 5.93m		5.60m PP>500kPa 5.70m PP>500kPa														6.0
					7.00m SPT 14,23,30 N=53 (0.45m REC) 7.45m				7.0 2.0											7.0
									8.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435707.9 m	Start Date	29/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250276.3 m	End Date	29/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	8.98 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH06**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					8.50m SPT 17,30/110mm N=R (0.26m REC) 8.76m			Not Observed	8.0 *1.0*				Sandy CLAY: high plasticity, dark brown to brown, sand is fine to coarse grained; trace fine to coarse grained, sub-angular to sub-rounded gravel; (Extremely Weathered). *(continued)*						EXTREMELY WEATHERED MATERIAL	
												8.75 *0.23*	Sandy CLAY: medium plasticity, dark grey to red-brown, sand is fine to medium grained; low strength; (Extremely Weathered).							
					10.00m SPT 30/80mm N=R (0.08m REC) 10.08m				9.0 *0.0*											9.0
									10.0 *-1.0*			10.00 *-1.12*	Clayey GRAVEL: fine to coarse grained, sub-angular to sub-rounded, grey to pale grey, clay is low plasticity; with fine to coarse grained sand; (Extremely Weathered).							10.0
													Sandy CLAY: medium plasticity, (Extremely Weathered).							
									11.0 *-2.0*											11.0
									12.0 *-3.0*											12.0
									13.0 *-4.0*											13.0
									14.0 *-5.0*			14.00 *-5.02*	Sandy CLAY: medium plasticity, pale brown and pale grey, sand is medium grained.	w≈PL	F				RESIDUAL SOIL	14.0
					15.00m SPT 2,2,3 N=5 (0.45m REC) 15.45m		15.30m PP=60kPa 15.40m PP=70kPa		15.0 *-6.0*		CI									15.0
									16.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435707.9 m	Start Date	29/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250276.3 m	End Date	29/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	8.98 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH06**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					16.50m SPT 2,3,6 N=9 (0.45m REC) 16.95m		16.70m PP=200kPa 16.80m PP=200kPa	Not Observed	16.0 -7.0		CI -CH	-7.02	CLAY: medium to high plasticity, pale grey and red-brown, trace fine grained sand.	w≈PL	St				RESIDUAL SOIL	
												16.95	Hole Terminated at 16.95 m Target Depth							
									17.0 -8.0											17.0
									18.0 -9.0											18.0
									19.0 -10.0											19.0
									20.0 -11.0											20.0
									21.0 -12.0											21.0
									22.0 -13.0											22.0
									23.0 -14.0											23.0
									24.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435855.2 m	Start Date	26/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250566.6 m	End Date	26/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	5.70 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH08**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
AD/T					0.50m SPT 1,3,1 N=4 (0.45m REC) 0.95m				0.0 *5.7*		CL -Cl	*5.70*	FILL Sandy CLAY: low to medium plasticity, dark brown, grey and pale grey, sand is fine to coarse grained; with fine to medium grained, sub-angular to sub-rounded gravel.	w<PL					FILL	BH08
	PW				1.50m SPT 2,4,3 N=7 (0.45m REC) 1.95m		1.95m PP>500kPa		1.0 *4.7*			1.60								1.0
					2.50m SPT 1,3,4 N=7 (0.45m REC) 2.95m		2.70m PP=140kPa 2.80m PP=180kPa		2.0 *3.7*		SP	*4.00*	FILL Gravelly SAND: fine to coarse grained, grey and dark brown, gravel is fine to coarse grained, sub-angular to sub-rounded.	D					ALLUVIAL SOIL	2.0
											CI		Sandy CLAY: medium plasticity, brown mottled white, sand is fine to medium grained.	w<PL	F - St					
					3.50m SPT 3,4,5 N=9 (0.45m REC) 3.95m		3.70m PP=300kPa 3.80m PP=300kPa		3.0 *2.7*		CI -CH	2.50 *3.20*	CLAY: medium to high plasticity, dark brown, with fine to medium grained sand.							3.0
					4.50m SPT 1,1,1 N=2 (0.45m REC) 4.95m		4.70m PP=150kPa 4.80m PP=140kPa		4.0 *1.7*		CH	3.50 *2.20*	CLAY: high plasticity, dark brown and dark grey, with fine to medium grained sand.	w≈PL	St					4.0
	HQ			U90				Not Observed				4.60 *1.10*	CLAY: medium plasticity, grey and dark grey, trace fine grained sand.		VS - S				MARINE SOIL	5.0
WB					7.00m SPT HW/450mm (0.45m REC)		6.00m PP=90kPa 7.30m PP=90kPa 7.40m PP=80kPa		5.0 *0.7* 6.0 *-0.3* 7.0 *-1.3* 8.0		CI									6.0 7.0

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435855.2 m	Start Date	26/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250566.6 m	End Date	26/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	5.70 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

Member of the Surbana Jurong Group

Borehole Identifier: **BH08**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB	HQ				8.50m SPT HW/450mm (0.45m REC)		8.80m PP=110kPa 8.90m PP=110kPa	Not Observed	8.0 -2.3				CLAY: medium plasticity, grey and dark grey, trace fine grained sand. *(continued)*	w≈PL	VS - S				MARINE SOIL	
				U90			10.50m PP=430-450kPa		9.0 -3.3				8.50: Trace fine to medium grained sand							
					11.50m SPT 1,3,7 N=10 (0.45m REC) 11.95m				10.0 -4.3											
					13.00m SPT 1,2,2 N=4 (0.45m REC) 13.45m				11.0 -5.3		CI	11.30 -5.60	CLAY: medium to high plasticity, grey to pale grey, with fine to medium grained sand.		St				ELLIOT FORMATION	
					14.50m SPT 4,5,4 N=9 (0.45m REC) 14.95m				12.0 -6.3		CI -CH	11.95 12.10 -6.40	Sandy CLAY: medium to high plasticity, red-brown, sand is fine to coarse grained; trace fine to coarse grained gravel; (Extremely Weathered).	W	L				EXTREMELY WEATHERED MATERIAL ELLIOT FORMATION	
					16.00m				13.0 -7.3		SC		Clayey SAND: fine to coarse grained, pale grey, clay is low to medium plasticity; trace fine to medium grained, sub-rounded gravel.							
									14.0 -8.3		CI -CH	14.80 -9.20	Sandy CLAY: medium to high plasticity, pale brown, sand is fine to medium grained; (Extremely Weathered).	W	MD				EXTREMELY WEATHERED MATERIAL ELLIOT FORMATION	
									15.0 -9.3		SC		Clayey SAND: medium to coarse grained, pale brown and pale grey, with fine to medium grained, sub-rounded gravel.							
									16.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435855.2 m	Start Date	26/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250566.6 m	End Date	26/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	5.70 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH08**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB	HQ				SPT 2,3,3 N=6 (0.45m REC) 16.45m			Not Observed	16.0 -10.3		SC	17.20 -11.50	Clayey SAND: medium to coarse grained, pale brown and pale grey, with fine to medium grained, sub-rounded gravel. *(continued)*	W	MD				ELLIOT FORMATION	
					17.50m SPT 2,3,3 N=6 (0.45m REC) 17.95m		18.00m PP>500kPa		17.0 -11.3				Gravelly SAND: fine to coarse grained, pale grey and pale brown, gravel is fine to coarse grained, sub-angular to sub-rounded; with low plasticity clay.							
					19.00m SPT 2,4,3 N=7 (0.45m REC) 19.45m				18.0 -12.3		SP									
									19.0 -13.3			19.20 -13.50	Clayey SAND: fine to coarse grained, pale brown and pale grey, clay is low to medium plasticity; trace fine to medium grained, sub-angular to sub-rounded gravel. 19.60: Possible boulder							
					22.00m SPT 4,10,13 N=23 (0.45m REC) 22.45m		22.30m PP>500kPa 22.40m PP>500kPa		20.0 -14.3		SC									
												20.50 -14.80	Sandy GRAVEL: fine to coarse grained, sub-angular to sub-rounded, sand is fine to coarse grained; with medium plasticity clay.							
									21.0 -15.3		GP									
					23.50m SPT 5,9,13 N=22 (0.45m REC) 23.95m		23.70m PP=420kPa 23.80m		22.0 -16.3			22.10 -16.40	CLAY: high plasticity, pale grey.	w<PL	VSt				RESIDUAL SOIL	
									23.0 -17.3		CH			w≈PL						
									24.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435855.2 m	Start Date	26/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250566.6 m	End Date	26/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	5.70 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH08**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					25.00m SPT 6,10,14 N=24 (0.45m REC) 25.45m 26.50m SPT 6,10,13 N=23 (0.45m REC) 26.95m 28.00m SPT 6,10,13 N=23 (0.45m REC) 28.45m 29.50m SPT 6,10,13 N=23 (0.45m REC) 29.95m		PP=480kPa 25.30m PP=480kPa 25.40m PP=480kPa 26.70m PP>500kPa 26.80m PP>500kPa 28.30m PP>500kPa 28.40m PP>500kPa 29.70m PP=480kPa 29.80m PP>500kPa	Not Observed	24.0 *-18.3* 25.0 *-19.3* 26.0 *-20.3* 27.0 *-21.3* 28.0 *-22.3* 29.0 *-23.3* 30.0 *-24.3* 31.0 *-25.3* 32.0		CH	29.95	CLAY: high plasticity, pale grey. *(continued)* 28.00: Colour changes to red-brown and pale grey Hole Terminated at 29.95 m Target Depth	w≈PL	VSt				RESIDUAL SOIL	25.0 26.0 27.0 28.0 29.0 30.0 31.0

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Project	Bundaberg East Levee	East	435793.4 m	Start Date	23/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250637.0 m	End Date	23/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	5.81 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH09**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
AD/T					0.50m SPT 4,6,8 N=14 (0.45m REC) 0.95m		0.80m PP>500kPa 0.90m PP>500kPa		0.0 *5.8*		CL	*5.81* 1.20	FILL Sandy CLAY: low plasticity, dark brown, sand is fine to coarse grained; with fine to coarse grained, sub-angular to sub-rounded gravel.	w<PL					FILL	
	PW				1.50m SPT 3,5,7 N=12 (0.45m REC) 1.95m		1.80m PP=450kPa 1.90m PP>500kPa		1.0 *4.8*			*4.61*	FILL Sandy CLAY: medium to high plasticity, dark brown mottled red-brown, sand is fine to medium grained; with fine to medium grained, sub-angular to sub-rounded gravel.							
					2.50m SPT 1,7,9 N=16 (0.45m REC) 2.95m		2.70m PP>500kPa 2.80m PP>500kPa		2.0 *3.8*		CI -CH									
					3.50m SPT 5,8,12 N=20 (0.45m REC) 3.95m				3.0 *2.8*				3.00: Possible boulder							
					4.50m SPT 2,2,3 N=5 (0.45m REC) 4.95m		4.70m PP=200kPa 4.80m PP=250kPa		4.0 *1.8*		CH	3.50 *2.31*	CLAY: high plasticity, brown mottled dark brown, with fine to medium grained sand.	w≈PL	VSt				ALLUVIAL SOIL	
					5.50m SPT HW/150mm,1,2 N=3 (0.45m REC) 5.95m		5.70m PP=150kPa 5.80m PP=170kPa		5.0 *0.8*		CI -CH	4.50 *1.31*	CLAY: medium to high plasticity, grey and red-brown, with fine grained sand.		F					
					7.00m SPT HW/300mm,1 N=1 (0.45m REC) 7.45m		7.30m PP=60kPa 7.40m PP=60kPa 7.70m PP>500kPa 7.80m	Not Observed	6.0 *-0.2*		CL -CI	5.30 *0.51*	CLAY: low to medium plasticity, dark grey to grey.		VS - S				MARINE SOIL	
WB									7.0 *-1.2*		CI	7.00 *-1.19*	Sandy CLAY: medium plasticity, dark brown, sand is fine grained.	w>PL	VS					
									8.0											

Observations and Comments

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435793.4 m	Start Date	23/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250637.0 m	End Date	23/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	5.81 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH09**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) Elevation	Graphic Log	USCS Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					8.50m SPT 16,13,10 N=23 (0.45m REC) 8.95m 10.00m SPT 1,1,2 N=3 (0.45m REC) 10.45m 11.50m SPT 1,2,3 N=5 (0.45m REC) 11.95m 13.00m SPT 4,7,11 N=18 (0.45m REC) 13.45m 14.50m SPT 3,5,6 N=11 (0.45m REC) 14.95m 16.00m		PP>500kPa	Not Observed	8.0 -2.2 9.0 -3.2 10.0 -4.2 11.0 -5.2 12.0 -6.2 13.0 -7.2 14.0 -8.2 15.0 -9.2 16.0		CI SP SC GP SC	8.50 -2.69 10.00 -4.19 13.20 -7.39 14.60 -8.79	Sandy CLAY: medium plasticity, dark brown, sand is fine grained. *(continued)* Gravelly SAND: fine to coarse grained, grey to pale grey, gravel is fine to medium grained, sub-angular to sub-rounded; with medium plasticity clay. Clayey SAND: medium to coarse grained, pale grey, clay is low plasticity; trace fine to medium grained, sub-angular to sub-rounded gravel. Sandy GRAVEL: fine to coarse grained, sub-angular to sub-rounded, pale grey and pale red brown, sand is fine to coarse grained; with low plasticity clay. Clayey SAND: fine to coarse grained, pale grey and red-brown, clay is low to medium plasticity; trace fine to coarse grained, sub-angular to sub-rounded gravel.	w>PL W	VS D VL - L MD - D MD				MARINE SOIL ELLIOT FORMATION	9.0 10.0 11.0 12.0 13.0 14.0 15.0

Observations and Comments

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Project	Bundaberg East Levee	East	435793.4 m	Start Date	23/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250637.0 m	End Date	23/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	5.81 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH09**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					SPT 1,2,1 N=3 (0.45m REC) 16.45m			Not Observed	16.0 -10.2		GP	16.20 -10.39	Sandy GRAVEL: fine to coarse grained, pale grey, red-brown, sand is fine to coarse grained; with low plasticity clay.	W	L				ELLIOT FORMATION	
											SC		Clayey SAND: fine to coarse grained, pale grey and red-brown, clay is low to medium plasticity; trace fine to medium grained, sub-angular to sub-rounded gravel.		MD					
					17.50m SPT 2,5,7 N=12 (0.45m REC) 17.95m				17.0 -11.2											17.0
											GP	17.50 -11.79	Sandy GRAVEL: fine to coarse grained, sub-angular to sub-rounded, pale grey, sand is fine to coarse grained; with low plasticity clay.							
											SC		Clayey SAND: fine to coarse grained, red-brown and brown, clay is low to medium plasticity; trace fine to coarse grained, sub-angular to sub-rounded gravel.							
					19.00m SPT 3,2,16 N=18 (0.00m REC) 19.45m				18.0 -12.2											18.0
RR									19.0 -13.2			19.95	Hole Terminated at 19.95 m Target Depth							19.0
									20.0 -14.2											20.0
									21.0 -15.2											21.0
									22.0 -16.2											22.0
									23.0 -17.2											23.0
									24.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Geological & Engineering Log

Project	Bundaberg East Levee	East	435797.5 m	Start Date	24/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250732.5 m	End Date	24/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	8.15 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH10**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) Elevation	Graphic Log	USCS Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
AD/T				0.50m SPT 3,3,3 N=6 (0.45m REC) 0.95m				0.0 8.2			8.15	FILL Sandy CLAY: low plasticity, dark brown mottled white and pale grey, sand is fine to medium grained; with fine to medium grained, sub-rounded gravel.	w<PL					FILL	
				1.50m SPT 1,2,8 N=10 (0.45m REC) 1.95m				1.0 7.2		CL	1.30								1.0
	PW			2.50m SPT 1,3,4 N=7 (0.45m REC) 2.95m				2.0 6.2		SC	6.85	FILL Clayey SAND: fine to coarse grained, grey and dark grey, clay is low plasticity; with fine to coarse grained, sub-angular to sub-rounded gravel.	D W					2.50: Losing water	2.0
				3.50m SPT 24,2,HB N=R (0.45m REC) 3.95m				3.0 5.2				3.50: Possible boulder							3.0
				4.50m SPT 23,30/20mm HB N=R (0.17m REC) 4.67m				4.0 4.2			4.50							3.80: Casing reinstalled to 3.8m 4.00: Changed to PCD bit due to progress	4.0
WB				5.50m SPT 2,3,1 N=4 (0.45m REC) 5.95m			5.70m PP=300kPa 5.80m PP=350kPa	5.0 3.2		CI	3.65	Sandy CLAY: medium plasticity, brown to dark brown, sand is fine to coarse grained; with fine to medium grained, sub-angular to sub-rounded gravel.	w≈PL	H				ALLUVIAL SOIL	5.0
				7.00m SPT 1,2,4 N=6 (0.45m REC) 7.45m			7.30m PP=200kPa 7.40m PP=210kPa	6.0 2.2		CI -CH	5.50 2.65	CLAY: medium to high plasticity, grey and red-brown, with fine to medium grained sand.		S					6.0
								7.0 1.2		CI -CH	7.00 1.15	CLAY: medium to high plasticity, grey, pale orange-brown.		F					7.0
								8.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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Project	Bundaberg East Levee	East	435797.5 m	Start Date	24/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250732.5 m	End Date	24/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	8.15 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH10**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					8.50m SPT 3,8,10 N=18 (0.45m REC) 8.95m		8.70m PP=410kPa 8.80m PP=400kPa	Not Observed	8.0 *0.2*				CLAY: medium to high plasticity, grey, pale orange-brown. *(continued)*	w≈PL	F				ALLUVIAL SOIL	
					10.00m SPT 7,10,16 N=26 (0.45m REC) 10.45m		10.30m PP>500kPa 10.40m PP>500kPa		9.0 *-0.8*		CI -CH		8.50: Colour changes to brown, red-brown and grey		VSt					9.0
					11.50m SPT 7,8,8 N=16 (0.45m REC) 11.95m		11.60m PP>500kPa 11.80m PP=200kPa		10.0 *-1.8*			10.00 *-1.85*	CLAY: low to medium plasticity, brown and grey, with fine to medium grained sand.	w<PL						10.0
					13.00m SPT 2,2,5 N=7 (0.45m REC) 13.45m		13.30m PP=250kPa 13.40m PP=250kPa		11.0 *-2.8*		CL -CI									11.0
					14.50m SPT 6,6,5 N=11 (0.00m REC) 14.95m				12.0 *-3.8*			11.50 *-3.35*	Sandy CLAY: medium plasticity, grey to pale grey and brown, sand is fine to medium grained.	w≈PL						12.0
					16.00m				13.0 *-4.8*		CI				St					13.0
									14.0 *-5.8*			14.50 *-6.35*	Clayey SAND: fine to coarse grained, pale brown and pale grey, clay is low plasticity; with fine to medium grained, sub-angular to sub-rounded gravel.	W	MD				ELLIOT FORMATION	14.0
									15.0 *-6.8*		SC									15.0
									16.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

Logged By	CP	Date 24/4/2024
Approved By	JY	Date 17/5/2024
Status	2	Page2 of 3

Geological & Engineering Log

Project	Bundaberg East Levee	East	435797.5 m	Start Date	24/4/2024	Contractor	DTMR	Inclination	-90°
Client	Department of Housing QLD	North	7250732.5 m	End Date	24/4/2024	Rig Type	Comacchio Geo 405	Azimuth	
Site	Bundaberg	Elevation	8.15 m			Mounting	Track	North	
Job No	30034151	Datum	MGA2020-56/AHD					Survey	

SMEC
Member of the Surbana Jurong Group

Borehole Identifier: **BH10**

Method	Casing	Progress Water (Loss/Return)	Run (TCR) RQD	Sampling	Testing: SPT (Recovered length)	Testing: DCP	Testing: PP (kPa) VS (kPa) (P/R uncorrected) PID (ppm)	Water Level & Inflow	Depth (m) *Elevation*	Graphic Log	USCS Code	Depth *RL*	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Origin, Geology Unit, Other Testing & General Observations	Installation
WB					SPT 3,4,4 N=8 (0.45m REC) 16.45m			Not Observed	16.0 -7.8		SC		Clayey SAND: fine to coarse grained, pale brown and pale grey, clay is low plasticity; with fine to medium grained, sub-angular to sub-rounded gravel. *(continued)*	W	MD				ELLIOT FORMATION	
					17.50m SPT 4,4,2 N=6 (0.45m REC) 17.95m				17.0 -8.8			17.50 -9.35	Gravelly SAND: fine to coarse grained, pale grey and pale brown, gravel is fine to coarse grained, sub-angular to sub-rounded; with low plasticity clay.		L - MD					
					19.50m SPT 8,7,6 N=13 (0.00m REC) 19.95m				18.0 -9.8		SP									
									19.0 -10.8			19.95	Hole Terminated at 19.95 m Target Depth							
									20.0 -11.8											
									21.0 -12.8											
									22.0 -13.8											
									23.0 -14.8											
									24.0											

Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted. Lugeon: BS5930:1999 Defect Log Abridged. Additional detail in digital dataset. For Vertical Holes: Angles reported in defects are relative to core normal. For Inclined Holes: Angles reported in defects are measured relative to core axis. Where beta angles are indicated, orientation of the core has been performed. Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

Logged By	CP	Date 24/4/2024
Approved By	JY	Date 17/5/2024
Status	2	Page3 of 3

Appendix C **SPT Photographs**

Photo 1: BH01 SPT01

Photo 2: BH01 SPT02

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **1 of 74**

Photo 3: BH01 SPT03

Photo 4: BH01 SPT04

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **2 of 74**

Photo 5: BH01 SPT05

Photo 6: BH01 SPT06

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **3 of 74**

Photo 7: BH01 U01

Photo 8: BH01 SPT07

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **4 of 74**

Photo 9: BH01 SPT08

Photo 10: BH01 SPT09

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **5 of 74**

Photo 11: BH01 SPT10

Photo 12: BH01 SPT11

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **6 of 74**

Photo 13: BH01 SPT12

Photo 14: BH01 SPT13

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **7 of 74**

Photo 15: BH01 SPT14

Photo 16: BH01 SPT15

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **8 of 74**

Photo 17: BH02 SPT01

Photo 18: BH02 SPT02

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **9 of 74**

Photo 19: BH02 SPT03

Photo 20: BH02 SPT04

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **10 of 74**

Photo 21: BH02 U01

Photo 22: BH02 SPT05

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **11 of 74**

Photo 23: BH02 SPT06

Photo 2: 4BH02 SPT07

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **12 of 74**

Photo 25: BH02 SPT08

Photo 26: BH02 SPT09

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	DHLGPPW
Taken By:	CP		Project:	Bundaberg East Levee
Checked By:	BY		Title:	Site Photographs
			Project No: 30034151	Page: 13 of 74

Photo 27: BH02 SPT10

Photo 28: BH02 SPT11

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **14 of 74**

Photo 29: BH02 SPT12

Photo 30: BH02 SPT13

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **15 of 74**

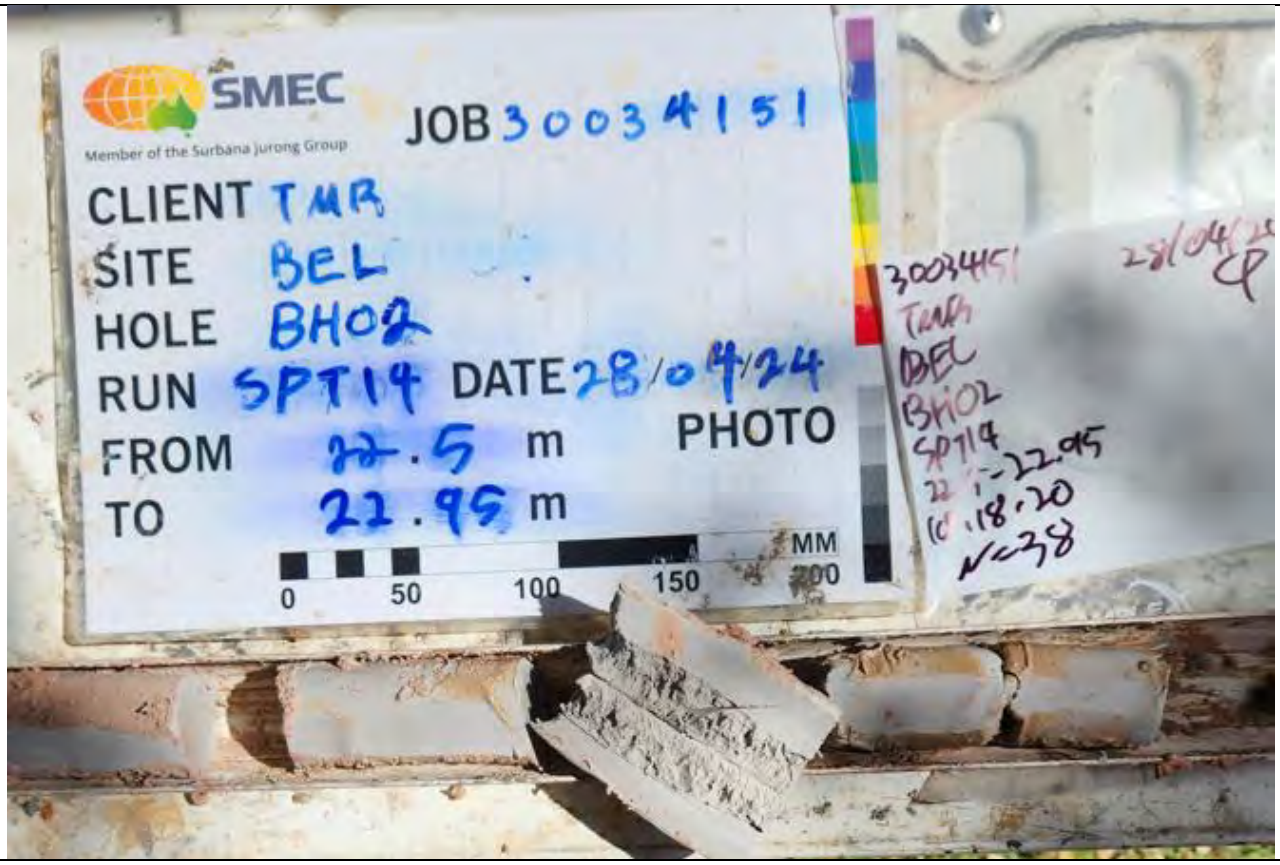

Photo 31: BH02 SPT14

Photo 32: BH02 SPT15

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **16 of 74**

Photo 33: BH02 SPT16

Photo 34: BH02 SPT17

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **17 of 74**

Photo 35: BH02 SPT18

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **18 of 74**

Photo 36: BH03 SPT01

Photo 37: BH03 SPT02

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **19 of 74**

Photo 38: BH03 SPT03

Photo 39: BH03 SPT04

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **20 of 74**

Photo 40: BH03 SPT05

Photo 41: BH03 SPT06

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	DHLGPPW
Taken By:	CP		Project:	Bundaberg East Levee
Checked By:	BY		Title:	Site Photographs
			Project No: 30034151	Page: 21 of 74

Photo 42: BH03 SPT07

Photo 43: BH03 SPT08

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **22 of 74**

Photo 44: BH03 SPT09

Photo 45: BH03 SPT10

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **23 of 74**

Photo 46: BH03 SPT11

Photo 47: B BH03 SPT12

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **24 of 74**

Photo 48: BH03 SPT13

Photo 49: BH03 SPT14

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **25 of 74**

Photo 50: BH03 SPT15

Photo 51: BH03 SPT16

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **26 of 74**

Photo 52: BH04 SPT01

Photo 53: BH04 SPT02

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **27 of 74**

Photo 54: BH04 SPT03

Photo 55: BH04 SPT04

Date Taken:	-		Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **28 of 74**

Photo 56: BH04 SPT05

Photo 57: BH04 U01

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **29 of 74**

Photo 58: BH04 SPT06

Photo 59: BH04 SPT07

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **30 of 74**

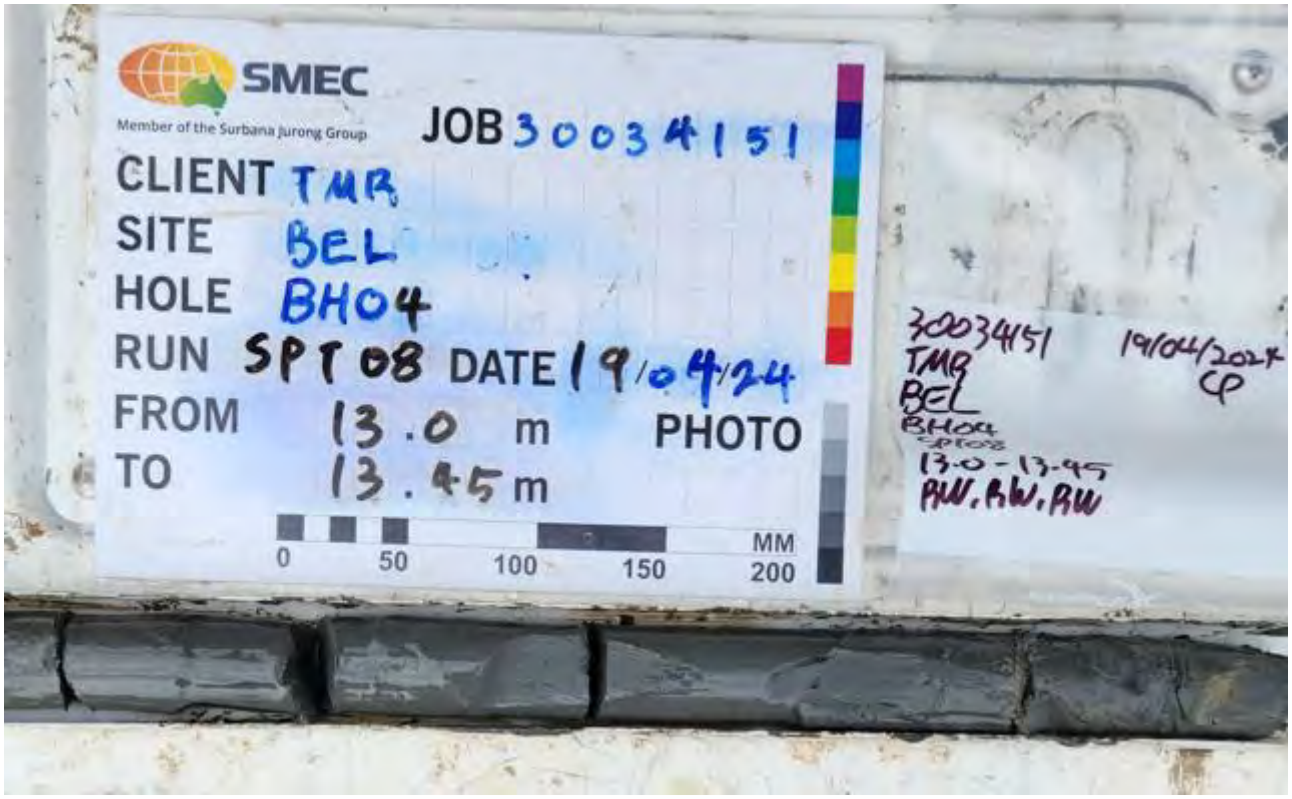

Photo 60: BH04 SPT08

Photo 61: BH04 U02

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **31 of 74**

Photo 62: BH04 SPT09

Photo 63: BH04 SPT10

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **32 of 74**

Photo 64: BH04 SPT11

Photo 65: BH04 SPT12

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **33 of 74**

Photo 66: BH04 SPT13

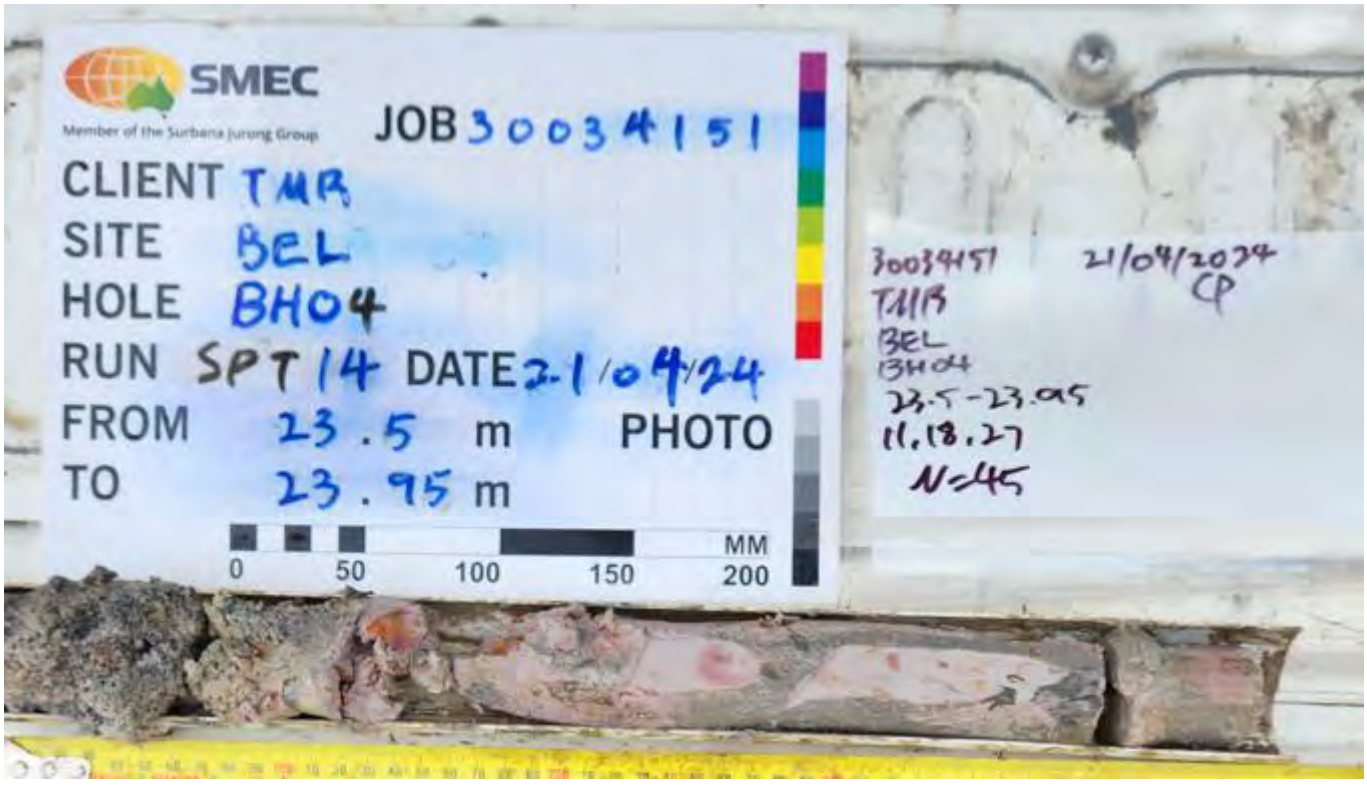

Photo 67: BH04 SPT14

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **34 of 74**

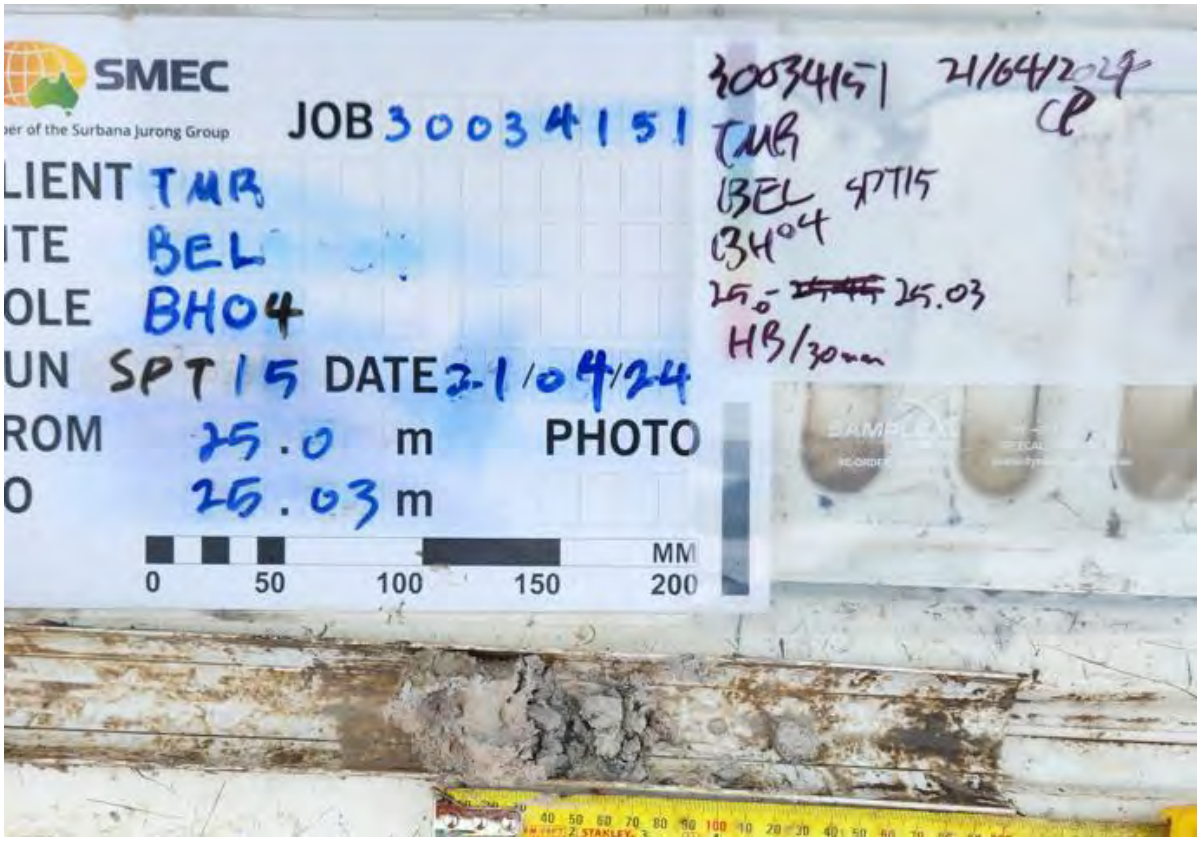

Photo 68: BH04 SPT15

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **35 of 74**

Photo 69: BH05 SPT01

Photo 70: BH05 SPT02

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **36 of 74**

Photo 71: BH05 SPT03

Photo 72: BH05 SPT04

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **37 of 74**

Photo 73: BH05 SPT05

Photo 74: BH05 SPT06

Date Taken:	-		Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **38 of 74**

Photo 75: BH05 SPT07

Photo 76: BH05 U01

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **39 of 74**

Photo 77: BH05 SPT08

Photo 78: BH05 SPT09

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **40 of 74**

Photo 79: BH05 SPT10

Photo 80: BH05 U02

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **41 of 74**

Photo 81: BH05 SPT11

Photo 82: BH05 SPT12

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **42 of 74**

Photo 83: BH05 SPT1013

Photo 84: BH05 SPT14

Date Taken:	-		Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **43 of 74**

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Photo 85: BH05 SPT15

Photo 86: BH05 SPT16

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **44 of 74**

Photo 87: BH06 SPT01

Photo 88: BH06 SPT02

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **45 of 74**

Photo 89: BH06 SPT03

Photo 90: BH06 SPT04

Date Taken:	-		Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **46 of 74**

SMEC
Member of the Surbana Jurong Group

Photo 91: BH06 SPT06

Photo 92: BH06 SPT06

Date Taken:	-		Client:	**DHLGPPW**
Taken By:	**CP**	SMEC Member of the Surbana Jurong Group	Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **47 of 74**

Photo 93: BH06 SPT07

Photo 94: BH06 SPT08

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **48 of 74**

Photo 95: BH06 SPT09

Photo 96: BH06 SPT10

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **49 of 74**

Photo 97: BH08 SPT01

Photo 98: BH08 SPT03

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **50 of 74**

Photo 99: BH08 SPT4

Photo 100: BH08 SPT05

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **51 of 74**

Photo 101: BH08 U01

Photo 102: BH08 SPT06

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **52 of 74**

Photo 103: BH08 SPT07

Photo 104: BH08 U02

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **53 of 74**

Photo 105: BH08 SPT08

Photo 106: BH08 SPT09

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **54 of 74**

Photo 107: BH08 SPT10

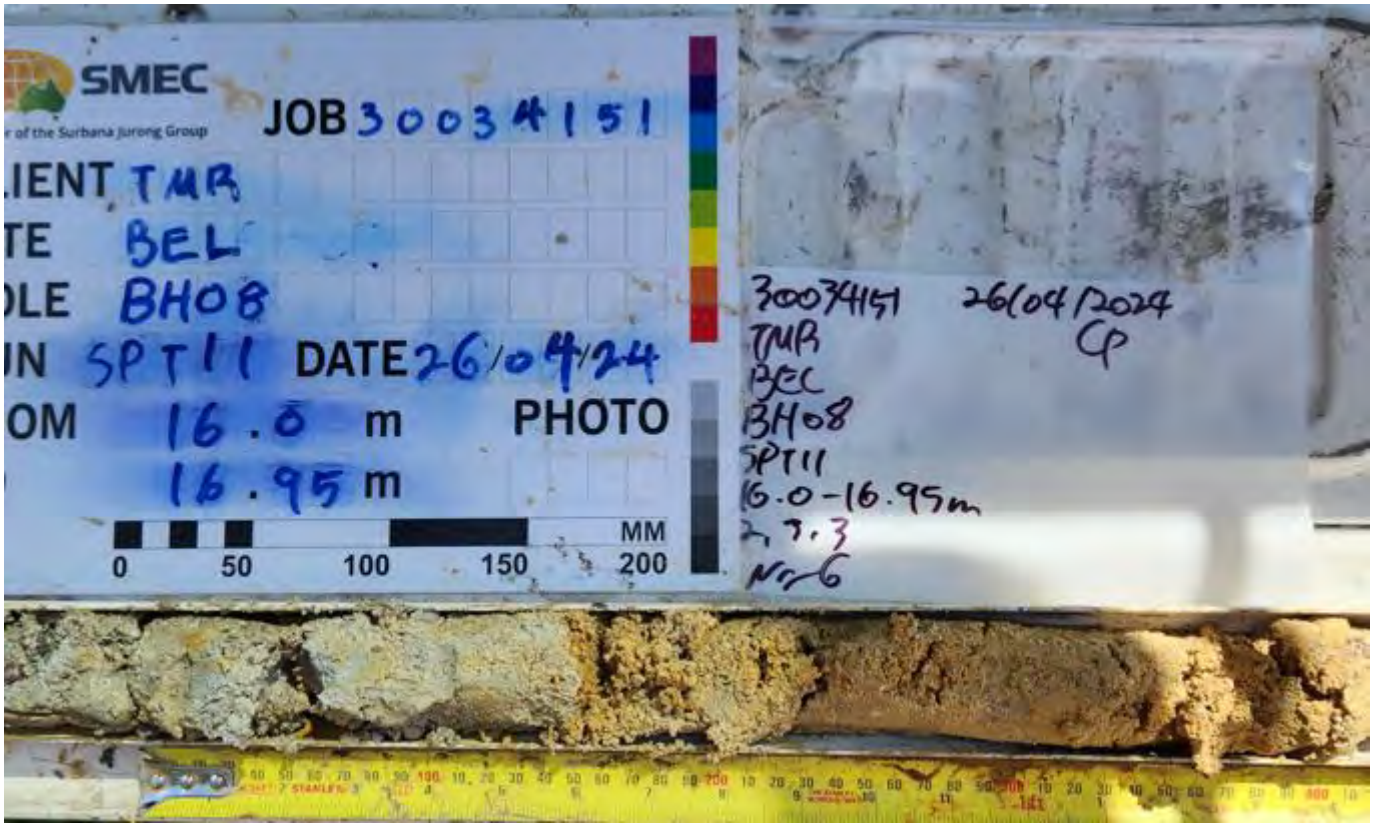


Photo 108: BH08 SPT11

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	DHLGPPW
Taken By:	CP		Project:	Bundaberg East Levee
Checked By:	BY		Title:	Site Photographs
			Project No: 30034151	Page: 55 of 74

Photo 109: BH08 SPT12

Photo 110: BH08 SPT13

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **56 of 74**

Photo 111: BH08 SPT14

Photo 112: BH08 SPT15

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **57 of 74**

Photo 113: BH08 SPT16

Photo 114: BH08 SPT17

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **58 of 74**

Photo 115: BH08 SPT18

Photo 116: BH08 SPT19

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **59 of 74**

Photo 117: BH09 SPT01

Photo 118: BH09 SPT02

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **60 of 74**

Photo 119: BH09 SPT03

Photo 120: BH09 SPT04

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **61 of 74**

Photo 121: BH09 SPT05

Photo 122: BH09 SPT06

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **62 of 74**

Photo 123: BH09 SPT07

Photo 124: BH09 SPT08

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **63 of 74**

Photo 125: BH09 SPT09

Photo 126: BH09 SPT10

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **64 of 74**

Photo 127: BH09 SPT11

Photo 128: BH09 SPT12

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **65 of 74**

Photo 129: BH09 SPT13

Photo 130: BH09 SPT14

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **66 of 74**

Photo 131: BH09 SPT15

Photo 2: BH02 Setup

Date Taken:	-		Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **67 of 74**

Photo 132: BH10 SPT01

Photo 133: BH10 SPT02

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **68 of 74**

Photo 134: BH10 SPT03

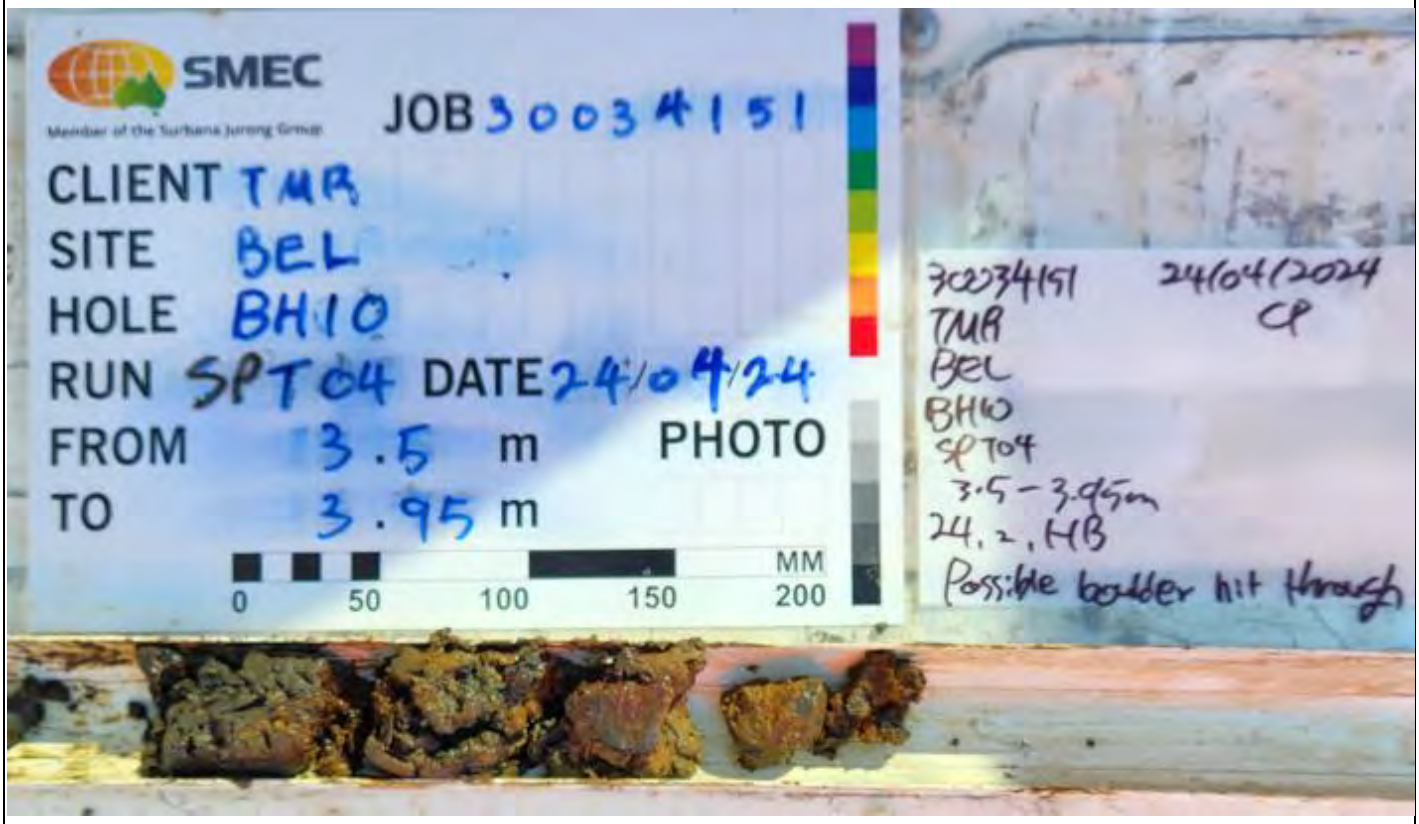


Photo 135: BH10 SPT04

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **69 of 74**

Photo 136: BH10 SPT05

Photo 137: BH10 SPT06

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **70 of 74**

Photo 138: BH10 SPT07

Photo 139: BH10 SPT08

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **71 of 74**

Photo 140: BH10 SPT09

Photo 141: BH10 SPT10

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **72 of 74**

Photo 142: BH10 SPT11

Photo 143: BH10 SPT13

Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **73 of 74**

Photo 144: BH10 SPT14

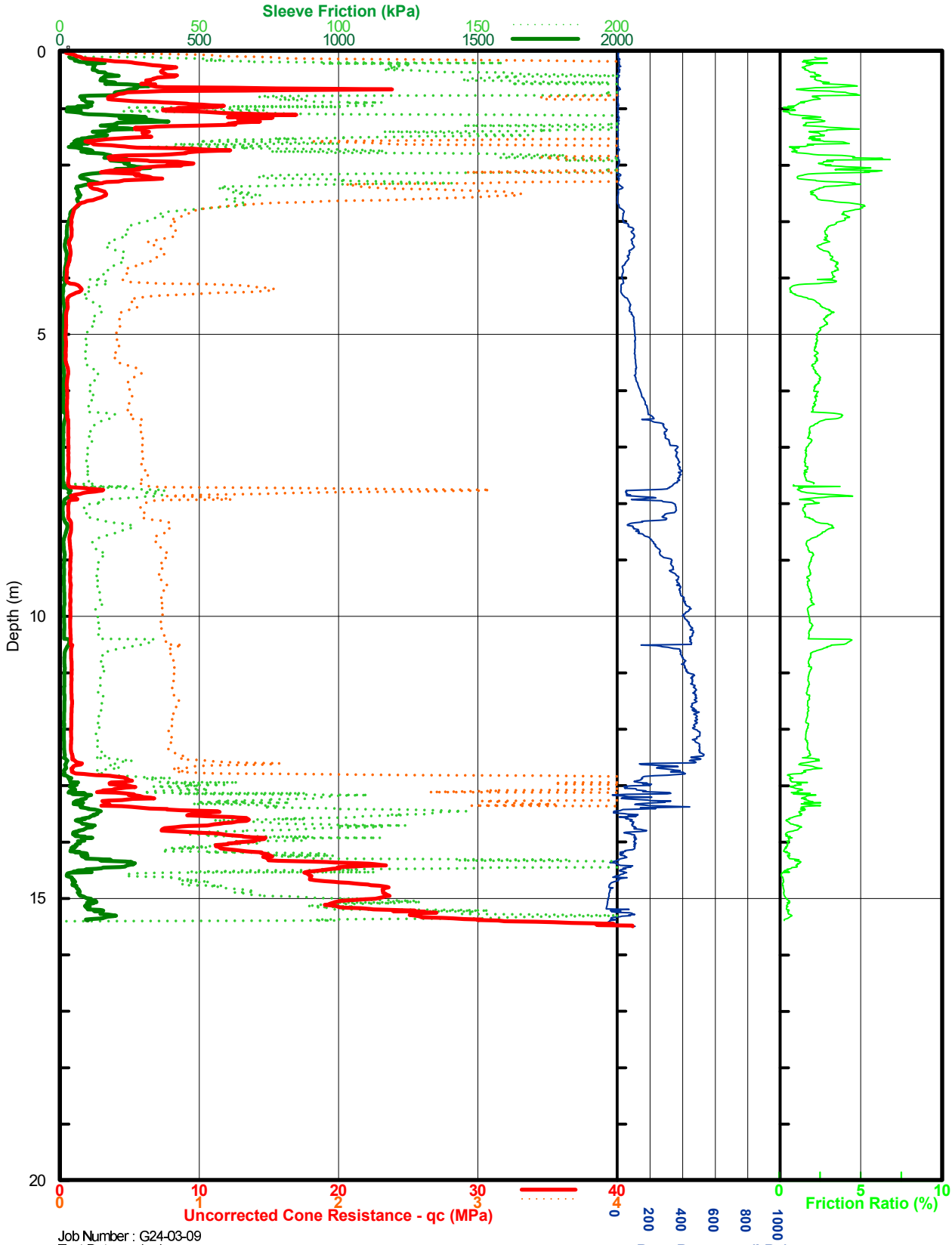
Date Taken:	-	SMEC Member of the Surbana Jurong Group	Client:	**DHLGPPW**
Taken By:	**CP**		Project:	**Bundaberg East Levee**
Checked By:	**BY**		Title:	**Site Photographs**
			Project No: **30034151**	Page: **74 of 74**

Appendix D **Piezocone Penetration Test**

CONE PENETROMETER TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-01



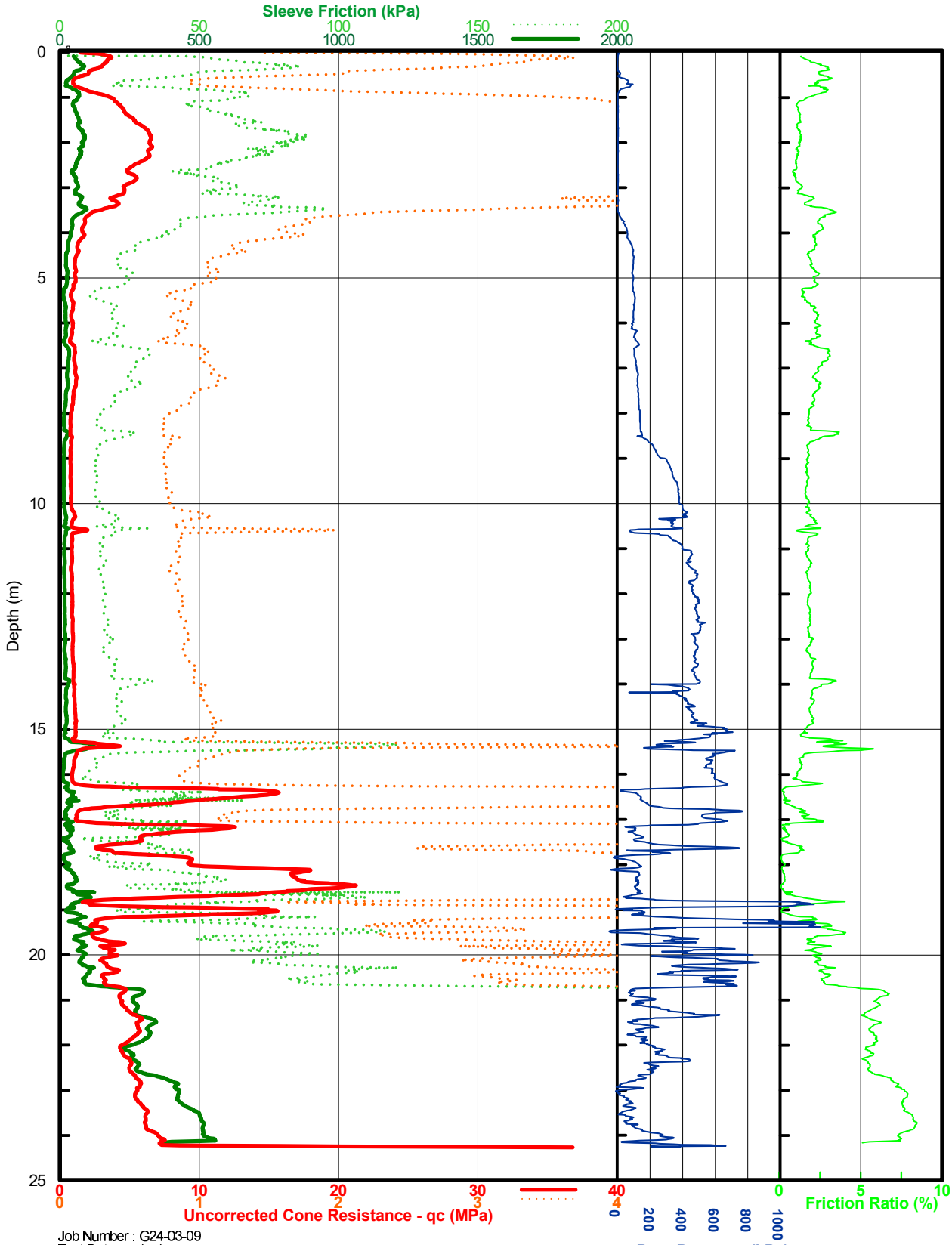
Job Number : G24-03-09
Test Date : 21/04/2024
GPS Position : 56 J 435019, 7250107
GPS Format : WGS 84
Rig : Beryl
Test Category : IGS-3S
Predrill Depth : 0.00m
Cone Stabilisation @ : 3m
Dissipation Tests @ : 6.5m 10.m
Terminated Due To : Equipment at Risk

Cone Number : S15CFIIP.S19568
Calibration Date : 15/04/2024
Cone Capacity : 100MPa
Cone Diameter : 44.07mm
Cone NAR : 0.785
Tested By : Sean Gibson
Checked By : Tony Hitchcock

CONE PENETROMETER TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-02



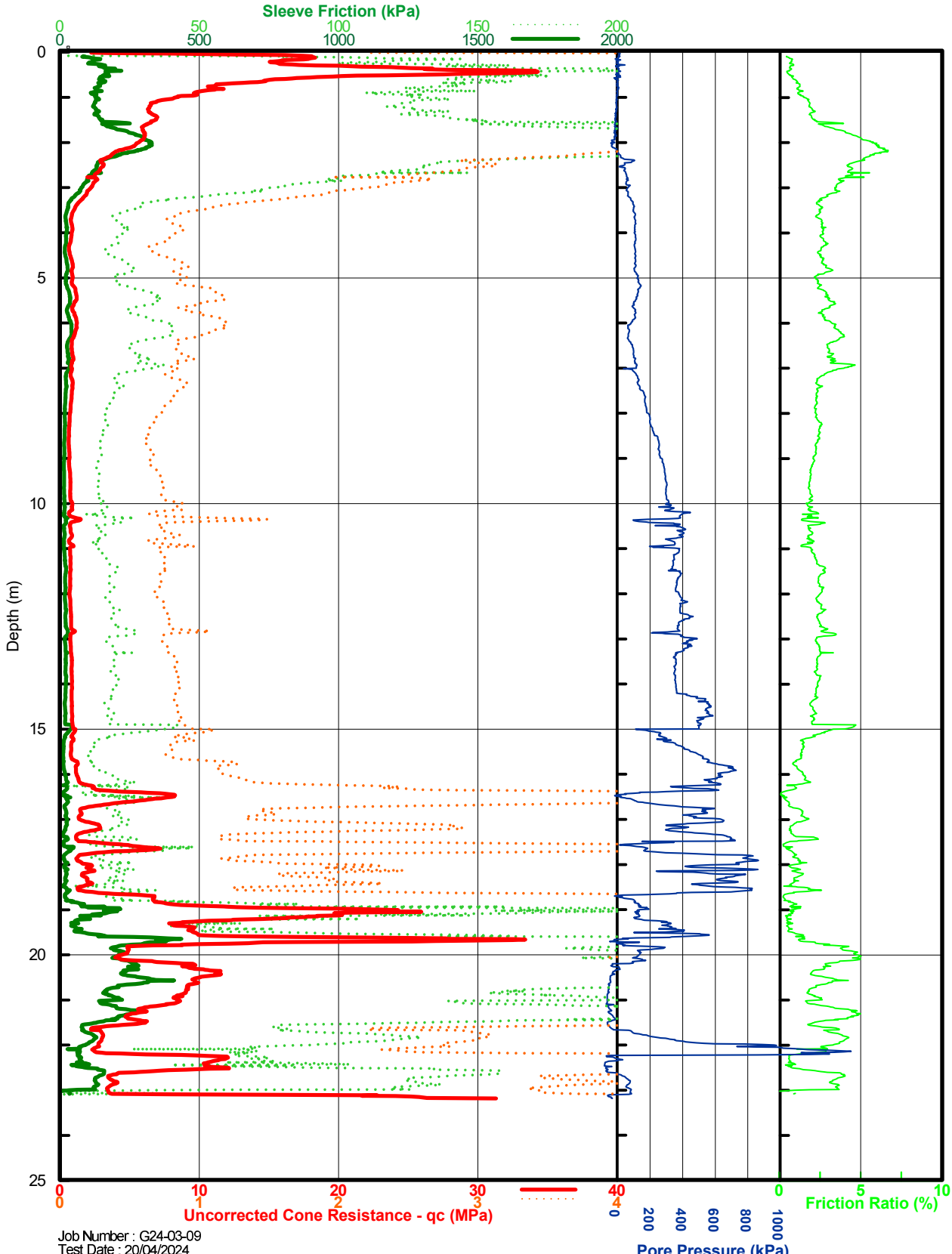
Job Number : G24-03-09
Test Date : 19/04/2024
GPS Position : 56 J 435099, 7250145
GPS Format : WGS 84
Rig : Beryl
Test Category : IGS-3S
Predrill Depth : 0.00m
Cone Stabilisation @ : 0.7m
Dissipation Tests @ : 8.5m 14m 19.41m
Terminated Due To : Equipment at Risk

Cone Number : S15CFIIP.S19568
Calibration Date : 15/04/2024
Cone Capacity : 100MPa
Cone Diameter : 44.07mm
Cone NAR : 0.785
Tested By : Sean Gibson
Checked By : Tony Hitchcock

CONE PENETROMETER TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-03



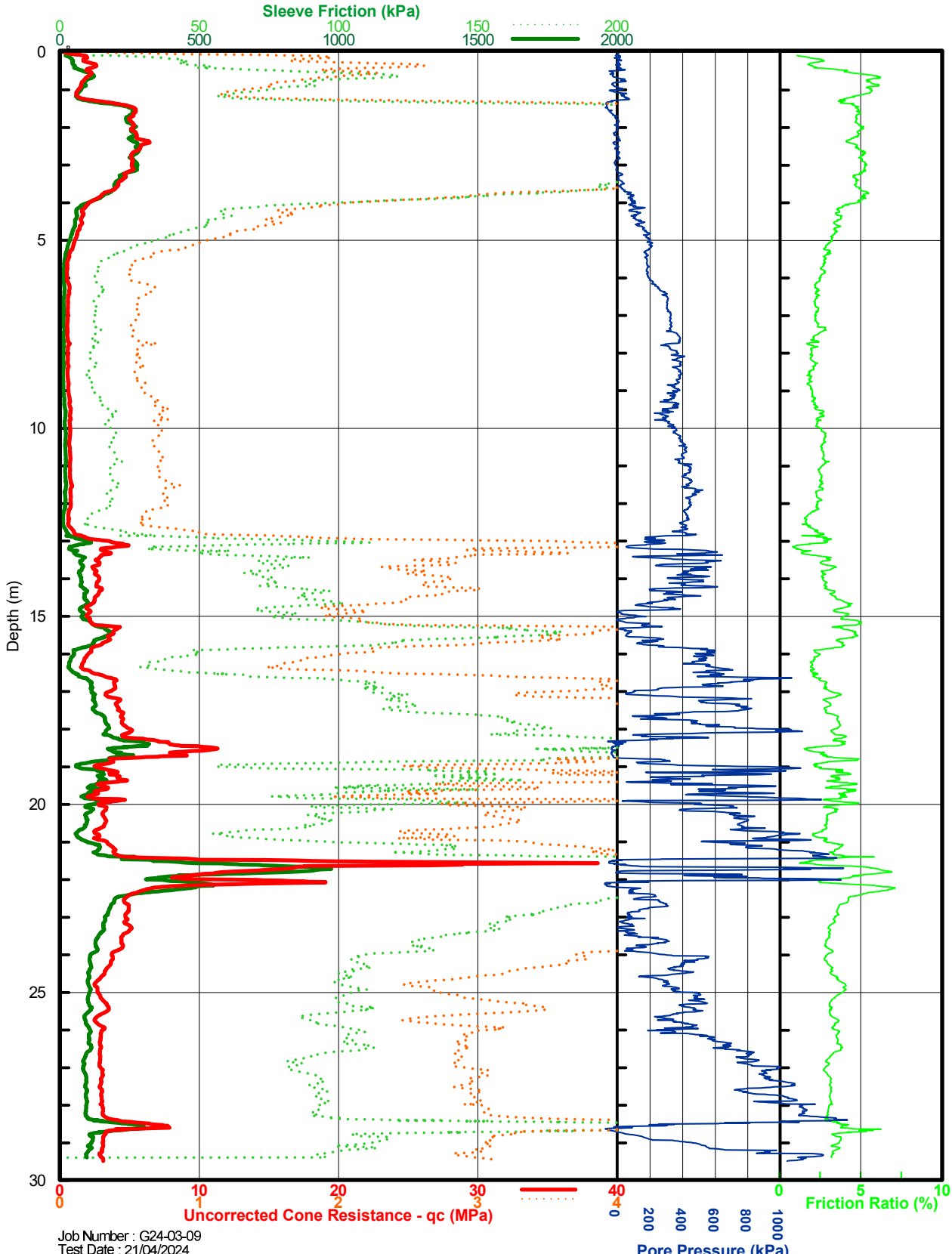
Job Number : G24-03-09
Test Date : 20/04/2024
GPS Position : 56 J 435168, 7250146
GPS Format : WGS 84
Rig : Beryl
Test Category : IGS-3S
Predrill Depth : 0.00m
Cone Stabilisation @ : 2.8m
Dissipation Tests @ : 7m 15m 17.49m
Terminated Due To : Equipment at Risk

Cone Number : S15CFIIP.S19568
Calibration Date : 15/04/2024
Cone Capacity : 100MPa
Cone Diameter : 44.07mm
Cone NAR : 0.785
Tested By : Sean Gibson
Checked By : Tony Hitchcock

CONE PENETROMETER TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-04



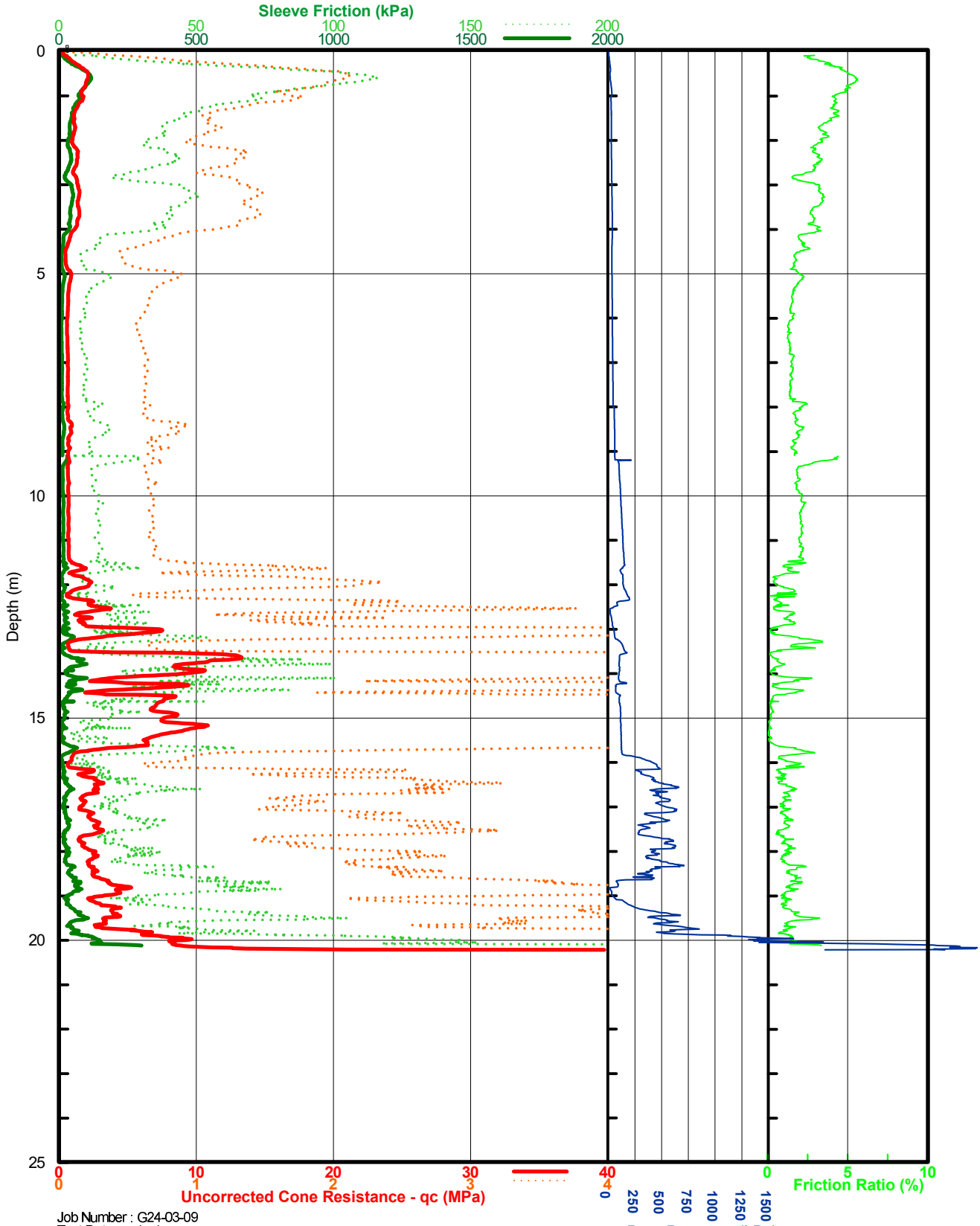
Job Number : G24-03-09
Test Date : 21/04/2024
GPS Position : 56 J 435214, 7250125
GPS Format : WGS 84
Rig : Beryl
Test Category : IGS-3S
Predrill Depth : 0.00m
Cone Stabilisation @ : 1m
Dissipation Tests @ : N/A
Terminated Due To : Lifted Rig

Cone Number : S15CFIIP.S19568
Calibration Date : 15/04/2024
Cone Capacity : 100MPa
Cone Diameter : 44.07mm
Cone NAR : 0.785
Tested By : Sean Gibson
Checked By : Tony Hitchcock

CONE PENETROMETER TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-05



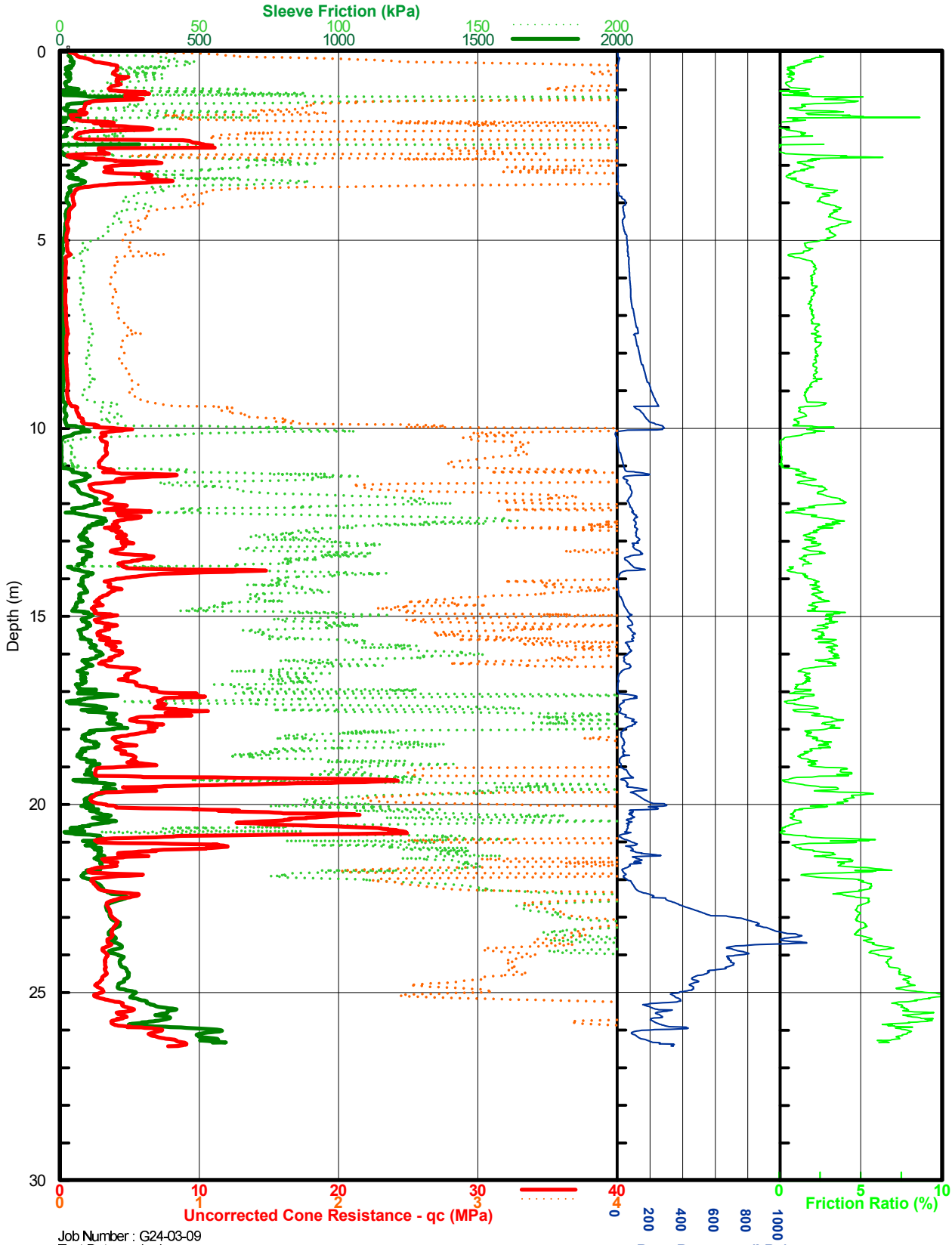
Job Number : G24-03-09
Test Date : 23/04/2024
GPS Position : 56 J 435335, 7250160
GPS Format : WGS 84
Rig : Beryl
Test Category : IGS-3S
Predrill Depth : 0.00m
Cone Stabilisation @ : 1m, 8m
Dissipation Tests @ : 9.2m
Terminated Due To : Equipment at Risk

Cone Number : S15CFIIPT.S22648
Calibration Date : 23/02/2024
Cone Capacity : 100MPa
Cone Diameter : 43.98mm
Cone NAR : 0.788
Tested By : Sean Gibson
Checked By : Tony Hitchcock

CONE PENETROMETER TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-06



Job Number : G24-03-09
Test Date : 22/04/2024
GPS Position : 56 J435818, 7250601
GPS Format : WGS 84
Rig : Beryl
Test Category : IGS-3S
Predrill Depth : 0.00m
Cone Stabilisation @ : 2.3m
Dissipation Tests @ : 9.5m
Terminated Due To : Equipment at Risk

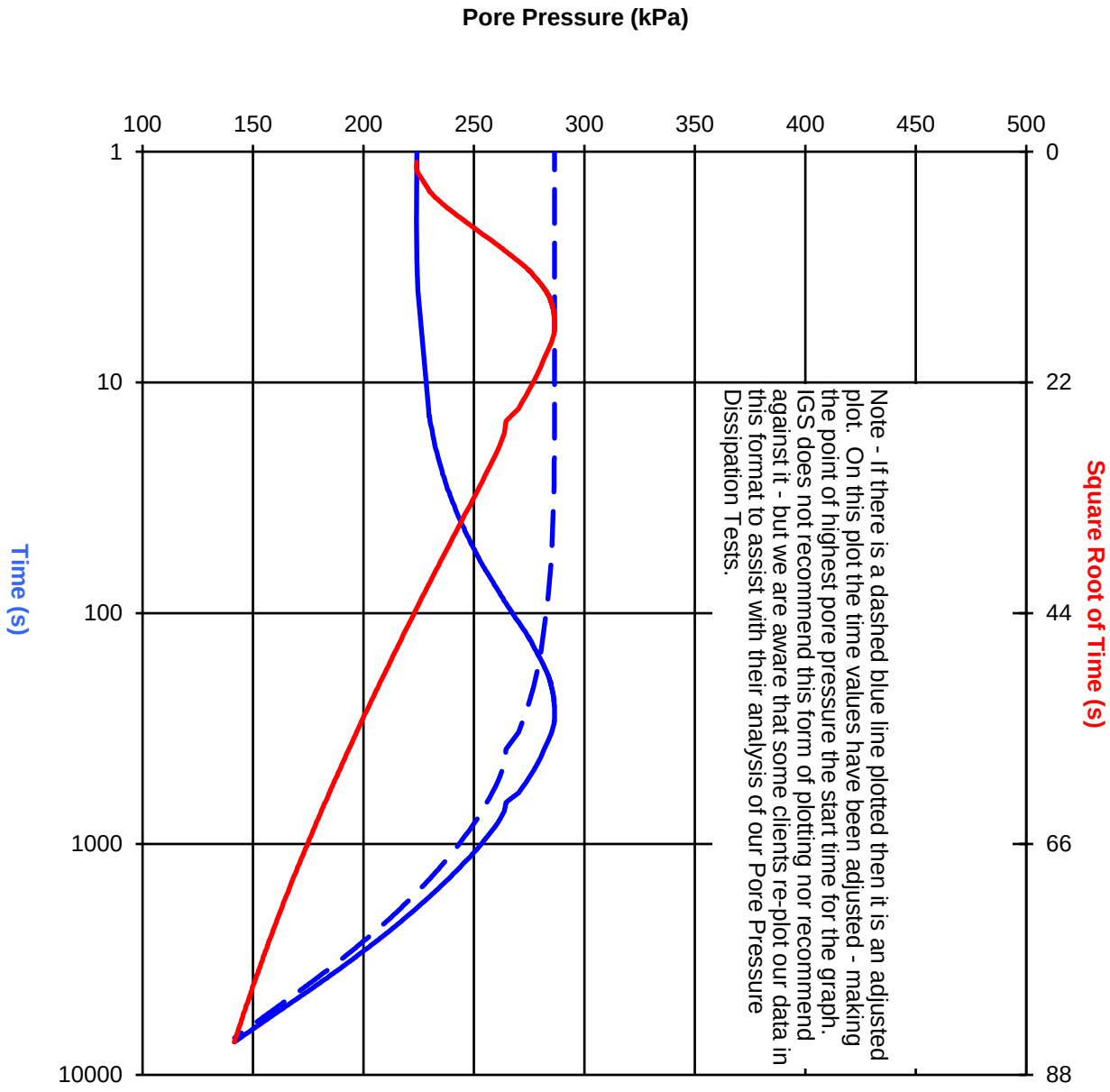
Cone Number : S15CFIIPT.S22648
Calibration Date : 23/02/2024
Cone Capacity : 100MPa
Cone Diameter : 43.98mm
Cone NAR : 0.788
Tested By : Sean Gibson
Checked By : Tony Hitchcock

Appendix E **Pore Pressure Dissipation Test**

PORE PRESSURE DISSIPATION TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-01
Depth: 6.5m



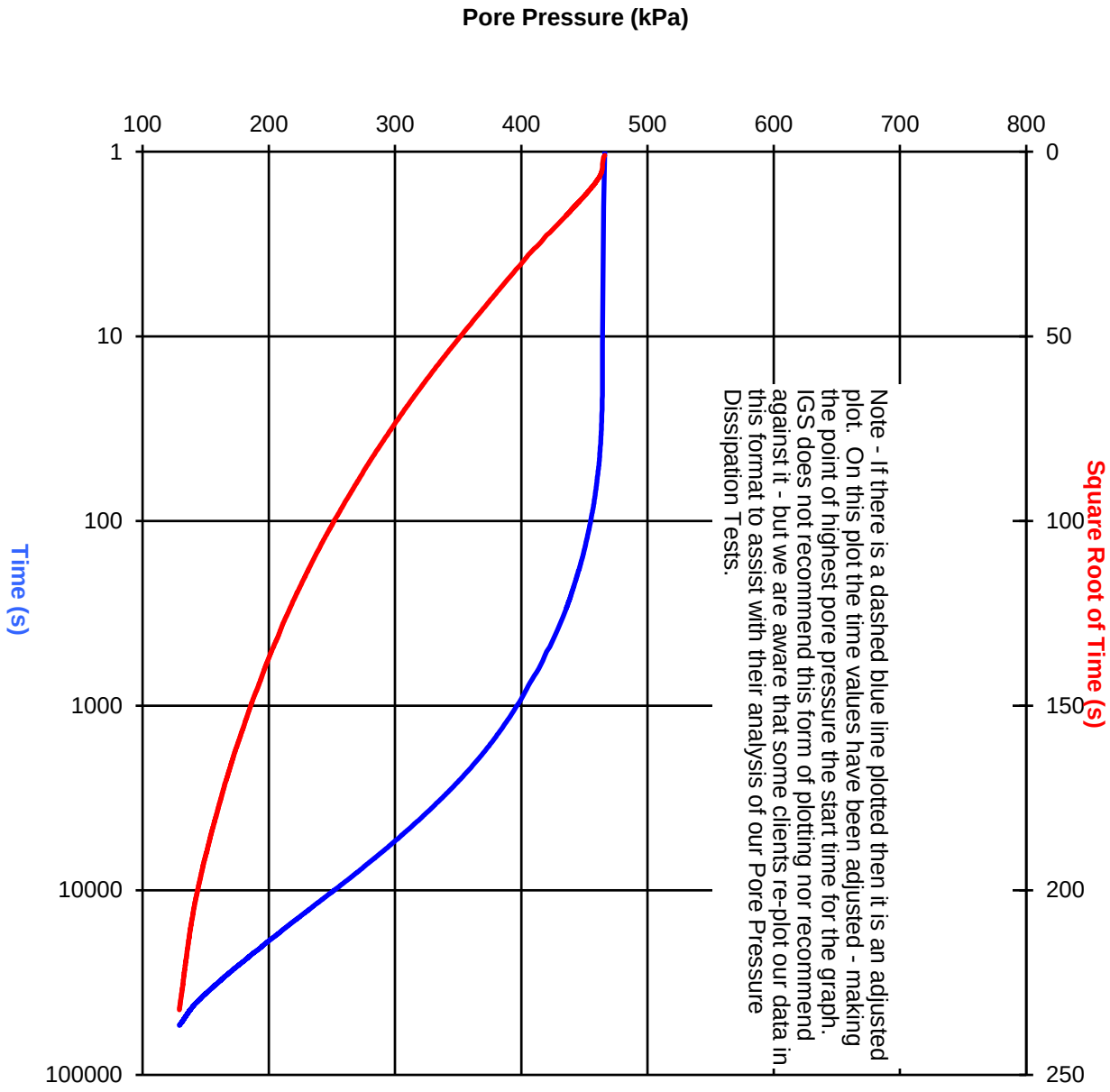
Tested By: Sean Gibson
Test Duration: 2 Hours, 0 Minutes
Test Date: 21/04/2024
Job No: G24-03-09
Cone: S15CFIIP.S19568

Termination Reason: Client Direction
Special Notes: Nil

PORE PRESSURE DISSIPATION TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-01
Depth: 10.5m



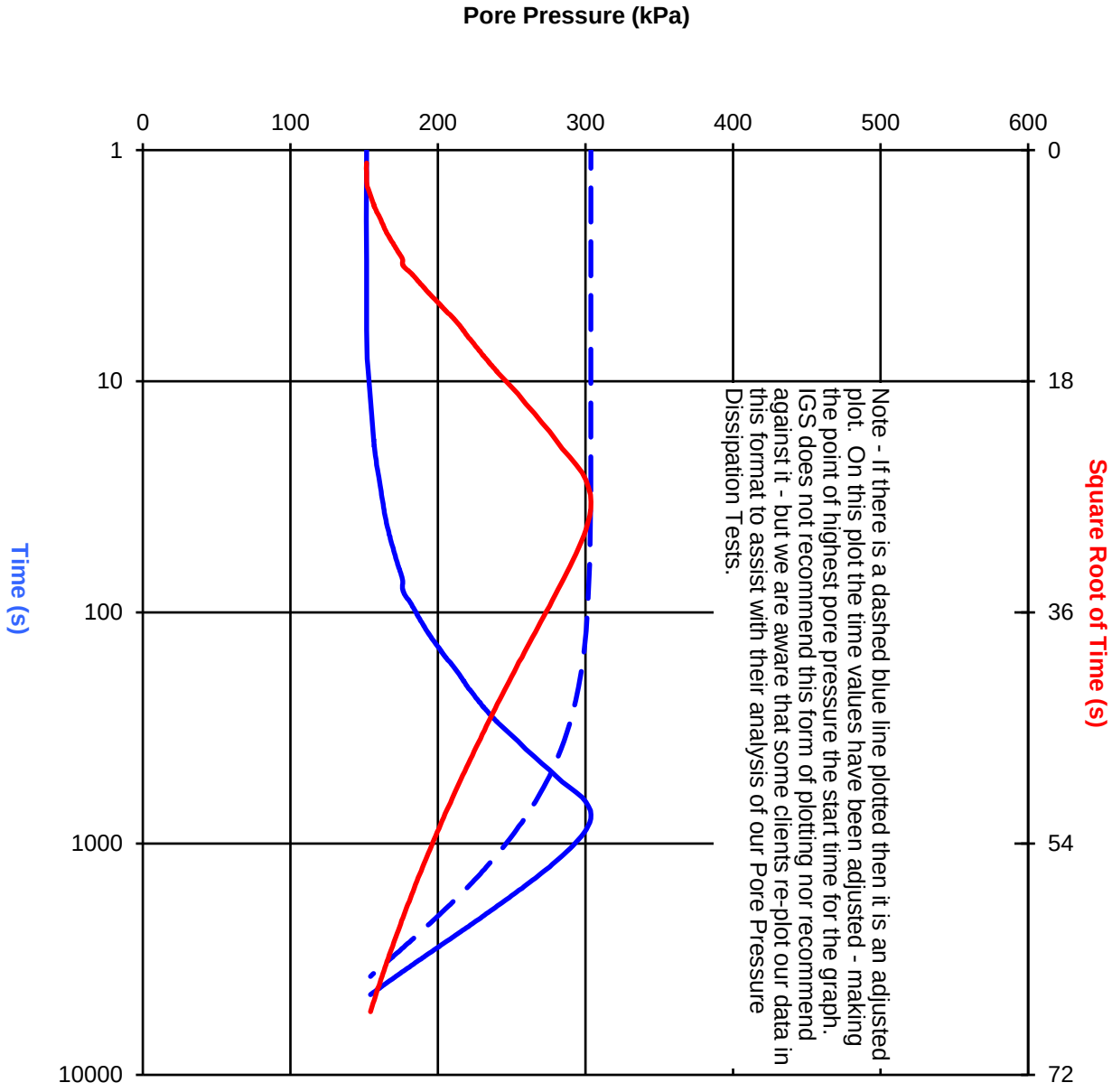
Tested By: Sean Gibson
Test Duration: 15 Hours, 0 Minutes
Test Date: 21/04/2024
Job No: G24-03-09
Cone: S15CFIIP.S19568

Termination Reason: Client Direction
Special Notes: Nil

PORE PRESSURE DISSIPATION TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-02
Depth: 8.5m



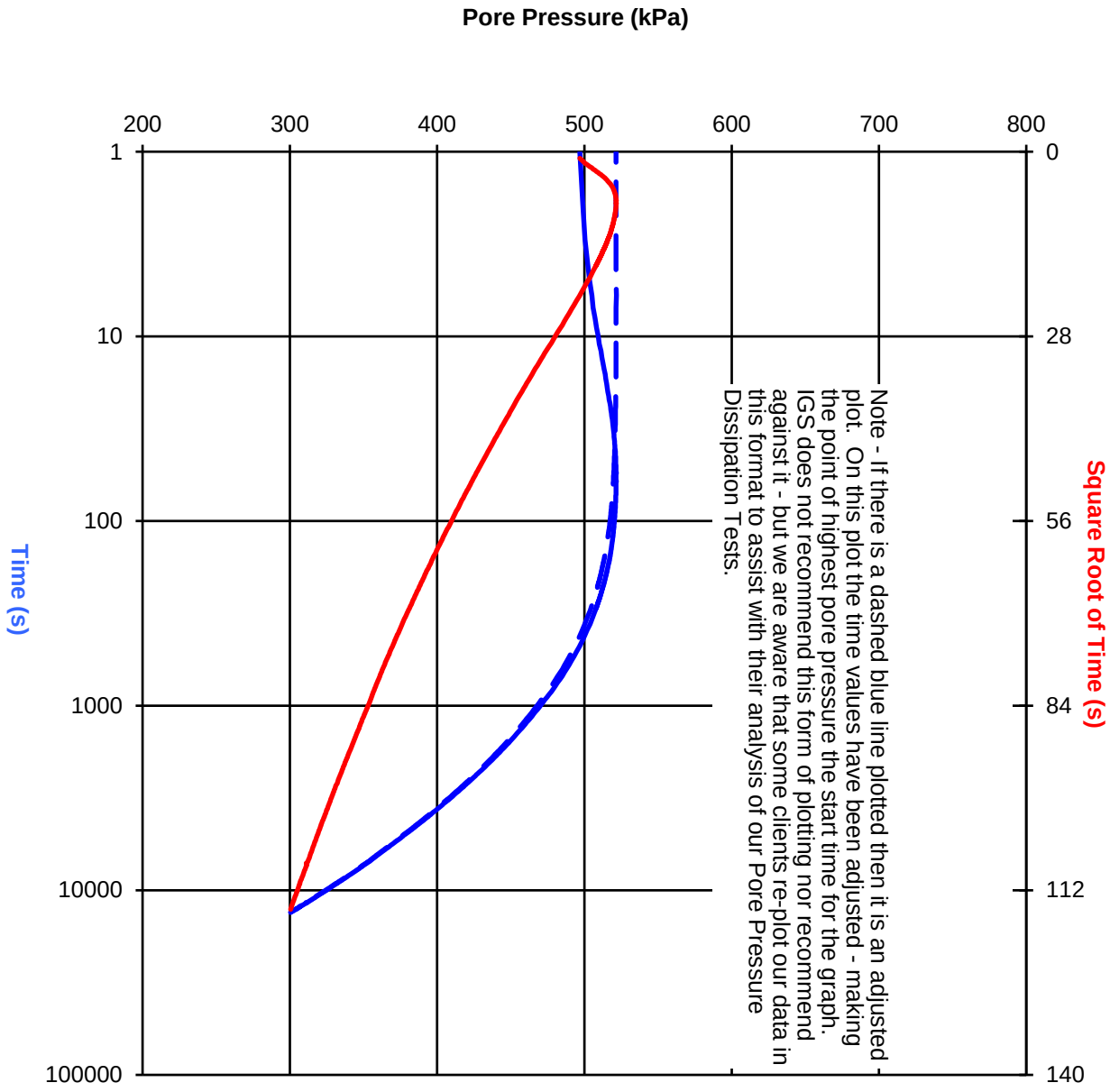
Tested By: Sean Gibson
Test Duration: 1 Hours, 15 Minutes
Test Date: 19/04/2024
Job No: G24-03-09
Cone: S15CFIIP.S19568

Termination Reason: Client Direction
Special Notes: Nil

PORE PRESSURE DISSIPATION TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-02
Depth: 14m



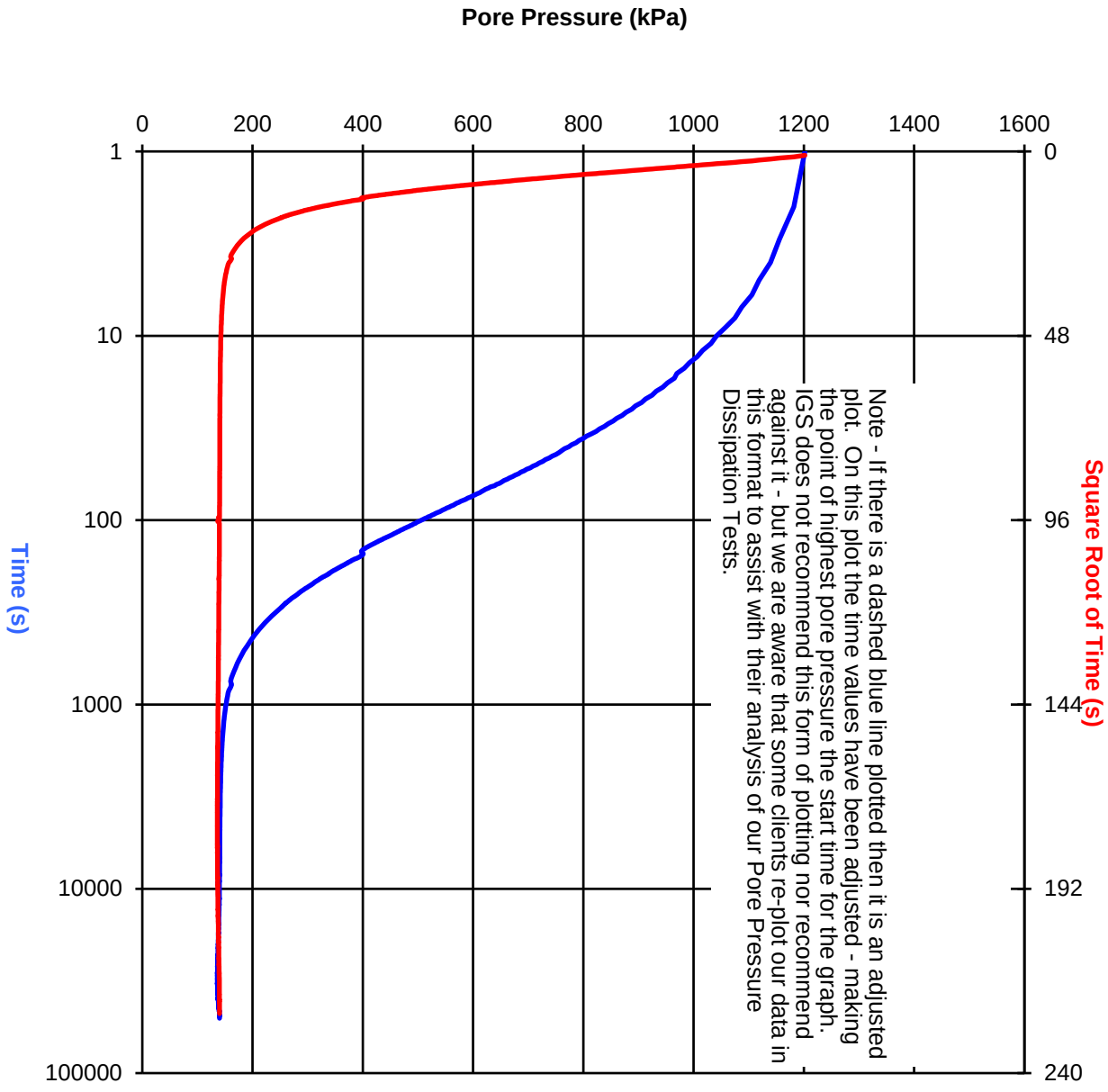
Tested By: Sean Gibson
Test Duration: 3 Hours, 40 Minutes
Test Date: 19/04/2024
Job No: G24-03-09
Cone: S15CFIIP.S19568

Termination Reason: Client Direction
Special Notes: Nil

PORE PRESSURE DISSIPATION TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-02
Depth: 19.41m



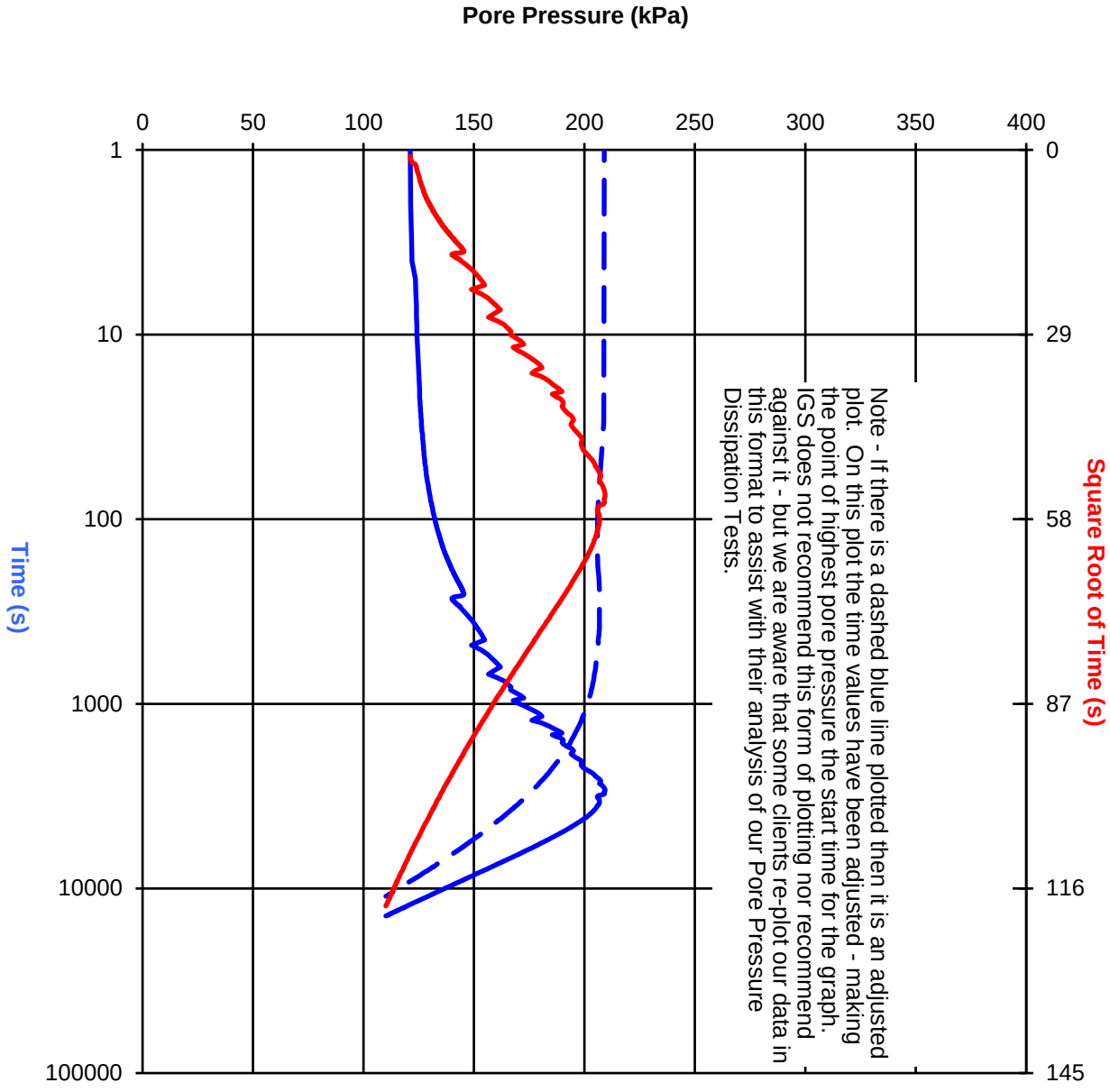
Tested By: Sean Gibson
Test Duration: 14 Hours, 0 Minutes
Test Date: 19/04/2024
Job No: G24-03-09
Cone: S15CFIIP.S19568

Termination Reason: Client Direction
Special Notes: Nil

PORE PRESSURE DISSIPATION TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-03
Depth: 7m



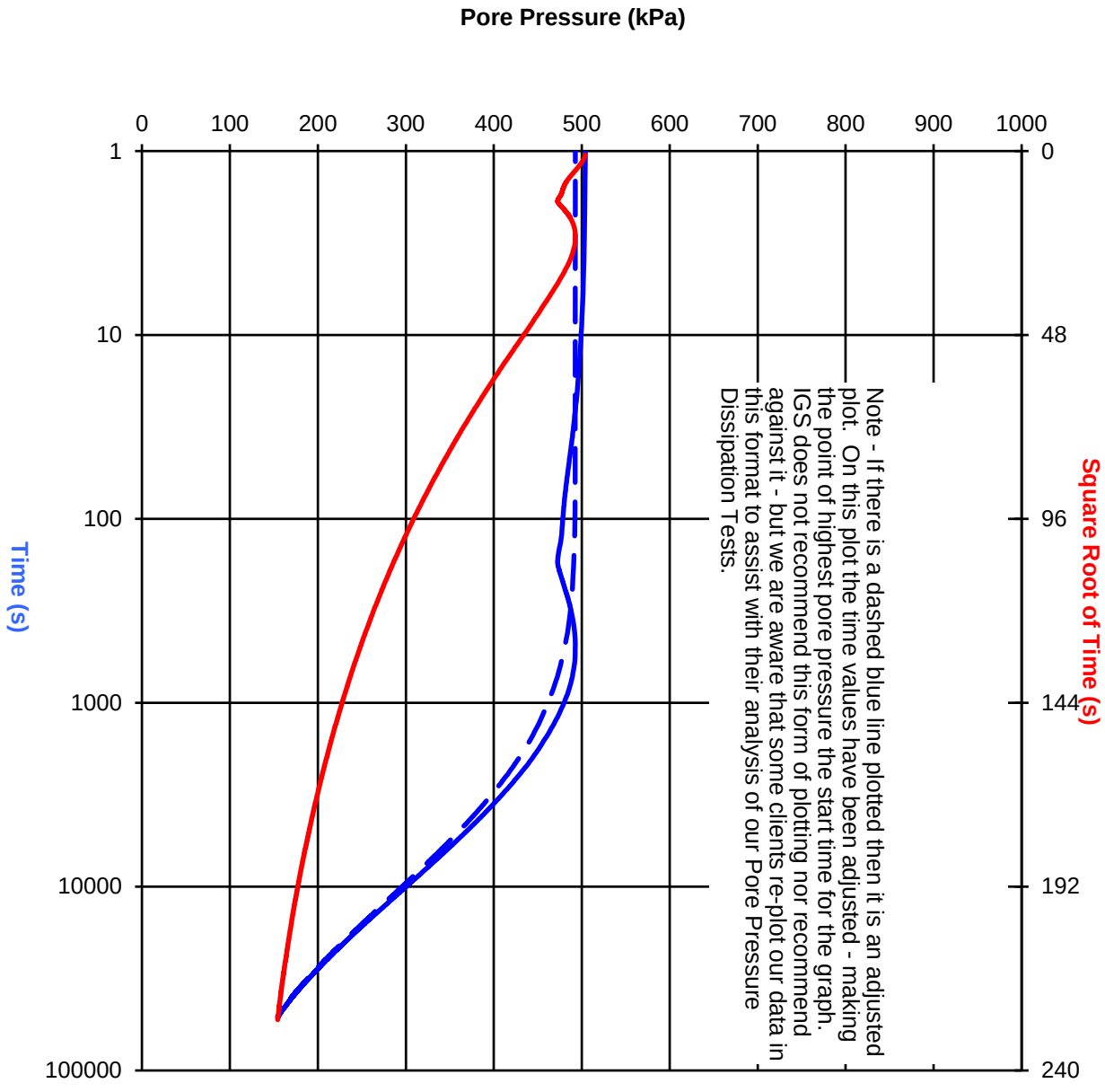
Tested By: Sean Gibson
Test Duration: 3 Hours, 55 Minutes
Test Date: 20/04/2024
Job No: G24-03-09
Cone: S15CFIIP.S19568

Termination Reason: Client Direction
Special Notes: Nil

PORE PRESSURE DISSIPATION TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-03
Depth: 15m



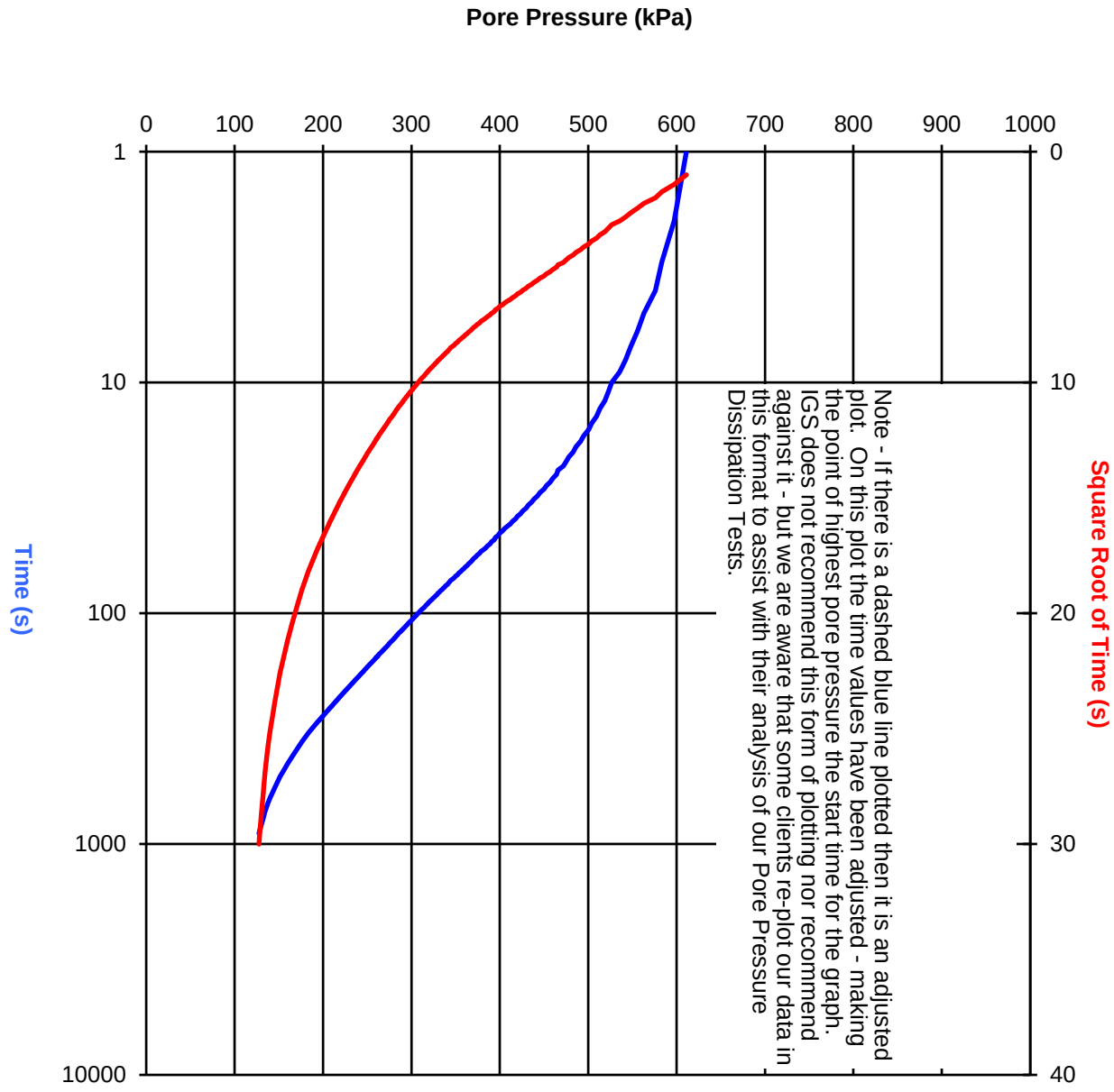
Tested By: Sean Gibson
Test Duration: 14 Hours, 17 Minutes
Test Date: 20/04/2024
Job No: G24-03-09
Cone: S15CFIIP.S19568

Termination Reason: Client Direction
Special Notes: Nil

PORE PRESSURE DISSIPATION TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-03
Depth: 17.49m



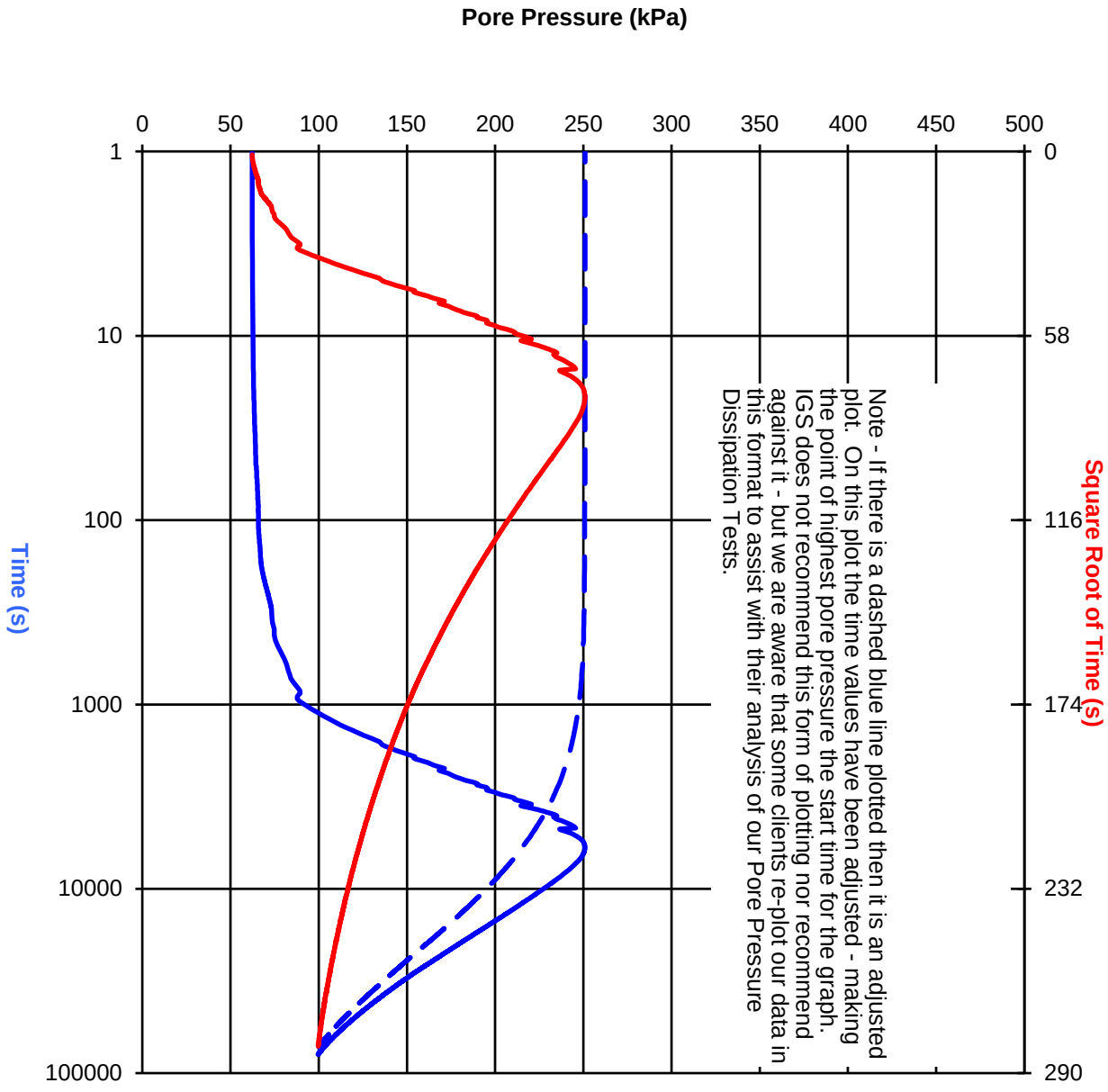
Tested By: Sean Gibson
Test Duration: 0 Hours, 15 Minutes
Test Date: 20/04/2024
Job No: G24-03-09
Cone: S15CFIIP.S19568

Termination Reason: Client Direction
Special Notes: Nil

PORE PRESSURE DISSIPATION TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-05
Depth: 9.2m



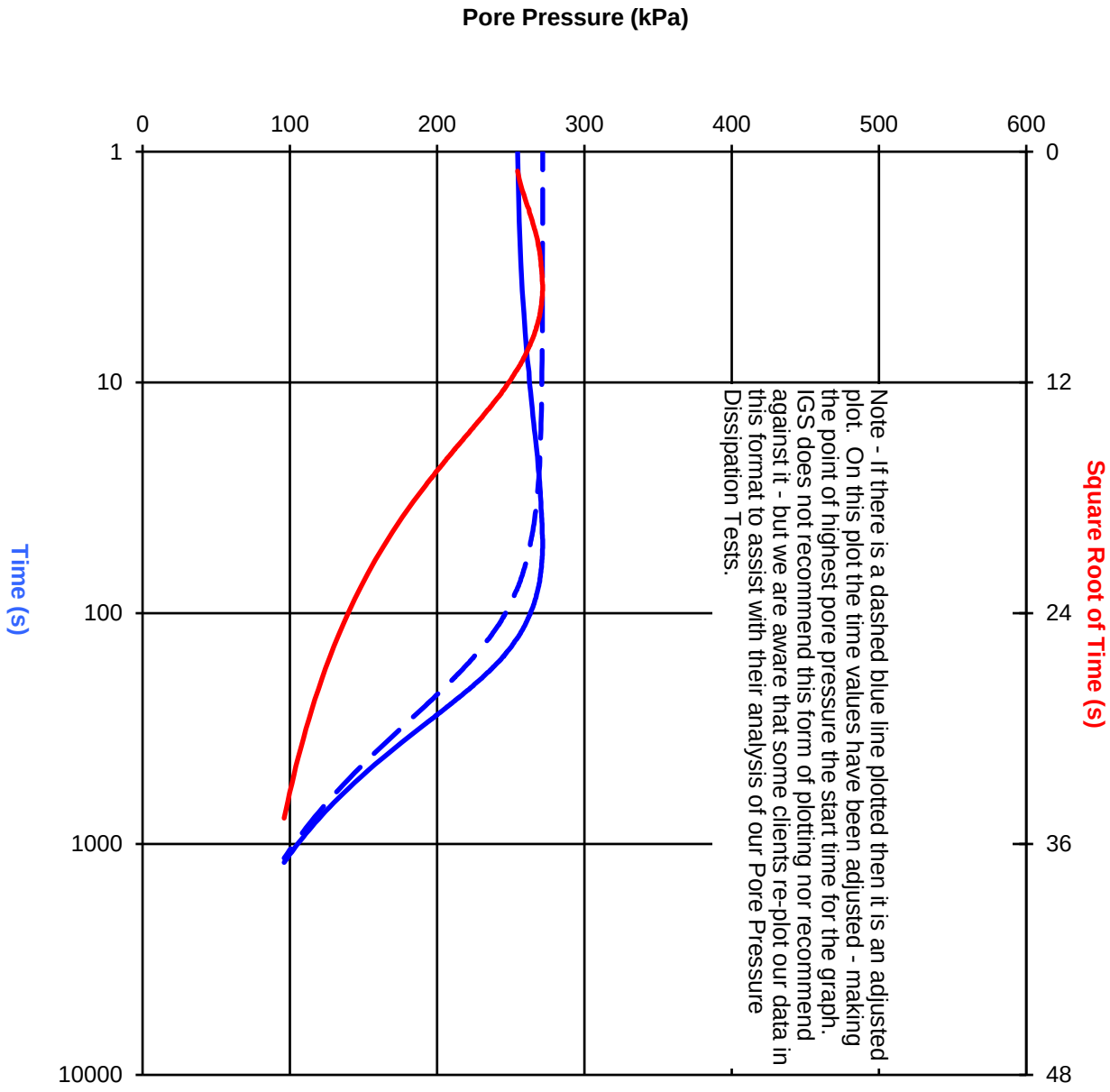
Tested By: Sean Gibson
Test Duration: 22 Hours, 1 Minutes
Test Date: 23/04/2024
Job No: G24-03-09
Cone: S15CFIIPT.S22648

Termination Reason: Client Direction
Special Notes: Nil

PORE PRESSURE DISSIPATION TEST RESULT

SMEC
Bundaberg East Levee Site Investigation
Bundaberg QLD

CPT-06
Depth: 9.5m



Tested By: Sean Gibson
Test Duration: 0 Hours, 20 Minutes
Test Date: 22/04/2024
Job No: G24-03-09
Cone: S15CFIIPT.S22648

Termination Reason: Client Direction
Special Notes: Nil

Appendix F **Vane Shear Test**

INSITU GEOTECH SERVICES
reducing geotechnical uncertainty

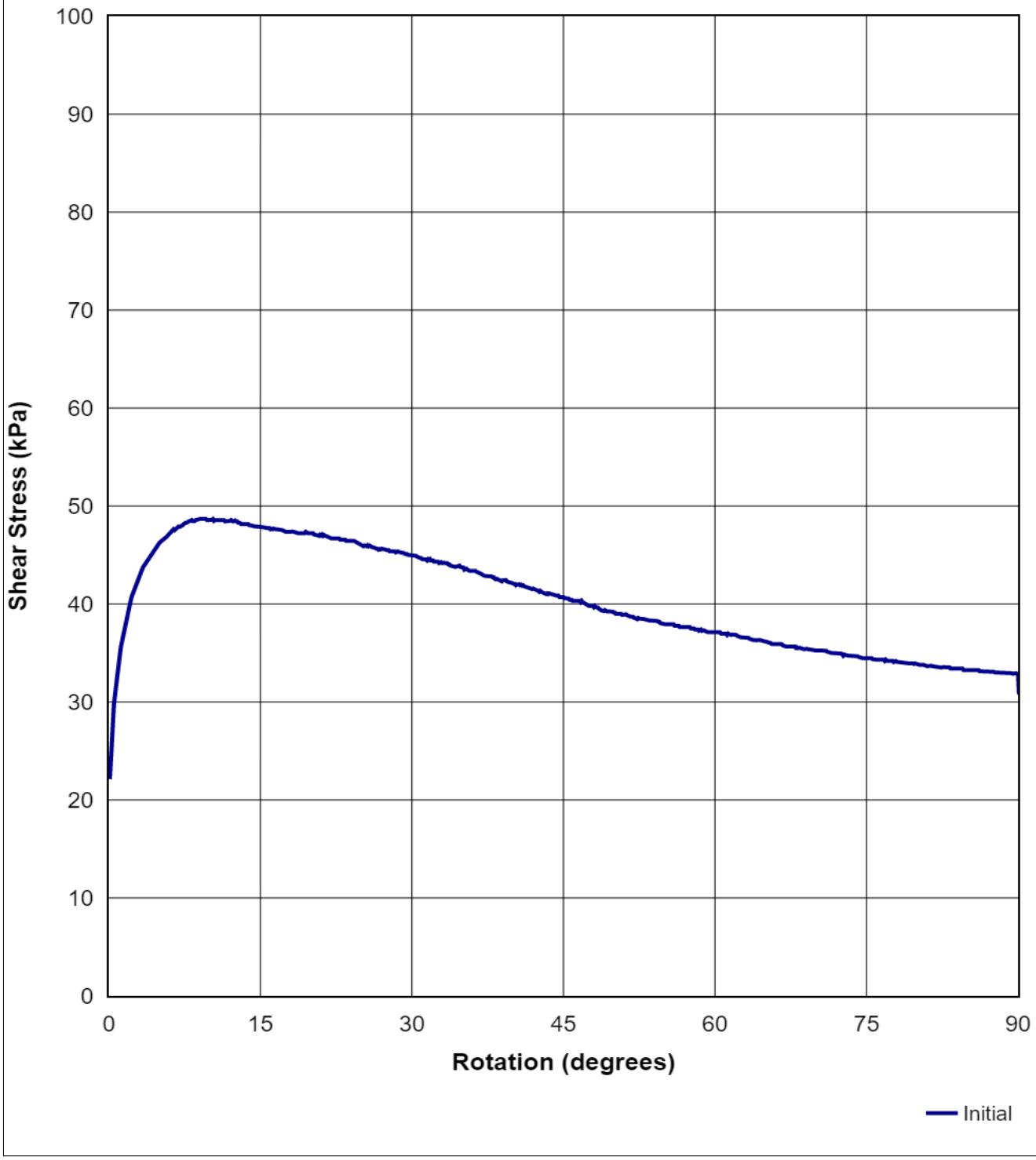
VANE SHEAR TEST

CPT-01
(3.5 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435018, 7250106**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**3.50**
TEST DATE	**20/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



INSITU GEOTECH SERVICES
reducing geotechnical uncertainty

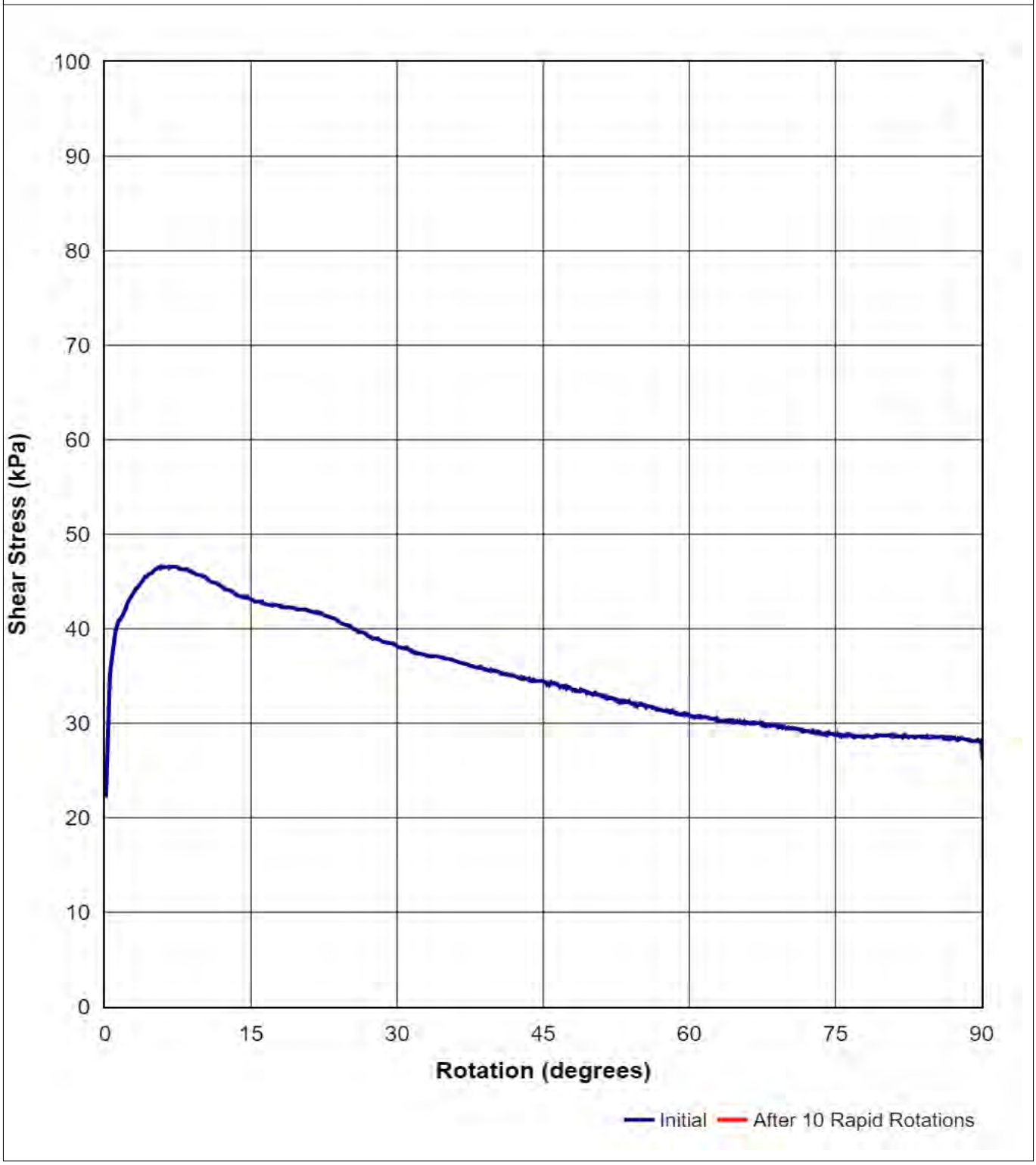
VANE SHEAR TEST

CPT-01
(5 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435018, 7250106**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**5.00**
TEST DATE	**20/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



INSITU GEOTECH SERVICES
reducing geotechnical uncertainty

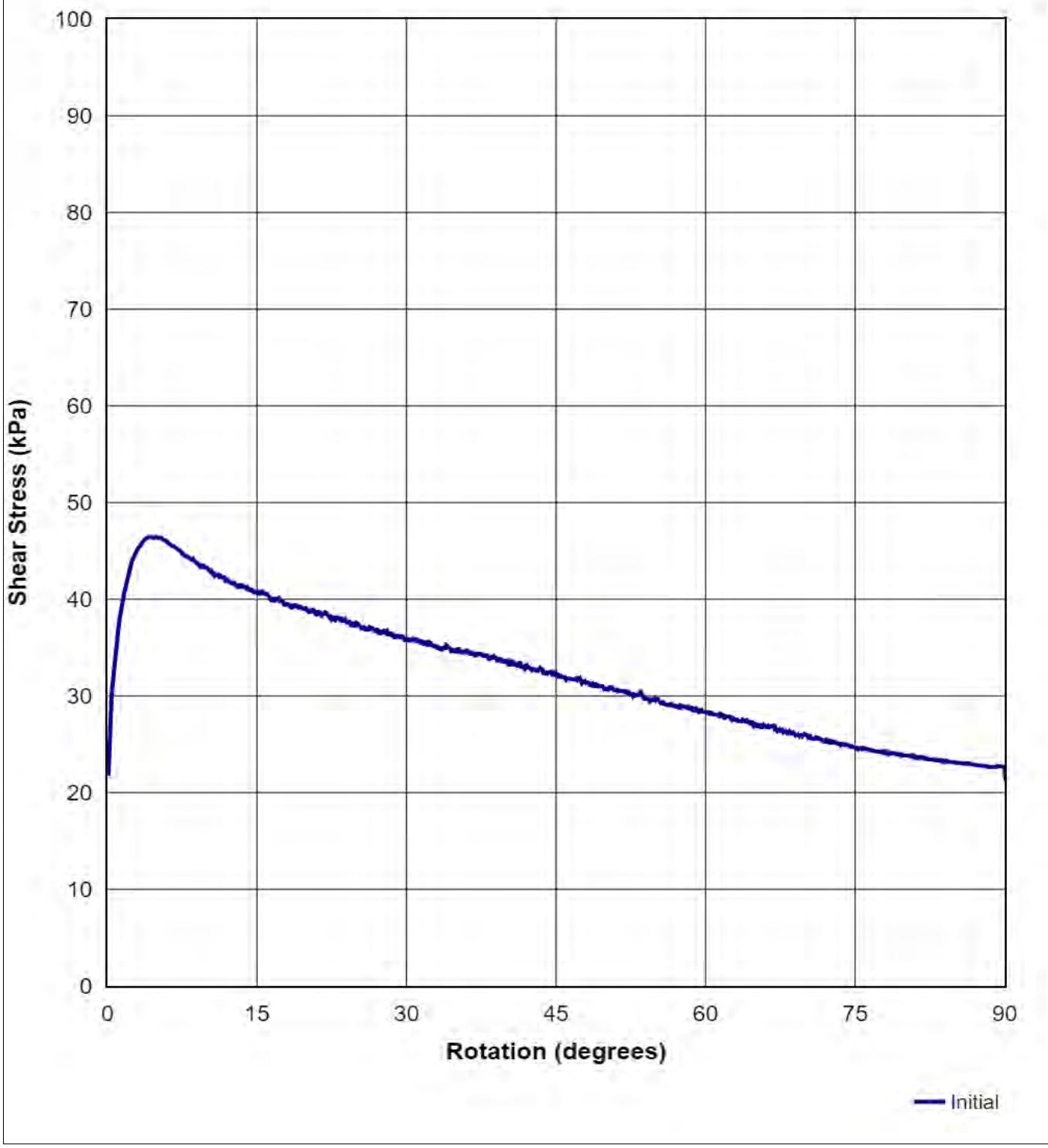
VANE SHEAR TEST

CPT-01
(7 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435018, 7250106**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**7.00**
TEST DATE	**20/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



INSITU GEOTECH SERVICES
reducing geotechnical uncertainty

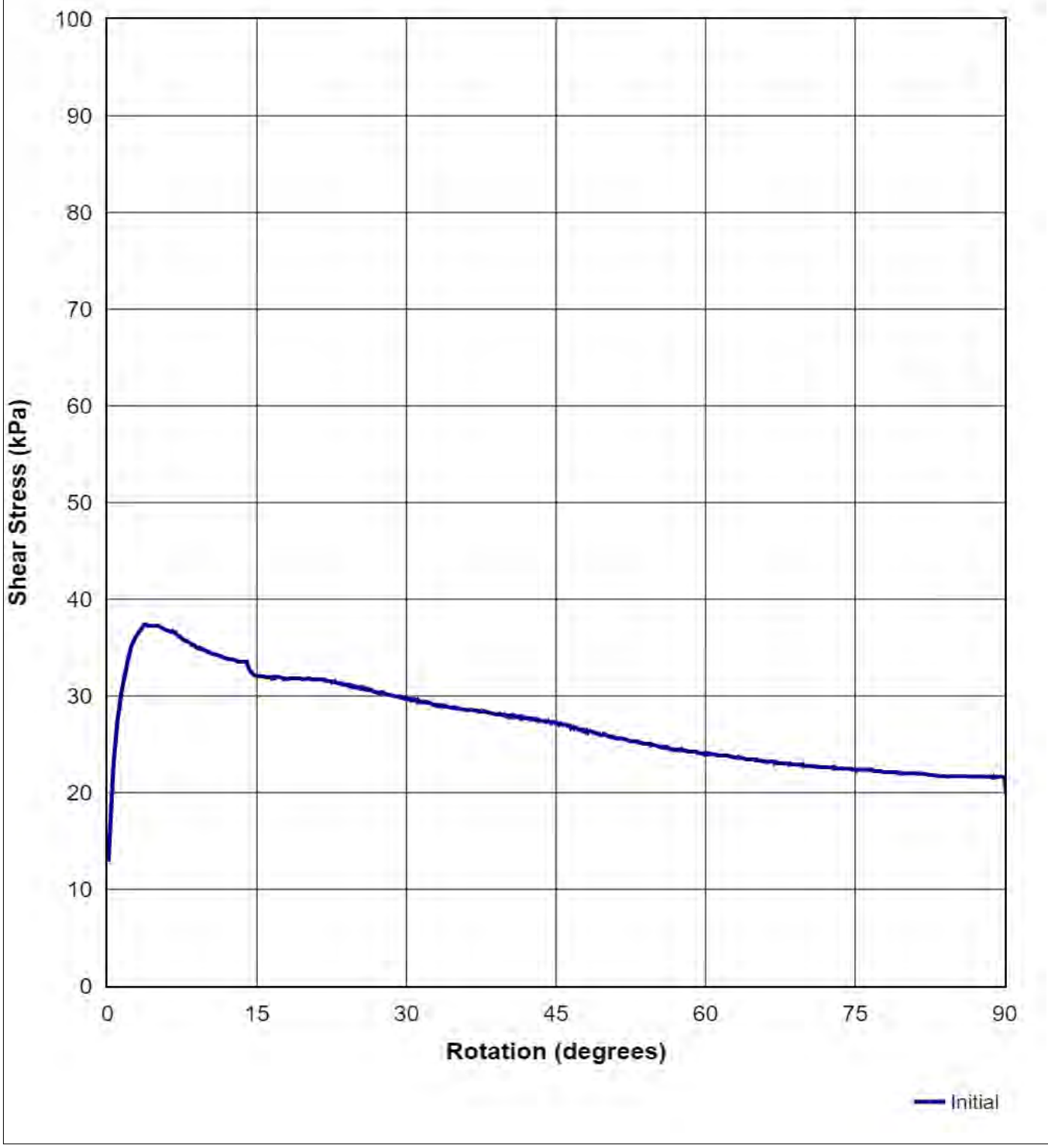
VANE SHEAR TEST

CPT-01
(9 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435018, 7250106**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**9.00**
TEST DATE	**20/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



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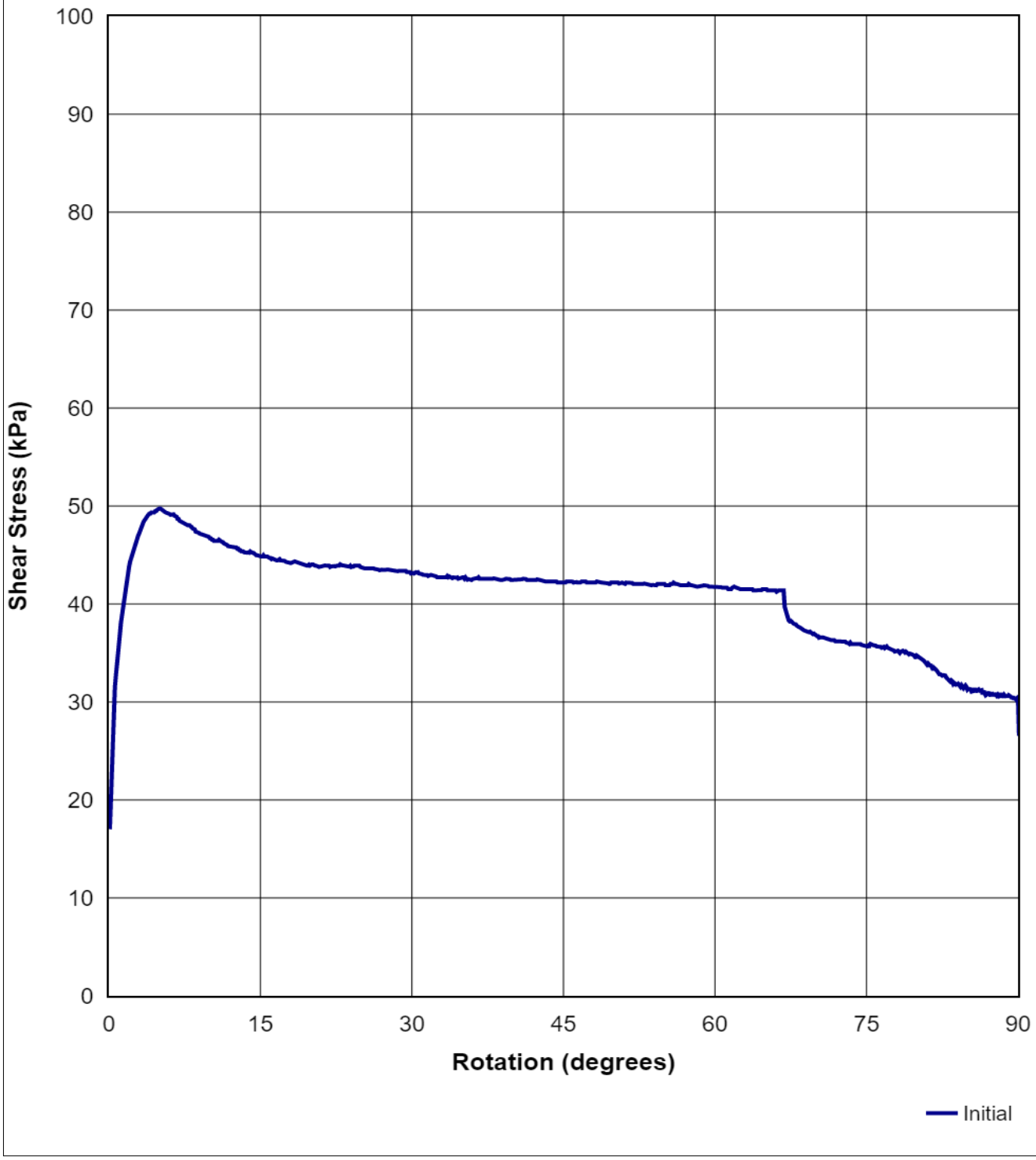
VANE SHEAR TEST

CPT-01
(11 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435018, 7250106**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**11.00**
TEST DATE	**20/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



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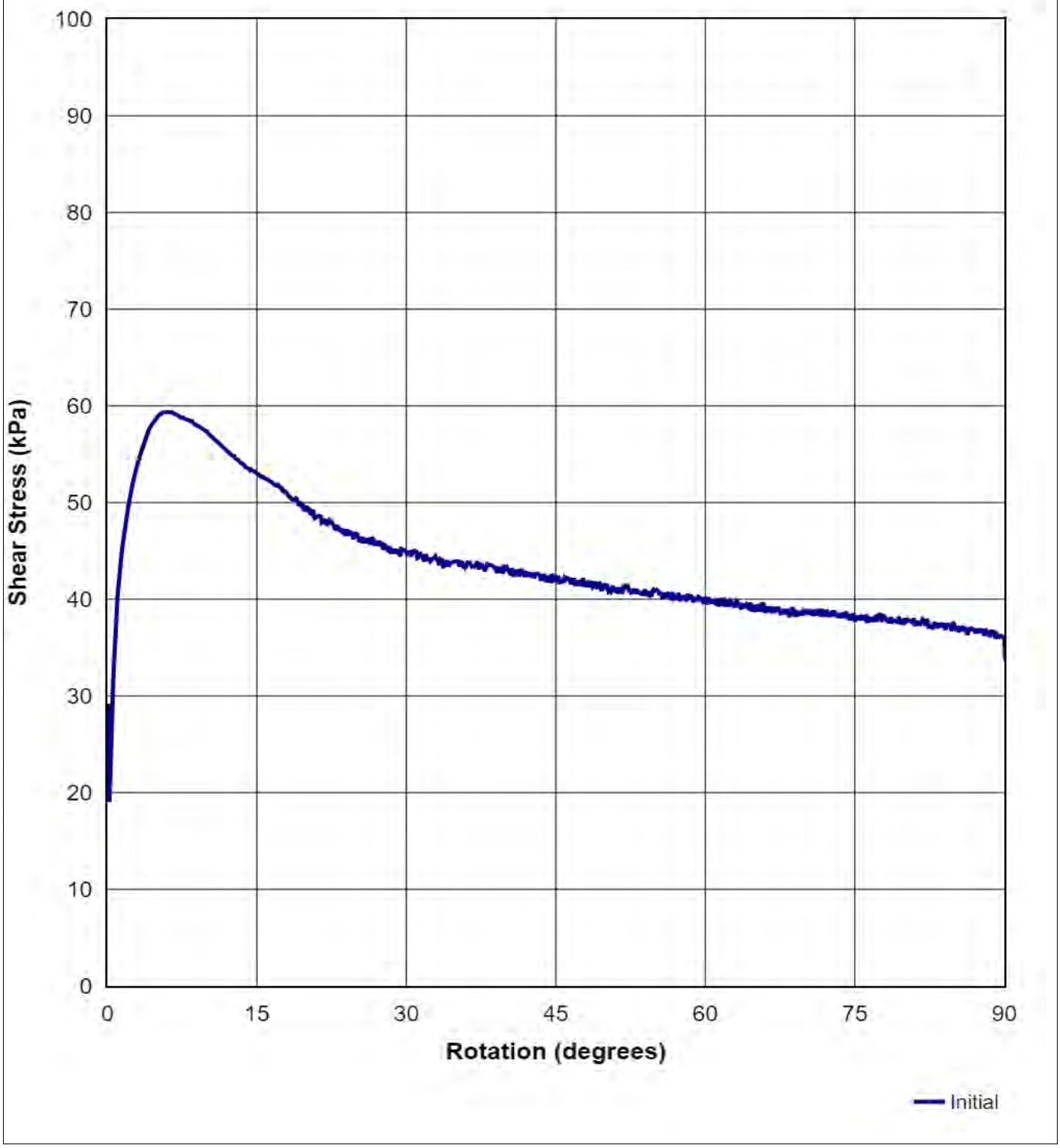
VANE SHEAR TEST

CPT-01
(12 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435018, 7250106**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**12.00**
TEST DATE	**20/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



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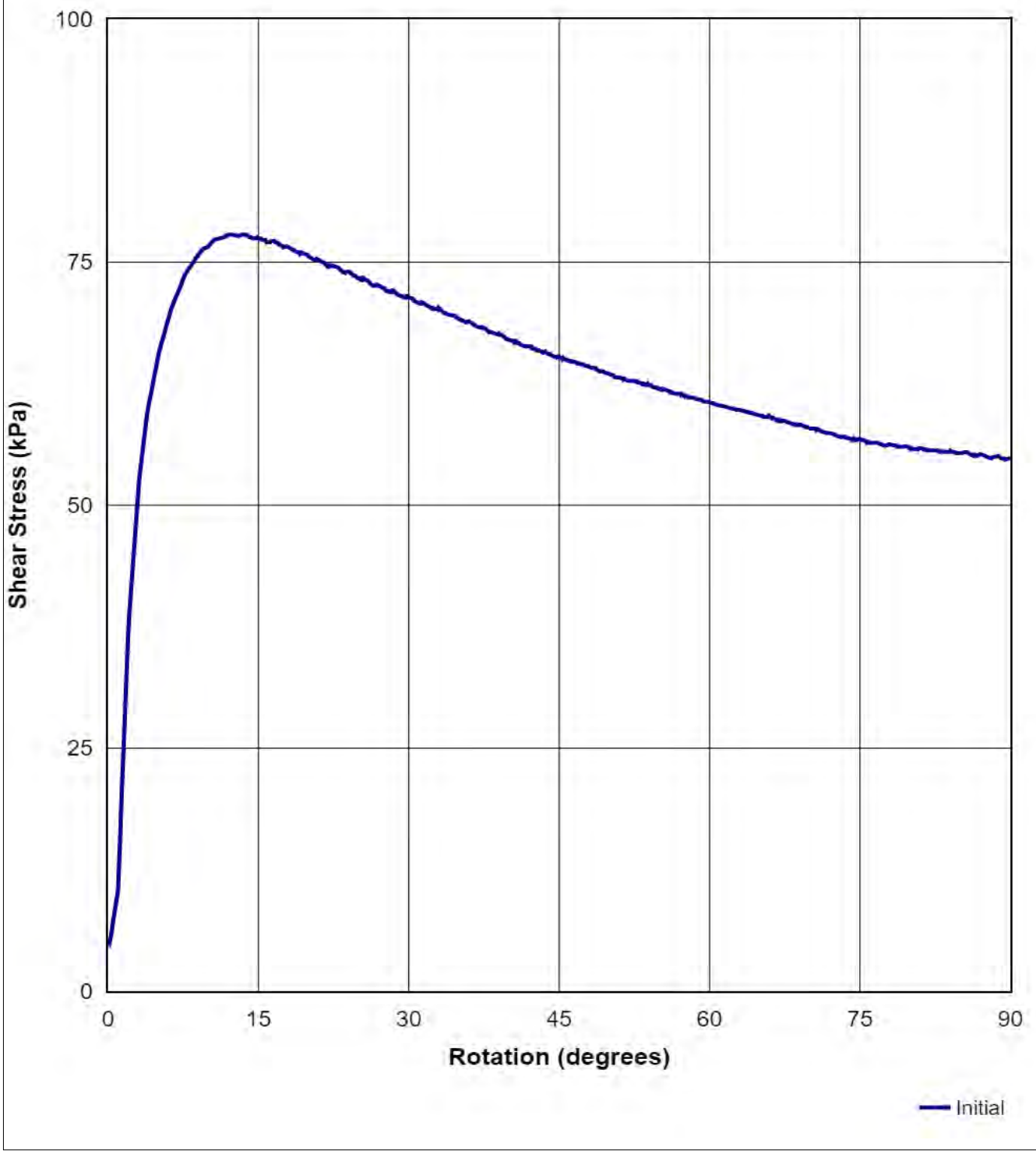
VANE SHEAR TEST

CPT-02
(5.0 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435098, 7250144**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**5.00**
TEST DATE	**20/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



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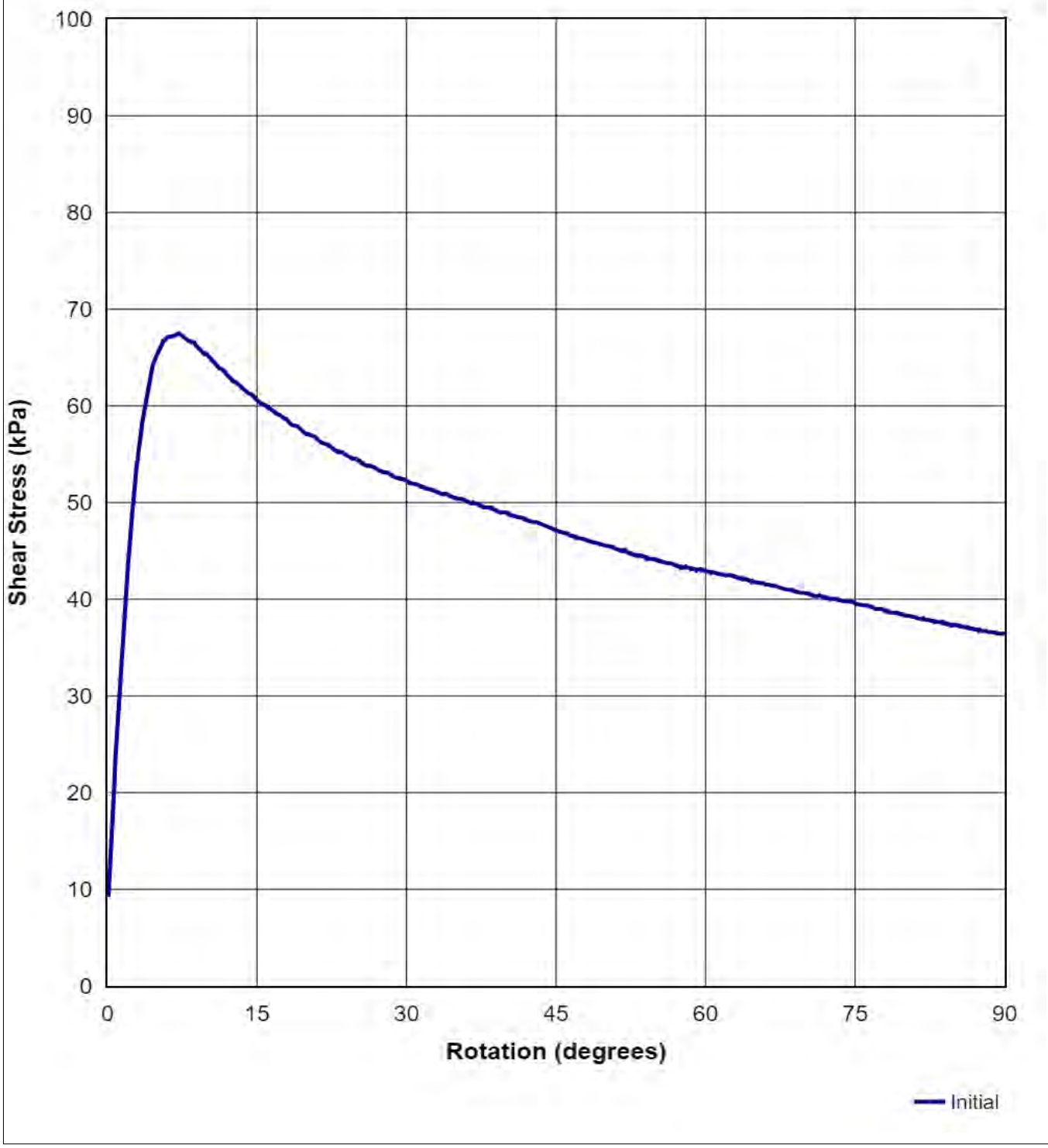
VANE SHEAR TEST

CPT-02
(7.0 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435098, 7250144**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**7.00**
TEST DATE	**20/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



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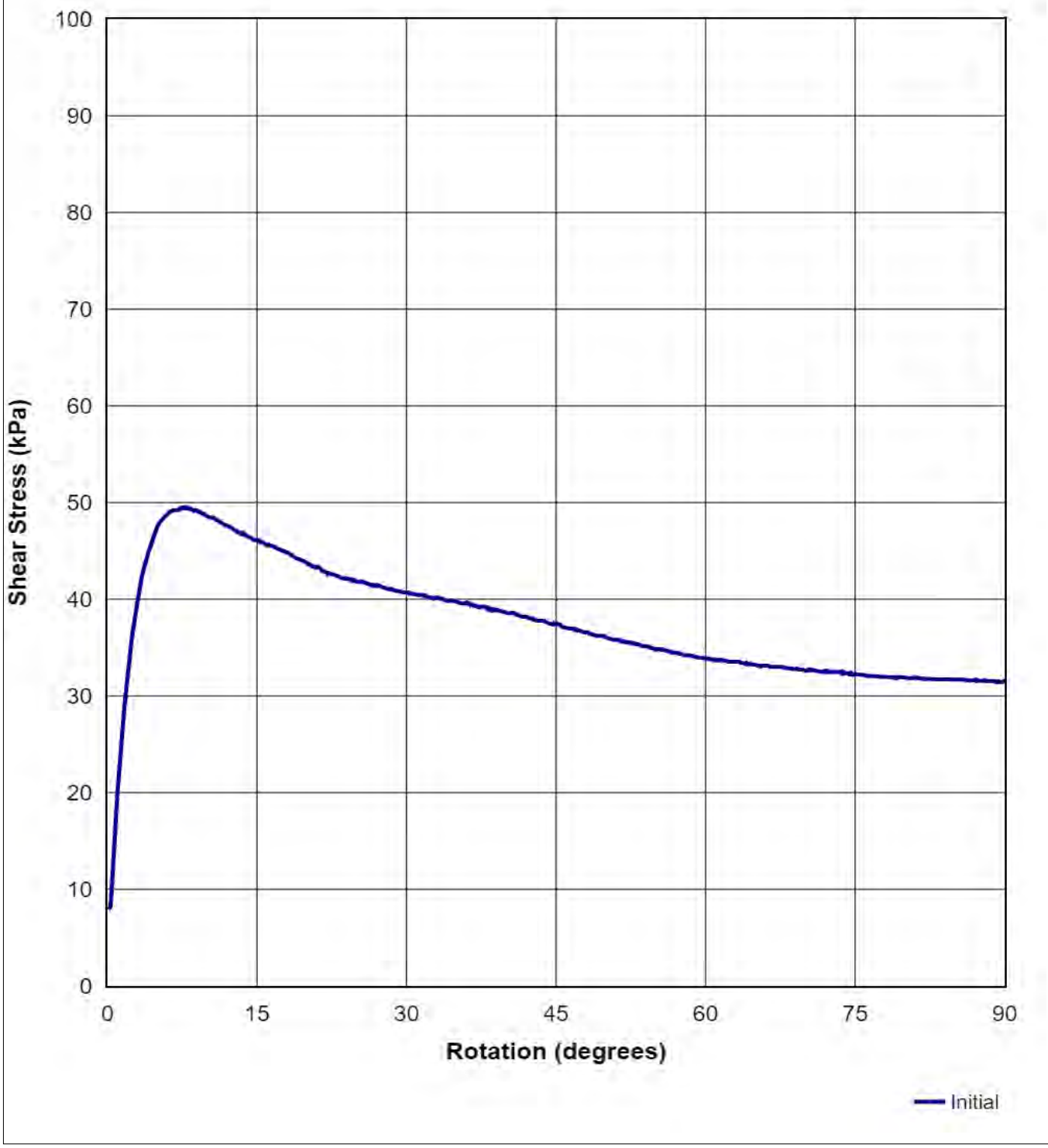
VANE SHEAR TEST

CPT-02
(8.5 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435098, 7250144**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**8.50**
TEST DATE	**20/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



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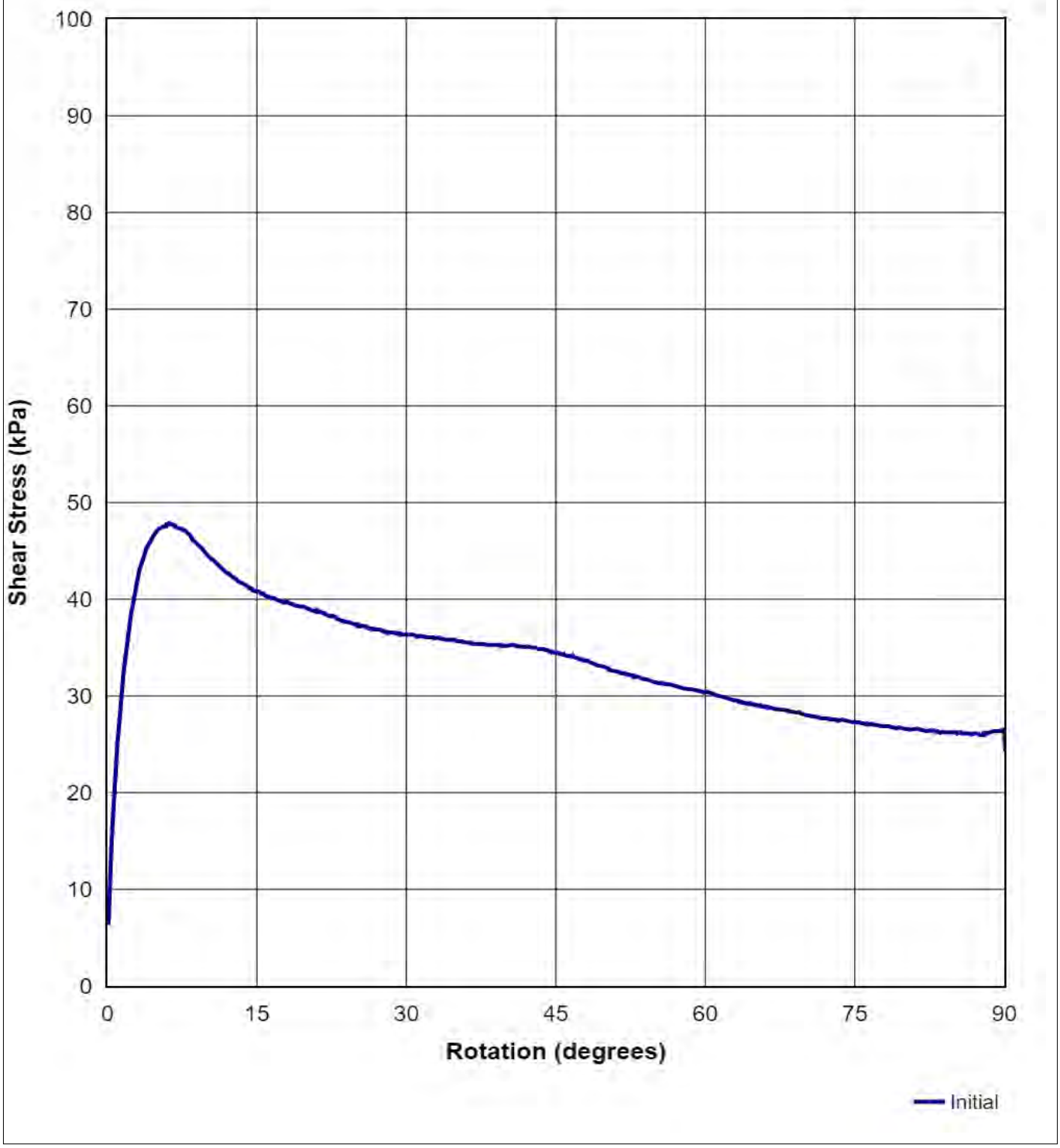
VANE SHEAR TEST

CPT-02
(11.2 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435098, 7250144**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**11.20**
TEST DATE	**20/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



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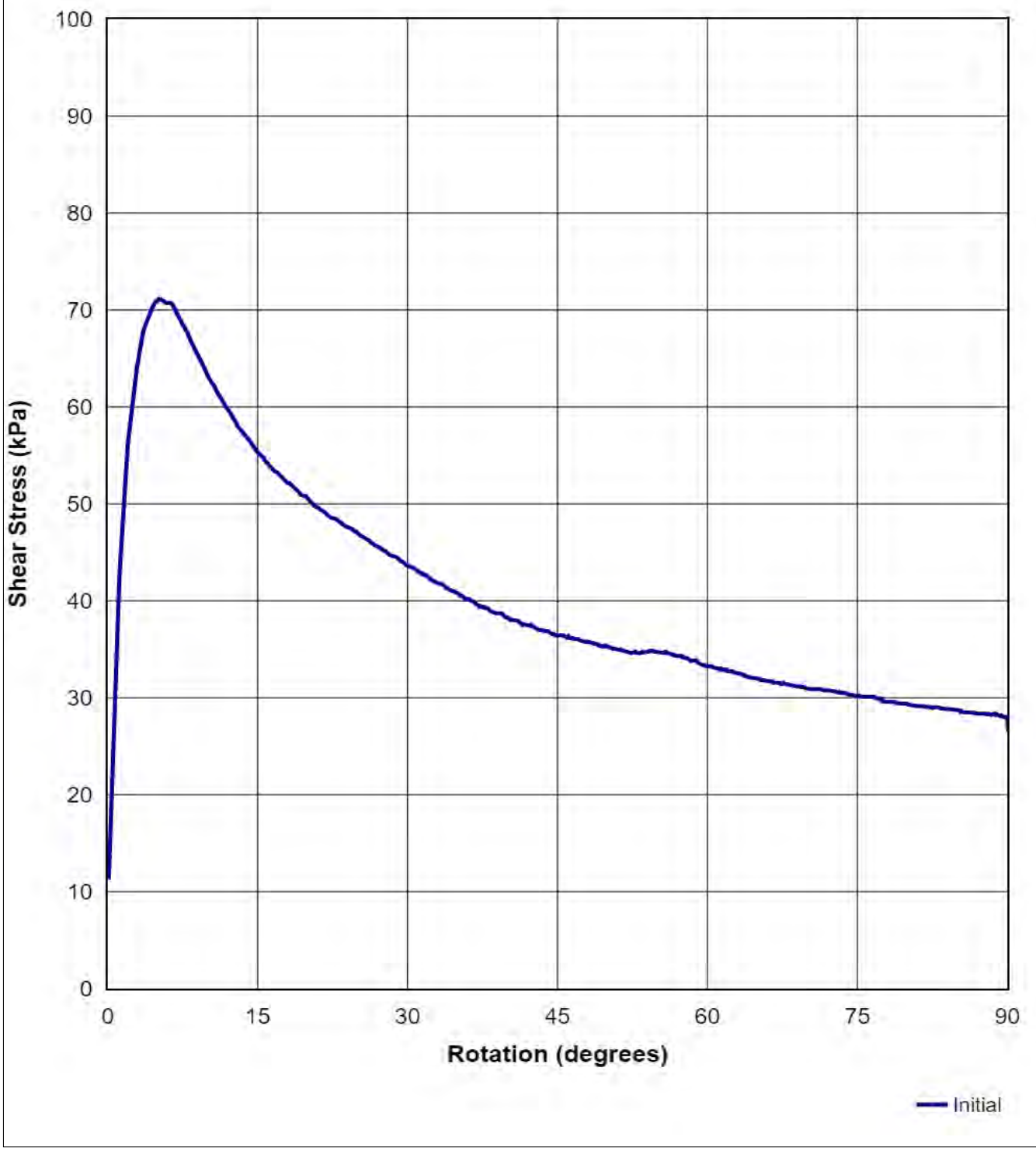
VANE SHEAR TEST

CPT-02
(13 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435098, 7250144**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**13.00**
TEST DATE	**20/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



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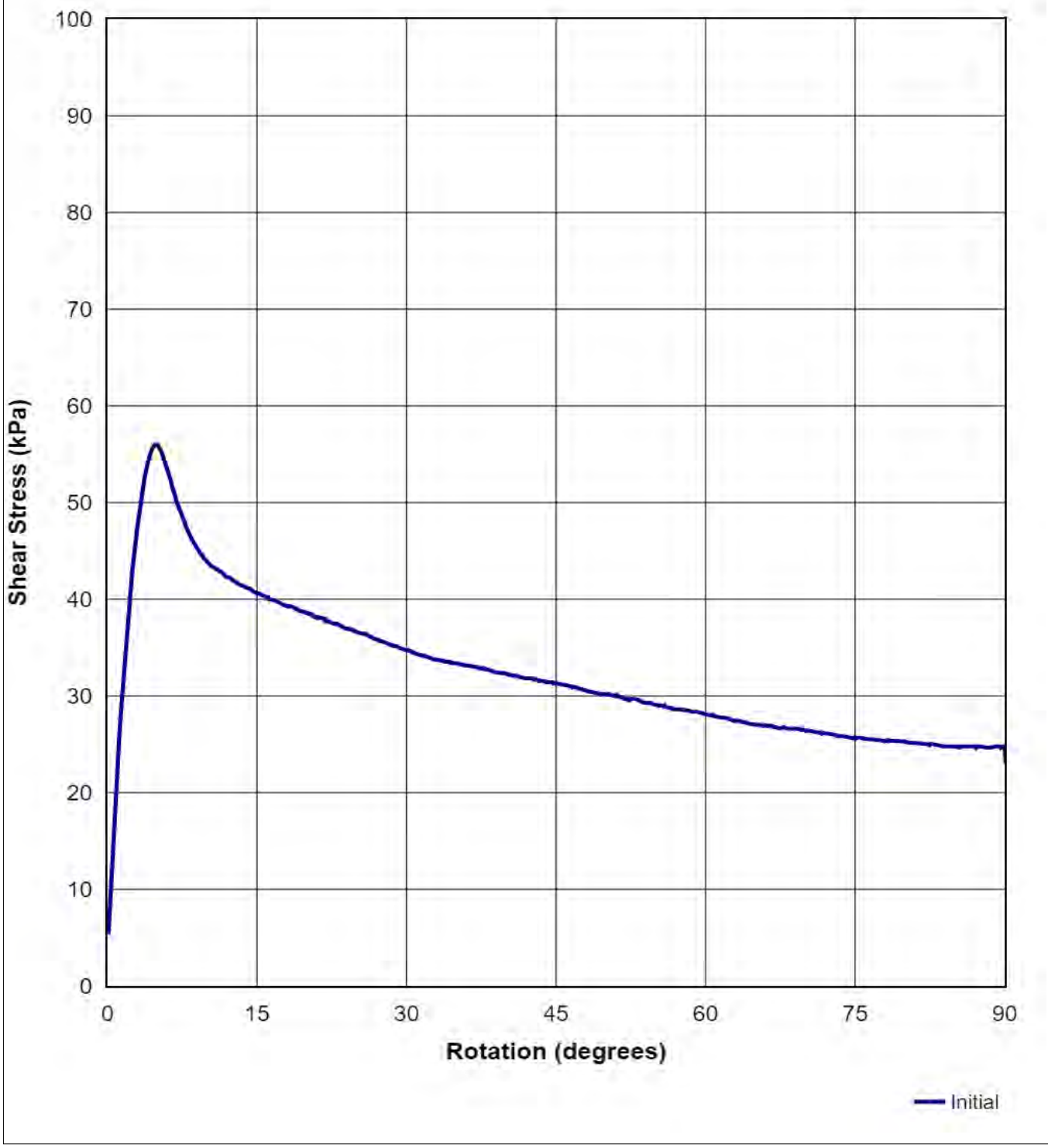
VANE SHEAR TEST

CPT-02
(14.5 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435098, 7250144**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**14.50**
TEST DATE	**20/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



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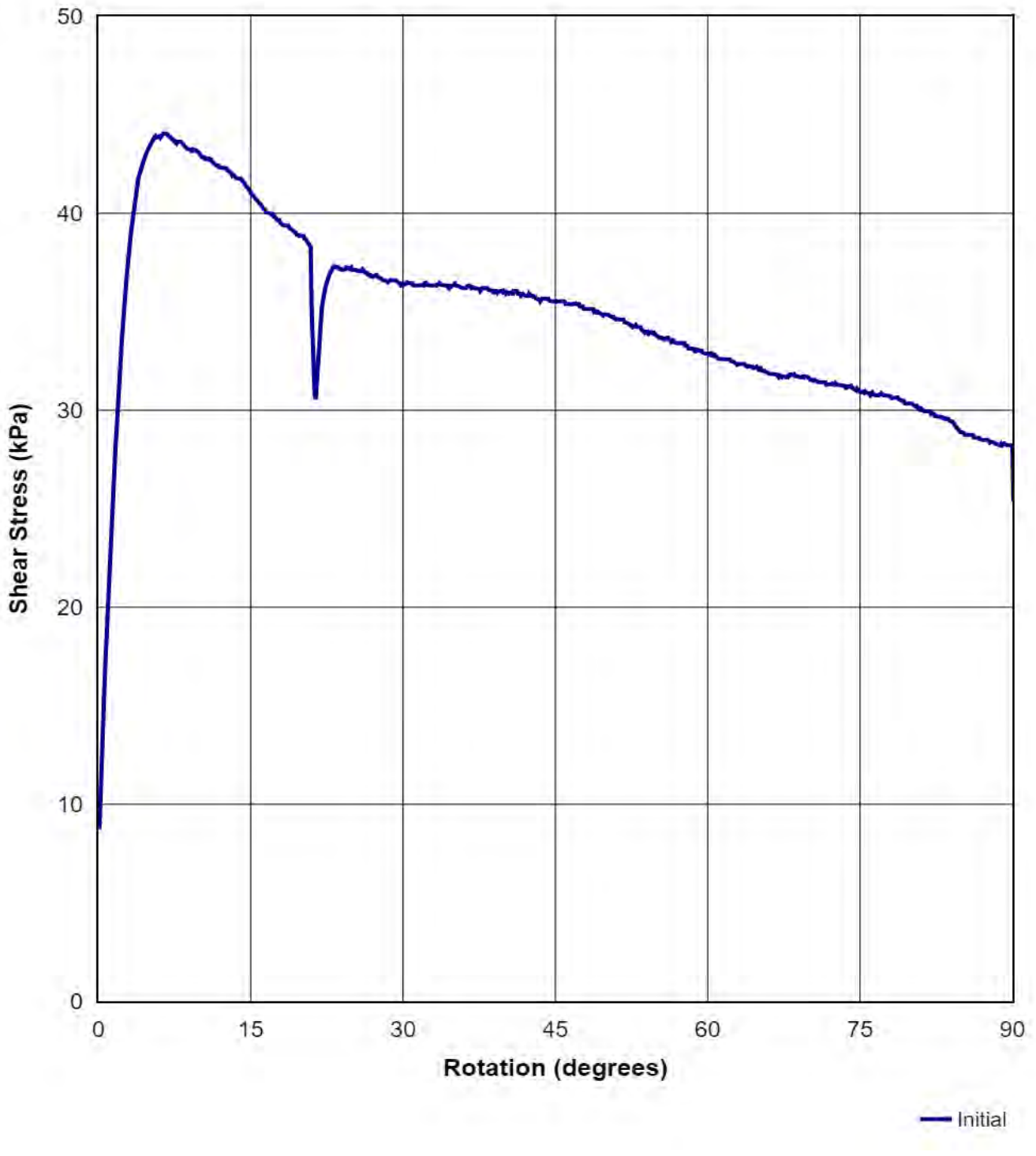
VANE SHEAR TEST

CPT-05
(4.5 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435334, 7250160**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**4.50**
TEST DATE	**24/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



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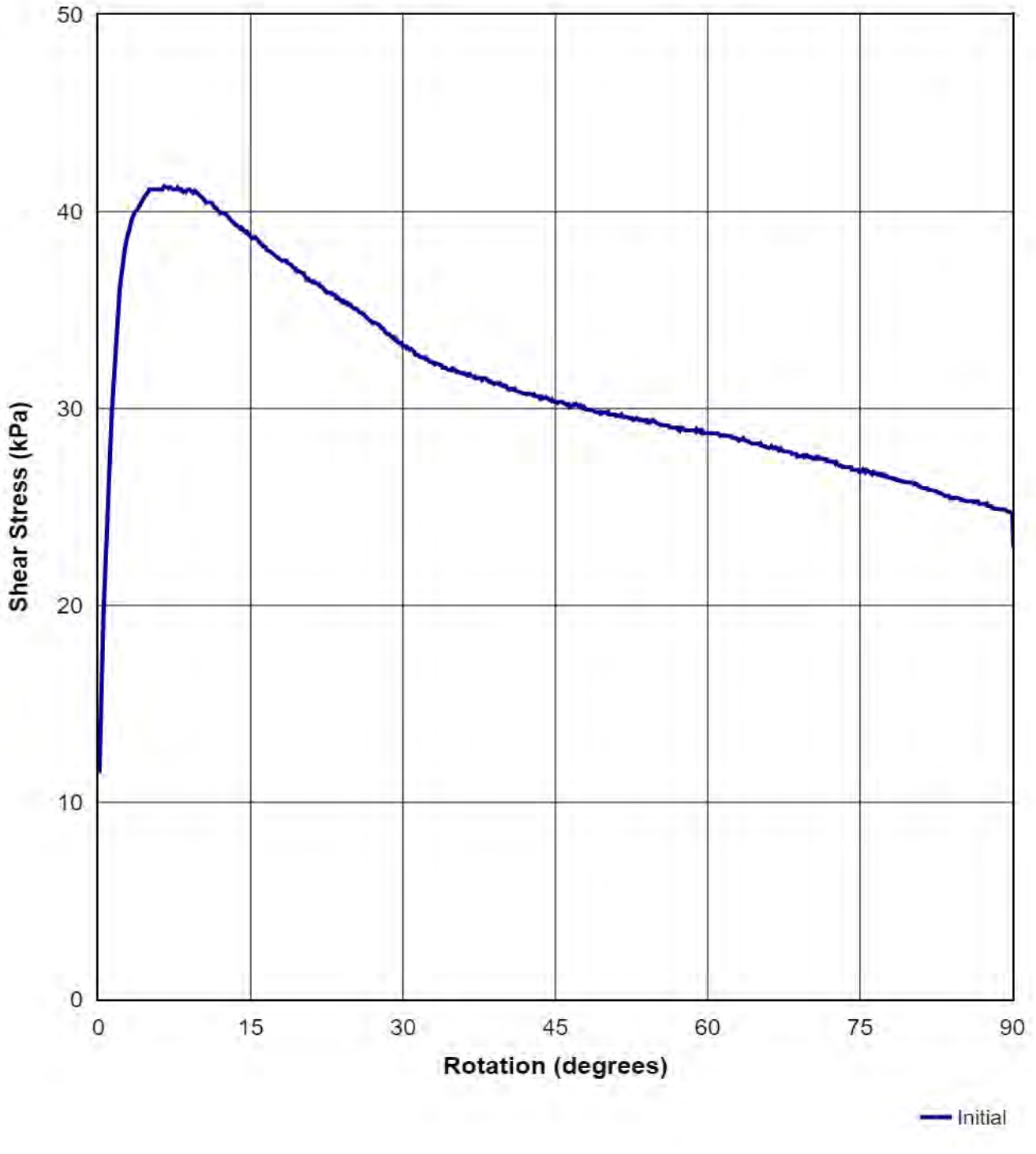
VANE SHEAR TEST

CPT-05
(6.0 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435334, 7250160**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**6.00**
TEST DATE	**24/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



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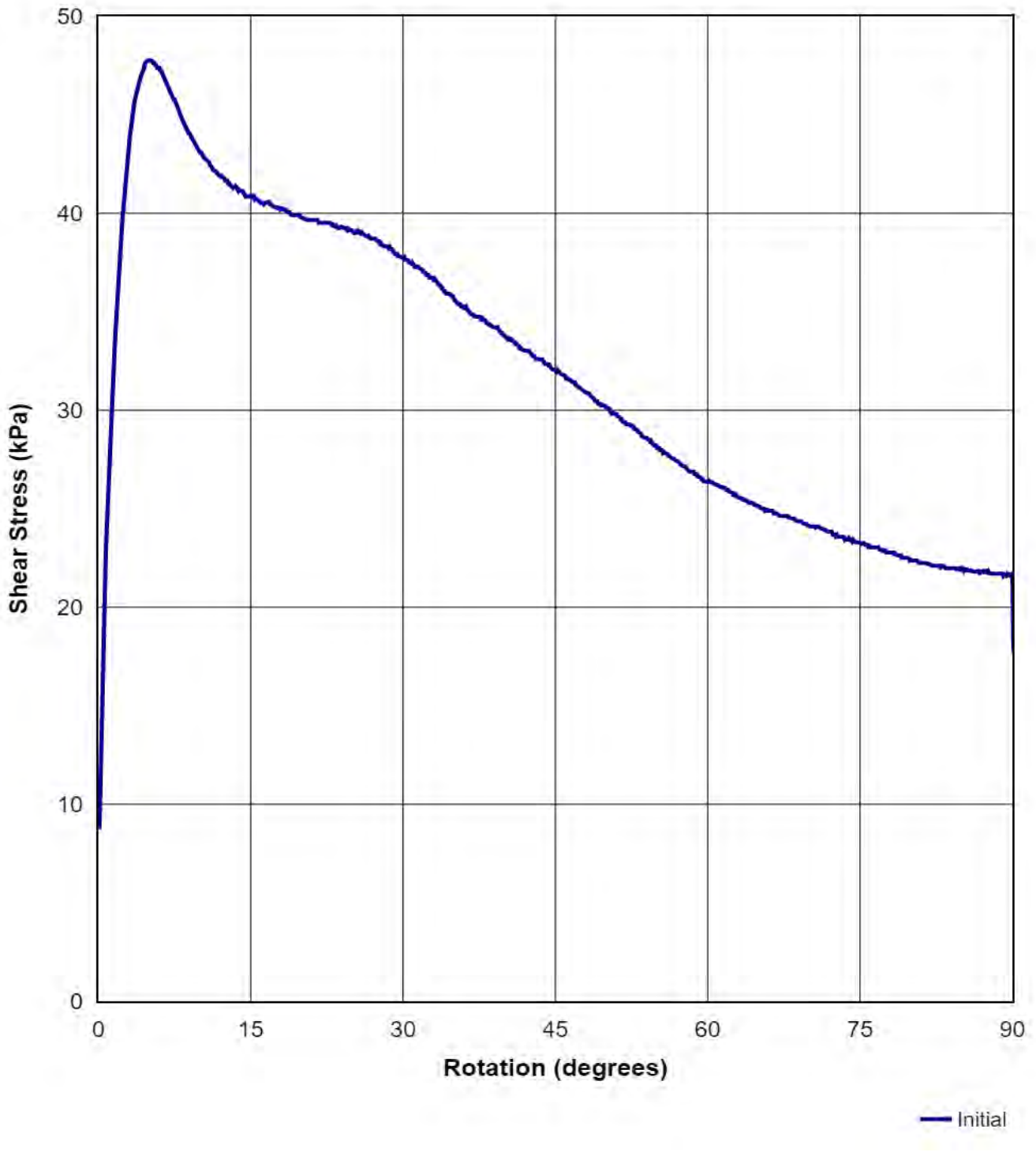
VANE SHEAR TEST

CPT-05
(7.5 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435334, 7250160**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**7.50**
TEST DATE	**24/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



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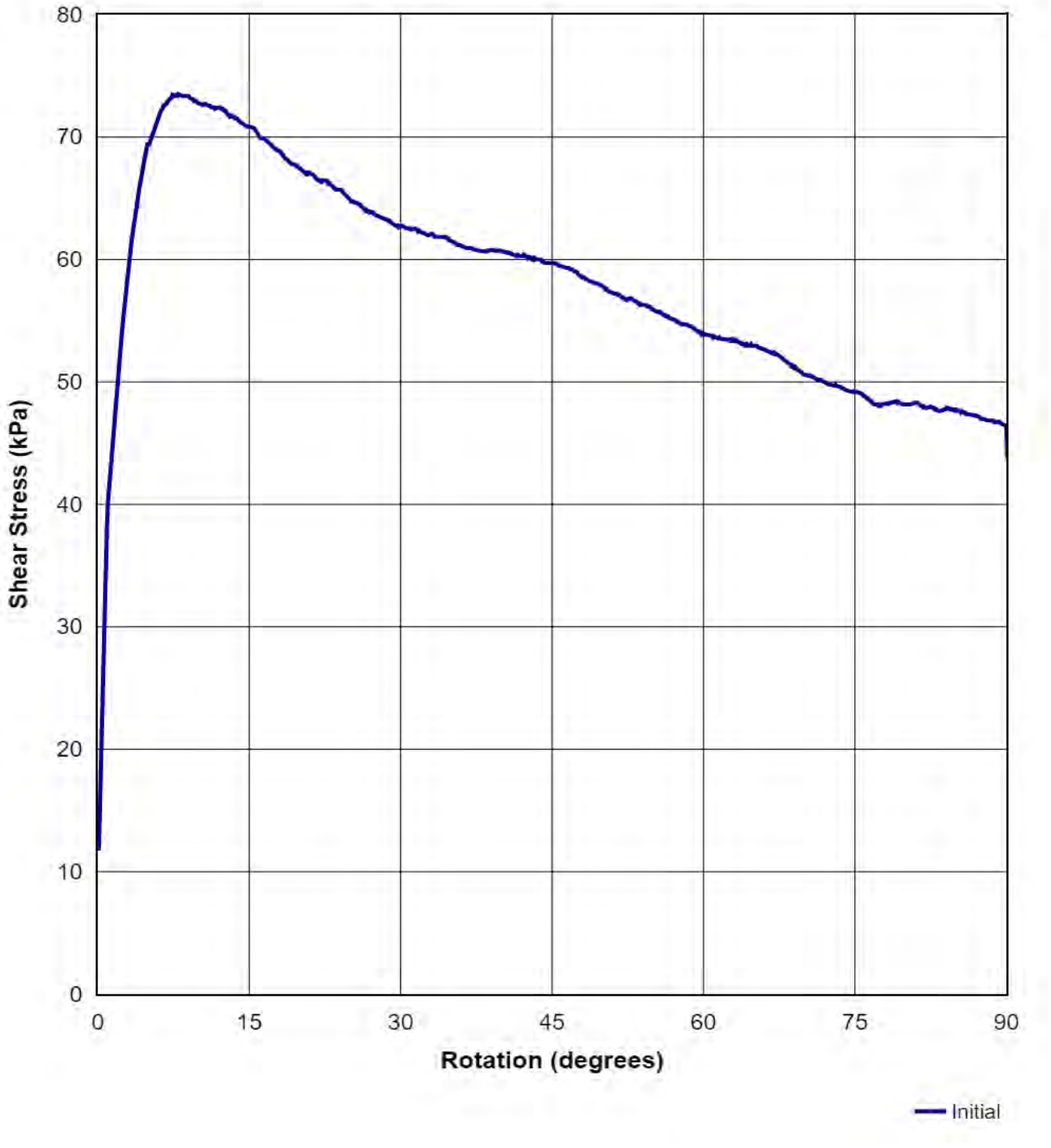
VANE SHEAR TEST

CPT-05
(10.0 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435334, 7250160**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**10.00**
TEST DATE	**24/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



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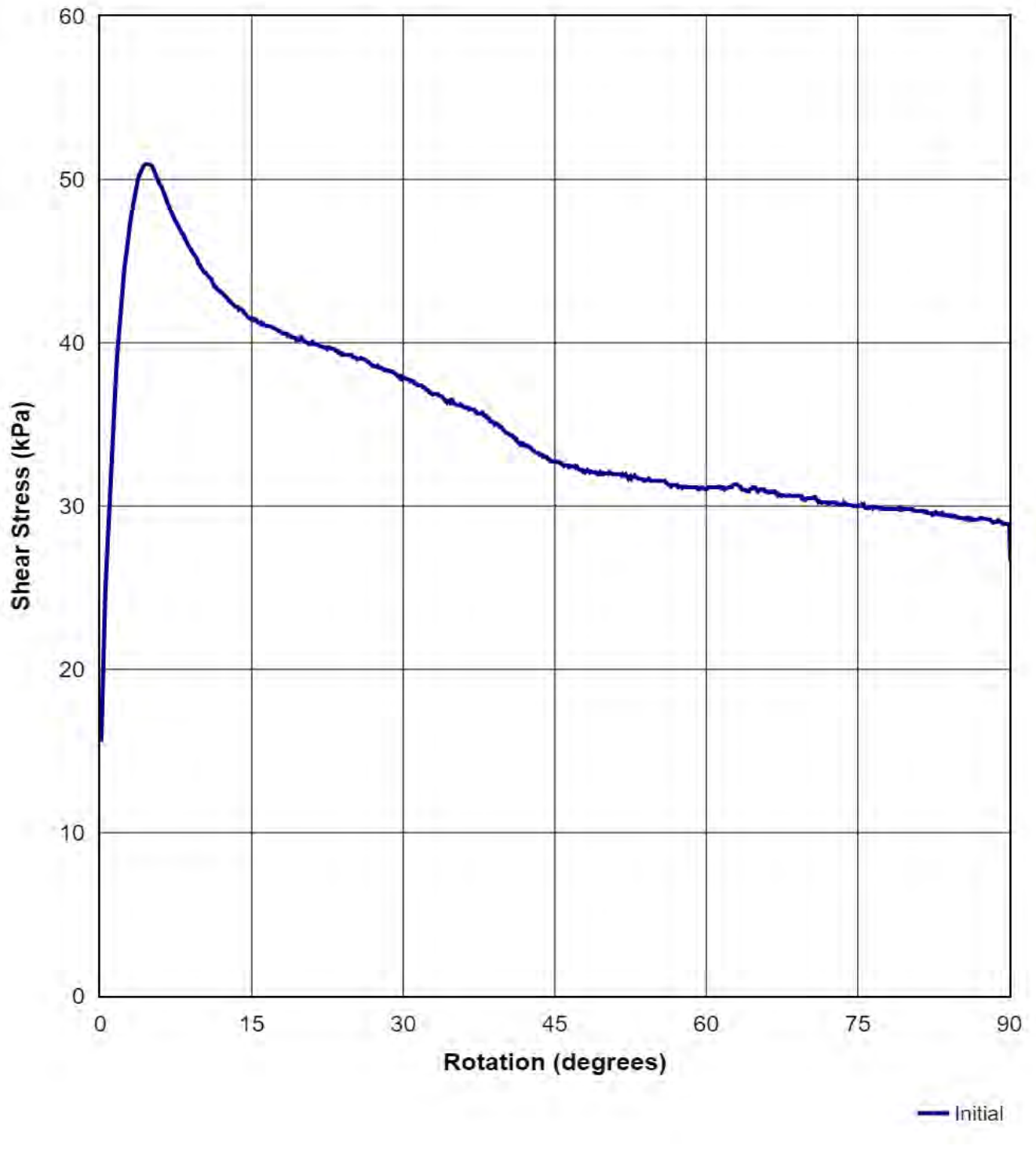
VANE SHEAR TEST

CPT-05
(11.0 m)

CLIENT	**SMEC**
PROJECT	**Bundaberg East Levee**
LOCATION	**Bundaberg QLD**
JOB NUMBER	**G24-03-09**
GPS POSITION	**56 J 435334, 7250160**
GPS FORMAT	**WGS84**

VANE TYPE	**I-VANE**
VANE NUMBER	**231001V**
CALIBRATION DATE	**19/12/2023**
VANE SIZE	**50 x 100**
VANE CONSTANT	**1.964**

TEST DEPTH (m)	**11.00**
TEST DATE	**24/04/2024**
ROTATION RATE (^{0}/min)	**6**
TESTED BY	**Sean Gibson**
CHECKED BY	**Mark Chapman**



Appendix G **Geophysics Survey**

Appendix H **Laboratory Test Certificates**

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Fortitude Valley, Queensland 4006

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Email: australia@smec.com

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