

**Additional Geotechnical
Investigation for Causeway
Pedestrian and Cyclist Bridge:
Factual Report
Causeway Link Alliance**

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	NAME	TITLE	SIGNATURE	DATE
PREPARED BY	Ian Benton	Senior Associate Engineering Geologist		19-08-2022
REVIEWED BY	Su Kwong, Tan	Principal Geotechnical Engineer		19-08-2022
APPROVED BY	Shereen Mikhail	Project Director		19-08-2022

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1. INTRODUCTION

This report presents the factual field and laboratory geotechnical results obtained during the Phase 2 Ground Investigation (GI) carried out to inform the detailed design of the Causeway Pedestrian and Cyclist Bridge (CPCB) project.

In June 2020, WSP was contracted by MRWA to carry out a preliminary GI (WSP, 2021) adjacent to, and along the alignment of the proposed CPCB project. The scope of phase 1 GI was developed by WSP and carried out in August 2021 for MRWA to provide tenderers with site-specific geotechnical data. A second phase of GI (phase 2 GI) was carried out between 23 June 2022 and 15 July 2022 to inform the detailed design of the CPCB project. The scope of work included investigation of geotechnical and hydrogeological conditions along the alignment of the proposed CPCB. The purpose of the investigation was to provide data and information for characterisation of soils and rocks and ground conditions to supplement detailed design and construction of the project. WSP was responsible for supervision of the GI and for collation of the factual data. Subcontractors used for the GI were procured, engaged, and inducted by WSP.

Geotechnical investigation works for the CPCB project were carried out at McCallum Park, Heirisson Island and Point Fraser. WSP and CLA were responsible for coordinating site access and arranging necessary permits to undertake the works at Point Fraser, Heirisson Island and McCallum Park.

Figure 1 shows the Phase 1 and 2 investigation location relative to the CPCB alignment. Drawings SK01A to SK01C (presented after text) present the CPCB alignment and Phase 1 and 2 GI test locations.

A program of geotechnical laboratory testing is being undertaken on samples recovered during the fieldwork. This report presents results for geotechnical laboratory testing received up to 12 August 2022 only. Outstanding geotechnical laboratory test results will be included in subsequent revisions of this report.



Figure 1: Phase 1 and 2 Investigation Test Locations

The scope of work for the Phase 2 GI included the following:

- Intrusive site investigation by drilling of boreholes with sampling and in situ testing (including Standard Penetration Tests (SPTs) and/or thin wall tube sampling, at 1.5 m intervals and coring in rock) and electric friction cone penetrometer tests (CPT and CPTu).
- Survey of all investigation locations, including position and elevation.
- Geotechnical laboratory testing on recovered samples to obtain design parameters, including classification, deformation, and strength testing.
- Geotechnical factual report.

1.1 Relevant Reports and Published Information

This report supplements geotechnical investigations conducted by WSP between June and August 2021. The following reports and published information are relevant to the CPCB project:

- BGE (2021). RN 1098 - Preliminary Waterways Assessment. (Ref: BGE-P0181-REP-W-0001 REV/0 Date 28/01/2021)
- Golder (2019). Waterbank Development Geotechnical Interpretive Report. (Ref: 137642103-017-R-Rev1).
- Golder (2021). Compilation of Historic Geotechnical Field Investigation Data. New Causeway Pedestrian Bridges, Perth. (Ref: 20391097-001-R-Rev0).
- Gordon, F. R. (2003). Sea Level Change and Paleochannels in the Perth Area. Australian Geomechanics Vol 38(4). The Engineering Geology of Perth, Part 2.
- Gozzard, B. (1986). Perth Sheet 2034 II and part 2034 III and 2134 III. Perth Metropolitan Region Environmental Geology Series. Geological Survey of Western Australia GSWA).
- Gozzard, B. (2007). The Guildford Formation Re-Evaluated. Australian Geomechanics Vol 42, pp.59-80.
- The Department of Water and Environmental Regulation (DWER) Perth Groundwater Map (2021). <https://maps.water.wa.gov.au/Groundwater/>
- WSP (2021a). Causeway Pedestrian and Cyclist Bridge Geotechnical Factual Report (Ref: PS124806-GTT-REP-001Rev0).
- WSP (2021b). Causeway Pedestrian and Cyclist Bridge Geotechnical Interpretive Report. Ref: PS124806-GTT-REP-002.

2. PROJECT BACKGROUND

The CPCB project involves the provision of a new active transport river crossing linking Point Fraser in East Perth to McCallum Park in the Town of Victoria Park via Heirisson Island. Comprising two cable stay bridges, the proposed crossing will be located approximately 80 m downstream of the existing Causeway bridge. The scope of the CPCB project includes:

- Point Fraser (north-western) bridge crossing the Swan River consisting of bridge abutments and an offset central support pier.
- McCallum Park (south-eastern) bridge crossing the Swan River consisting of bridge abutments and two offset central support piers.

- 6.0 m wide separated path on bridge, associated footpath approach ramps, connections, and footpath pavements. Increased navigational clearances for both structures in particular the Point Fraser structure i.e., the primary river navigational channel.

3. OBJECTIVES

The objectives of the Phase 2 GI described in this report were to obtain additional information about the subsurface ground and groundwater conditions along the alignment of the CPCB project and to supplement geotechnical information gained from the preliminary GI. The scope of work comprised the following items:

- Intrusive ground investigation including borehole drilling (BHs), cone penetration tests (CPTs) and hand auger boreholes (HAs),
- Laboratory and in situ testing on recovered soil samples,
- This factual report describing the works completed and presentation of the results of the field and laboratory investigations.

The extent of the investigatory works carried out to date are shown on drawings SK01A to SK01C (3 drawings).

4. SITE CONDITIONS

4.1 Site History

The proposed CPCB will be situated on reclaimed land at Point Fraser, McCallum Park and Heirisson Island which have been modified and reclaimed through the following activities at various times:

- Point Fraser: Reclamation by placement of uncontrolled fill, sometime between 1953 and 1961.
- Heirisson Island: Reclamation of parts of the river by placement of uncontrolled fill including industrial and domestic landfill and clean sand, sometime before 1953.
- McCallum Park: Reclamation by placement of uncontrolled fill, sometime before 1953.

4.2 Geological Setting

This section of the report describes the topography along the CPCB alignment and prevailing geological conditions in both a regional and local context. The character, distribution and depositional history of the geological units outlined in Section 4.2.4 are described in detail in Gordon (2003), Gozzard (2007), Gordon (2012) and WSP (2021b).

4.2.1 Topography

Based on available Landgate ground contour information, the CPCB alignment is typically characterised as flat lying. Elevations along the alignment vary relative to the Australian Height Datum (AHD) as follows:

- Point Fraser and McCallum Park: elevations typically vary between RL 0.4 m and 2 m AHD.
- Heirisson Island: elevations typically vary between RL 0.4 m and 3 m AHD.

4.2.2 Geomorphology

The Geological Survey of Western Australia (GSWA) Perth Sheet 2034 II, part of 2034 III and 2134 III (Gozzard, 1986), 1:50,000 scale environmental geology series map indicates that the CPCB alignment is situated within a geomorphological domain that is characterised by a gently undulating surfaces associated with a river floodplain and undifferentiated river terraces with slope angles that range between 0° and 3°.

4.2.3 Regional Geology

The Swan Coastal Plain is the surface expression of the Perth Basin, which contains sedimentary rocks and soils of Mesozoic Age (Jurassic to Early Cretaceous Age) which are widespread and represent filling of the basin. Erosion of the Cretaceous Age sediments during the Late Tertiary (Pliocene Age) created a planar unconformity surface on which Pliocene Age to recent superficial deposits were laid down in marine, alluvial and aeolian environments.

Rivers that cross the Swan Coastal Plain have formed a network of channels in the Pliocene and recent superficial formations and older underlying Mesozoic sedimentary rocks, filling the channels with a complex suite of granular and cohesive soils. These channels are referred to in the published literature as paleochannels.

At the Causeway site, Gordon, (2012) suggests that two paleochannels are present in a broad valley that was created by erosion of the underlying Kings Park and Osborne Formations (Mullaloo Sandstone and Kardinya Shale Members respectively) by an ancestral Swan River. The paleochannels are assigned names i.e., Channel 2 (Last Glacial) and Channel 6 (Penultimate Glacial), which correspond to two separate drops in global sea levels that are believed to have occurred sometime around 20,000 and 150,000 years ago respectively. Gordon, (2012) also suggests that Channel 2, situated below the East Perth side of the Swan River, is infilled with superficial deposits that have been assigned to the Swan River Formation. The thalweg for Channel 2 (i.e., line of lowest elevation within a channel) is believed to be located at a depth of around 26 m, however this remains speculative at present.

Similarly, Gordon, (2012) suggests that Channel 6, located below the Victoria Park side of the Swan River, is infilled with superficial deposits that are now assigned to the Perth Formation. The thalweg for Channel 6 is believed to be located at a depth of around 35 m, however this remains speculative at present.

4.2.4 Site Geology

Historical records and information from historic and recent ground investigations indicates that a superficial layer of uncontrolled fill, derived from landfill and reclamation activities is present at the Causeway site i.e., at Point Fraser, Heirisson Island and McCallum Park. Available GI information indicates that the thickness of fill varies along the project alignment e.g., at Heirisson Island the fill is up to 6 m thick. At Point Fraser and McCallum Park, fill is up to 4.5 and 1.5 m in thickness respectively.

Gozzard, (1986) indicates that the superficial layer of uncontrolled fill is underlain by geological Unit C1 (unit terminology adopted in Gozzard, 1986) which is described as "*mid to dark grey, soft, saturated CLAY of alluvial origin, with prominent 0.2 m thick oyster shell bed near the surface.*" Geological Unit C1 is inferred to be the Swan River Alluvium (SRA), which is referred to as Sulphurous Silt and Holocene Alluvium in Gordon, (2003) and Gozzard, (2007) respectively.

Available GI information (WSP, 2021a and 2021b) and information derived from this GI indicates that the SRA (Unit 2 of this study) is around 15 m thick at Point Fraser and decreases in thickness along the CPCB project alignment to the southern end of Heirisson Island, where it appears to be absent. The SRA is believed to be underlain by Pleistocene Alluvium, i.e., soils that are now assigned to the Swan River Formation (formerly categorised as the Guildford Formation in the literature). The Swan River Formation (Unit 3 of this study) may also be underlain by soils belonging to the Perth Formation (Unit 4 of this study); however the thickness and spatial distribution of both the Swan River and Perth Formations along the CPCB alignment is uncertain at present. Soils belonging to the Perth Formation may be restricted in occurrence to the Victoria Park channel of the Swan River.

The unconsolidated soils of Holocene and Pleistocene Age (Units 2 to 4 of this study) are in turn underlain by unconsolidated and partly lithified sediments assigned to the Palaeocene-Eocene Age Mullaloo Sandstone Member (Unit 5 of this study) of the Kings Park Formation. Information from boreholes undertaken at McCallum Park suggests that the fill and superficial deposits at McCallum Park may be underlain by the Kardinya Shale Member (Unit 6 of this study), which is assigned to the Osborne Formation.

A summary of the project specific geological units and lithological descriptions developed from published geological information and available GI information adopted for the CPCB project are presented in Table 1. Reference should be made to WSP, (2021b) for a detailed description of the thicknesses, distribution, and extent of geological units along the alignment of the CPCB.

Table 1: Summary of Project Specific Geological Units

Unit Name	Unit ID	Lithological Description	Depositional Environment
Uncontrolled Fill	Unit 1 Fill	Designated as uncontrolled fill (Sand fill, possible domestic waste). (Filling records unavailable).	Deposited / placed in recent history
Swan River Alluvium	Unit 2 SRA	Typically comprises SAND and CLAY: mid to dark grey, black, blue, soft, saturated, prominent 0.2 m thick oyster shell bed near surface of alluvial origin. (Described in Gozzard, (2007) as Holocene Alluvium and as Black Sulphurous Silt in Baker (1954).	Fluvial / Estuarine
Swan River Formation	Unit 3 SRF (Formerly Guildford Formation)	Typically comprises clean, coarse, grey sands and conglomerates to red, brown, yellow, and black clays and occasional shell beds. (Unit 3 may unconformably overlie the Kings Park Formation and may also be restricted in occurrence to the East Perth side of Swan River Channel)	Fluvial / Estuarine
Perth Formation	Unit 4 PF (Formerly Guildford Formation)	Medium dense sands, interbedded with stiff clay lenses and some gravel layers. (Unit 4 may unconformably overlie the Kings Park Formation and may also be restricted in occurrence to the Victoria Park side of Swan River Channel).	Fluvial / Estuarine
Mullaloo Sandstone Member	Unit 5 MSM (KPF)	Typically comprises unconsolidated and partly lithified soils and rocks. Mullaloo Sandstone Member: Poorly sorted, fine to very coarse grained, pale brownish green, slightly glauconitic and clayey sand. (Unit 5 believed to be incised into the siltstones and shales of the Kings Park Formation)	Fluvial / Estuarine / Marine
Kardinya Shale Member (Osborne Formation)	Unit 6 KSM (OF)	Typically comprises Interbedded siltstones and shales. (Unit 6 may be restricted in occurrence to McCallum Park)	Fluvial / Estuarine / Marine

4.3 Groundwater

The Perth Groundwater Atlas, which shows the inferred historical maximum groundwater level (1m contour intervals) does not show contours over the site but indicates that the historical maximum groundwater level is less than RL 2.0 m AHD. The 1997 Groundwater Atlas also indicates that the estimated river flood level at Heirisson Island is RL 1.5 m AHD (unknown Annual Exceedance Probability (AEP). BGE (2021) has estimated that the surface water level at the proposed bridges for a 1 in 100-year AEP is RL 2.3 m AHD.

Due to the proximity of the site to the Swan River, groundwater levels in the Upper Aquifer would mainly be governed by the Swan River and thereby affected by flood events, seasonal fluctuations, and tidal

fluctuations. The tidal influence will depend on the distance to the river. Based on our experience in the area we would expect the groundwater level fluctuations in the Upper Aquifer could be up to 1 m.

The groundwater levels during geotechnical drilling during the investigation phases in June and July 2022 indicated that groundwater levels (one-off measurement) ranged between approximately RL 0 m AHD and RL 0.85 m AHD. It is noted that the observed measurements are one-off measurements, which may not have fully stabilised and that range in levels could reflect geographical locations of boreholes and tidal effects. Long-term groundwater level monitoring would be required across the site to better understand the groundwater behaviour and changes (daily and seasonal).

4.3.1 Groundwater Levels

Groundwater level measurement were undertaken in monitoring wells installed as part of Phase 1 geotechnical investigation. Groundwater level measurements are summarised in Table A2, Appendix A.

5. DESCRIPTION OF FIELDWORK

5.1 Scope

The GI was undertaken in accordance with Australian Standard AS1726:2017 Geotechnical site investigations. The following fieldwork was undertaken between 23 June 2022 and 15 July 2022:

- 8 boreholes designated CPCB-BH01 to CPCB-BH08 inclusive. Boreholes were drilled by sub-contractor National Geotech using PQ3 (83 mm) core drilling techniques to depths up to 44.45 m below ground level. Details of the strata encountered are provided on the individual borehole logs in addition to an assessment of Total Core Recovery (TCR), Solid Core Recovery (SCR) and Rock Quality Designation (RQD) (where appropriate), each expressed as a percentage of the individual core runs.
- 17 CPTs designated CPCB-CPTU03 to CPCB-CPTU06 inclusive, CPCB-CPTU06A, CPTU06B, CPCB-CPTU07A, CPCB-CPTU07B, CPCB-CPTU08, CPCB-CPTU09, CPCB-CPT11, CPCB-CPT12, CPCB-CPT12A and CPCB-CPT13 to CPCB-CPT16 inclusive without pore water pressure measurement by Probedrill Geotechnical Survey Pty Ltd (Probedrill) and tested in accordance with AS 1289.6.5.1-1999 to depths of up to 30.1 m.
- 4 CPTUs designated CPCB-CPTU01, CPCB-CPTU02, CPCB-CPTU07 and CPCB-CPTU10 with pore water pressure measurement by Probedrill and tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer to depths of up to 20.48 m.
- 11 Hand Auger (HA) boreholes designated CPCB-HACPT01 to CPCB-HACPT06, CPCB-HACPT11, CPCB-HACPT12, and CPCB-HACPTU07 to CPCB-HACPTU09 inclusive to depths up to 2 m to clear BH and CPT test locations for underground services.

During the investigation, the positions of some proposed test locations were changed or removed from the scope of work due to heritage and archaeological restrictions.

A summary of the individual test location details including unique identification numbers, coordinates and levels of each test type are presented in Table A1 Appendix A. BH, CPT and HA Logs are provided in Appendix B to D respectively.

5.2 Fieldwork Supervision

Site access to enable the investigatory works was coordinated by representatives from Causeway Link Alliance (CLA) who were responsible for the following planning and GI management tasks:

- Liaison with the City of Perth to obtain the relevant permits, and approvals to undertake investigatory works at Point Fraser and Heirisson Island. The Town of Victoria Park were also consulted prior to undertaking investigatory works at McCallum Park.

- Dial-Before-You-Dig (DBYD) requests.
- Coordination with approved service locator.
- On-site relocation and positioning of test locations to confirm that they avoided underground services. Test locations were adjusted in accordance with the criteria set out within the WSP permit to dig system which was adopted for the investigatory works.

Geotechnical engineers from CLA completed the following fieldwork tasks:

- Supervision of drilling and probing of BHs and CPTs respectively, and hand auguring to clear test locations of underground services.
- Logging of soils and rocks encountered during the investigation.
- Collection of soil and rock samples for laboratory testing.
- In-situ testing e.g., infiltration testing.
- Coordination of access with City of Perth Rangers to facilitate the investigation.
- Coordination of Traditional Owner who were engaged to monitor the investigation.

5.3 Permits and Approvals

Representatives from CLA liaised with the City of Perth to obtain the relevant permits, and approvals to undertake investigatory works at Point Fraser and Heirisson Island. The Town of Victoria Park were also consulted prior to undertaking investigatory works at McCallum Park, although no permit was required to undertake investigatory works.

5.4 Service Location

A phased approach was adopted for the identification and avoidance of underground services along the CPCB alignment. Investigation locations were positioned away from services deemed to be high-risk (e.g., high-pressure gas pipelines and water/sewer mains) to reduce the risk of impact to the service.

Prior to intrusive ground activities, CLA conducted a Dial Before You Dig (DBYD) request to assess the location of underground services along the CPCB alignment. Abaxa, an accredited MRWA service locator, was engaged to assess the locations of underground services along the CPCB alignment. Potholing for underground services at Point Fraser was sub-contracted to National Geotech and their sub-contractor Abaxa and coordinated by representatives from CLA. Potholing for underground services at McCallum Park was coordinated by CLA to facilitate investigation of specific underground services e.g., Telstra fibre-optic cable and an abandoned gas main that could not be adequately confirmed by Cable Avoidance Tool (CAT) techniques and non-destructive methods. Geotechnical Engineers from CLA were provided with a site plan showing the locations of all geotechnical tests and locations relative to existing underground services (abandoned or otherwise).

The following tasks pertaining to the identification and avoidance of underground services were undertaken:

- Desktop study of DBYD information and site-based visual inspection of all test locations.
- Service detection using Cable Avoidance Tool (CAT) techniques prior to breaking ground.
- Investigation by HA (with geotechnical logging to depths up to 1.5 m) at each test location at McCallum Park and Heirisson Island.
- Investigation by vacuum potholing (with geotechnical logging to depths of up to 2 m) at each test location at Point Fraser.

5.5 Survey Information

Test locations were initially surveyed by an Engineering Surveyor using a Leica Real Time Kinematic (RTK) Global Positioning System (GPS) and a Leica total station, accurate to ± 0.05 m and relative to the Perth Coastal Grid Coordinate System (PCG94) and AHD.

Following completion of the investigations, the locations of test positions were also recorded using a hand-held GPS by geotechnical engineers from CLA, accurate to ± 5 m, with visual reference to surface features.

The surveyed coordinates and ground surface levels of the test locations are presented in Table A1 Appendix A. Test locations are also shown on drawings SK01A to SK01C (3 No. drawings).

5.6 Geotechnical Boreholes

Geotechnical borehole drilling was conducted using a Geoprobe 7822DT track mounted drill rig supplied and operated by National Geotech Pty Ltd. The boreholes were drilled by PQ3 drilling techniques to depths between 25 m and 44.45 m below the existing ground surface.

All retrieved core was photographed, logged and sub-sampled prior to packaging in lay flat plastic within the core boxes to minimise moisture loss. Geotechnical borehole logs and core photographs are presented in Appendix B. In addition, a list of explanatory notes, abbreviations and a description of the soil classification system used to develop the descriptions on the logs are also presented in Appendix B.

All boreholes were backfilled with grout and topped with spoil material at the conclusion of drilling. No permanent monitoring installations (e.g., PVC casing, wells, piezometers, etc) were installed in the boreholes prior to completion.

All other waste was collected from the drilling sites following completion of the boreholes and disposed of by National Geotech.

5.6.1 Standard Penetration Testing

Standard Penetration Tests (SPTs) were carried out at 1.5 m intervals to assess the relative density of the soil encountered and recover disturbed samples. The SPT termination criteria adopted was in accordance with ASTM D1586 / D1586M:2018 (EDT 1) as this was deemed more onerous than the criteria specified in AS1289.6.3.1. ASTM D1586:2018 termination criteria specifies 50 blows in any 300 mm interval, 10 blows with no observable advancement or hammer bouncing. SPT values presented on borehole reports are uncorrected for overburden pressure; however, the relative density descriptions presented on borehole reports were corrected due to overburden pressure. The following formula (Liao and Whitman, 1986) was used to correct SPT N values for this purpose:

$$COP = (95.76 / \sigma'_{vo})^{1/2}$$

COP = correction for overburden pressure

σ'_{vo} = effective overburden pressure (kPa)

5.7 Hand Auger Boreholes

HA boreholes were excavated by a geotechnical engineer from CLA to depths up to 1.5 m below ground surface level. On completion, HA boreholes were loosely backfilled with arisings and tamped with the auger.

HA borehole reports are presented in Appendix D in addition to photographs of the recovered material. All material recovered from the hand auger boreholes was logged in accordance with AS1726:2017.

5.8 Geotechnical Logging

Geotechnical boreholes and hand auger boreholes were logged by a geotechnical engineer from CLA in accordance with AS1726-2017.

5.9 Cone Penetration Testing

5.9.1 Cone Penetration and Piezocone Penetration Tests

CPT and CPTu were undertaken using a 22-tonne truck mounted CPT rig supplied and operated by Probedrill Pty Ltd under contract to WSP. Where access prevented the use of the 22-tonne truck mounted rig, an 11-tonne track mounted CPT rig was used. CPTs were undertaken in accordance with AS 1289.6.5.1-1999. A piezocone configuration was used to enable measurements of pore water pressures for the CPTu tests conducted at the proposed bridge abutments.

Results of the testing are presented as plots of cone resistance (q_c), sleeve friction (f_s), friction ratio ($FR = (f_s/q_t) \times 100\%$) and porewater pressure versus depth in Appendix C. A method of soil classification proposed by Robertson et al, (1986) based on values of q_t and FR is also included in Appendix C.

Refusal of the CPT probe was considered to have occurred when the probe deviated significantly from the vertical (inclination) or encountered material that could not be penetrated. Refusal occurred at several locations at shallow depths (less than 2 m below ground level). Where shallow refusal occurred, or if refusal was encountered above target depth, probing was re-attempted at up to two further locations in the vicinity of the original proposed CPT site (within an approximate 2 m radius). Where penetration testing was repeated, suffixes are included in the test location identifier (i.e. -A, -B, etc). A summary of the locations where CPT refusal was encountered, and the termination reasons is presented Table A1 of Appendix A.

Where underground services were anticipated, CPTs were pre-drilled with a hand auger to depths of up to 1.5 m to check for the absence of underground services. Cone penetration tests were then undertaken through the backfilled hole. The length of the disturbed section is noted on the relevant CPT logs. These zones are not representative of the in-situ conditions.

Groundwater depth measurements were taken after the removal of the CPT rods. These are shown on the CPT/CPTu reports, where groundwater was encountered. It should be noted that groundwater levels observed following extraction of the CPT rods may not necessarily correspond with the static groundwater level at each CPT/CPTu location.

5.10 Test Pits

Test pits were not undertaken as part of the Phase 2, Additional GI.

5.11 Infiltration Testing

5.11.1 Hand Auger Infiltration Testing

At the time of writing, infiltration tests were not undertaken as part of the Phase 2, Additional GI. Infiltration tests will be conducted and reported in Appendix E of subsequent revision of this report

6. DESCRIPTION OF LABORATORY TESTING

6.1 Geotechnical Laboratory Testing

A program of geotechnical laboratory testing is being undertaken on samples recovered during the fieldwork. Laboratory testing on selected soil samples was performed at the following NATA-accredited laboratories:

- WSP Golder,

- E-Precision Laboratory Pty Ltd, and
- Trilab Pty Ltd

Laboratory test results will be reported in Appendix F of subsequent revision of this report.

Table 2: Summary of Geotechnical Laboratory Testing

Test Type	Testing Laboratory	Test Method	No. of Tests Scheduled	No. of Tests Completed
Geotechnical – Soil Testing				
Particle size distribution	WSP Golder	AS1289 3.6.1	17	17
Atterberg limits and linear shrinkage	WSP Golder	AS1289 3.1.2, 3.2.1, 3.3.1 and 3.4.1	17	17
Consolidated Undrained (CU) Triaxial test with pore pressure measurement (single stage)	E-Precision	AS1289 6.4.2	4	2
One-Dimensional Consolidation (1-D)	Trilab / WSP Golder	AS1289.6.6.1	7	0
Geotechnical – Rock Testing				
Uniaxial Compressive Strength (UCS)	WSP Golder	AS4133 4.2.1, 4.2.2	8	0
Point Load Index (PLI)	WSP Golder	AS4133 4.1	16	16

6.1.1 Classification Testing

Particle size distribution, Atterberg limits and linear shrinkage classification tests have been scheduled as shown in Table 2. Testing will be undertaken in accordance with AS1289 3.6.1, AS1289 3.1.2, 3.2.1, 3.3.1 and 3.4.1.

6.1.2 Triaxial and Consolidation Testing

One single stage, consolidated, isotropic and undrained (CU) triaxial test with pore water pressure measurement was scheduled on 4 undisturbed tube samples recovered from the boreholes CPCB-BH01, CPCB-BH05, CPCB-BH06.

One-Dimensional (1-D) consolidation tests were scheduled on seven undisturbed tube samples recovered from boreholes CPCB-BH01, CPCB-BH05, CPCB-BH06 and CPCB-BH08.

6.1.3 Rock Testing

Uniaxial compressive strength (UCS) testing was scheduled on samples of rock strength material with Point Load Index (PLI) testing was also scheduled on samples generally adjacent to the USC samples. UCS testing will be carried out in accordance with AS4133 4.2.1 and 4.2.2.

Axial and diametral tests were scheduled on rock strength materials to assess the effects of anisotropy on the testing. PLI testing will be undertaken in accordance with AS4133.4.1 in diametral and axial directions, with results corrected to a standard 50 mm core diameter.

7. REFERENCES

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AS1726 (2017). Geotechnical Site Investigations. Standards Australia.

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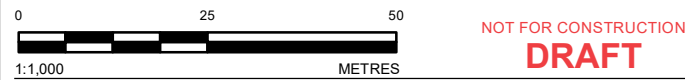
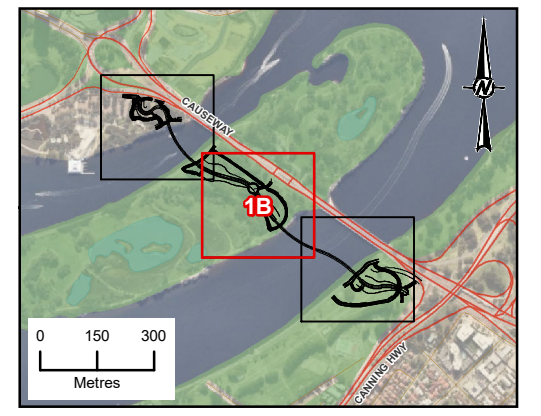
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- LEGEND**
- PHASE 2 ADDITIONAL INVESTIGATION:**
- BOREHOLE LOCATION
 - CONE PENETRATION TEST LOCATION
 - CPTUs WITH DISSIPATION TEST LOCATION

- PHASE 1 INVESTIGATION:**
- TEST PIT LOCATION
 - BOREHOLE LOCATION
 - CONE PENETRATION TEST LOCATION

- HISTORICAL INVESTIGATION:**
- TEST PIT LOCATION
 - BOREHOLE LOCATION
 - MONITORING WELL LOCATION
 - INFILTRATION TEST LOCATION
 - DILATOMETER TEST LOCATION
 - CONE PENETRATION TEST LOCATION



NOT FOR CONSTRUCTION
DRAFT

NOTE:
1. COORDINATE SYSTEM: GDA2020 MGA ZONE 50

REFERENCES:
1. SITE LAYOUT OVERLAY PROVIDED BY CLIENT. DRAWING FILES:
* C301-CLA-0000-CI-REF-00002-REFERENCE-LINES.DWG
* CORRIDOR 3D-ALL.DWG
2. CADASTRE BASED ON INFORMATION PROVIDED BY AND WITH THE PERMISSION OF THE WESTERN AUSTRALIAN LAND INFORMATION AUTHORITY TRADING AS LANDGATE (2021).
3. AERIAL IMAGERY SOURCED FROM NEARMAP DATED JULY 2021.

CLIENT
CAUSEWAY LINK ALLIANCE

PROJECT
CAUSEWAY PEDESTRIAN AND CYCLIST BRIDGE

TITLE
GROUND INVESTIGATION LAYOUT PLAN

CLIENT	YYYY-MM-DD	2022-08-05
DESIGNED	IB	
PREPARED	JRP	
REVIEWED		
APPROVED		

PROJECT NO. **C87.20** REV. **A** FIGURE **1B**

PATH: B:\Main_Roads_WA\Perth\09_PROJECT\SPS131725_Causeway_Pedestrian_and_Cyclist_Bridge\02_PRODUCT\NIM\DC301-CLA-0000-GE-REP-00003\REF-00002-REFERENCE-LINES.DWG PRINTED ON: 2022-08-05 AT: 12:24:48 PM

25mm THIS MEASUREMENT DOES NOT MATCH WITH AS SHOWN. THE SHEET SIZE HAS BEEN MODIFIED FROM ISO/A3



LEGEND

PHASE 2 ADDITIONAL INVESTIGATION:

- BOREHOLE LOCATION
- CONE PENETRATION TEST LOCATION
- CPTUs WITH DISSIPATION TEST LOCATION

PHASE 1 INVESTIGATION:

- TEST PIT LOCATION
- BOREHOLE LOCATION
- CONE PENETRATION TEST LOCATION

HISTORICAL INVESTIGATION:

- TEST PIT LOCATION
- BOREHOLE LOCATION
- MONITORING WELL LOCATION
- INFILTRATION TEST LOCATION
- DILATOMETER TEST LOCATION
- CONE PENETRATION TEST LOCATION

0 25 50

1:1,000 METRES

NOT FOR CONSTRUCTION DRAFT

NOTE:
1. COORDINATE SYSTEM: GDA2020 MGA ZONE 50

REFERENCES:
1. SITE LAYOUT OVERLAY PROVIDED BY CLIENT. DRAWING FILES:
* C301-CLA-0000-CI-REF-00002-REFERENCE-LINES.DWG
* CORRIDOR 3D-ALL.DWG
2. CADASTRE BASED ON INFORMATION PROVIDED BY AND WITH THE PERMISSION OF THE WESTERN AUSTRALIAN LAND INFORMATION AUTHORITY TRADING AS LANDGATE (2021).
3. AERIAL IMAGERY SOURCED FROM NEARMAP DATED JULY 2021.

CLIENT
CAUSEWAY LINK ALLIANCE

PROJECT
CAUSEWAY PEDESTRIAN AND CYCLIST BRIDGE

TITLE
GROUND INVESTIGATION LAYOUT PLAN

CLIENT	YYYY-MM-DD	2022-08-05
	DESIGNED	IB
	PREPARED	JRP
	REVIEWED	
	APPROVED	

PROJECT NO. **C87.20** REV. **A** FIGURE **1C**

PATH: B:\Main_Roads_WA\Perth\09_PROJECT\SPS\131735_Causeway_Pedestrian_and_Cyclist_Bridge\02_PRODUCT\CON\MXD\C301-CLA-0000-GE-REP-00003-REF-00002-REFERENCE-LINES.DWG PRINTED ON: 2022-08-05 AT: 12:24:55 PM

THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN. THE SHEET SIZE HAS BEEN MODIFIED FROM 100x70

APPENDIX A: SUMMARY OF TEST LOCATIONS

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Table A1 Causeway Link Pedestrian and Cyclist Bridge- Phase 2 Additional Ground Investigation (GI) - Summary of GI Information

Test Location ID	Location / Design Element	Operation Date	Easting (GDA2020)	Northing (GDA2020)	Proposed Target Depth (m)	Actual Depth (m)	Ground Surface Elevation (mAHD)	Base Elevation (mAHD)	Termination Reason	Remarks
CPCB-BH01	Point Fraser Bridge / Abutment 1	7-8/07/2022	394186	6463028	40	40	2.24	-37.76	Target Depth	
CPCB-BH02	Point Fraser Bridge / Pier 2	12-13/07/2022	394218	6463029	40	40	1.71	-38.29	Target Depth	Groundwater encountered at ~1.25 m bgl.
CPCB-BH03	Point Fraser Bridge / Pier 3	14/07/2022	394225	6463007	40	40	1.43	-38.57	Target Depth	
CPCB-BH04	Heirisson Island / Embankment	5-6/07/2022	394318	6462881	45	44.45	1.83	-42.62	Target Depth	
CPCB-BH05	Heirisson Island / Embankment	4-5/07/2022	394375	6462859	25	25	1.84	-23.16	Target Depth	
CPCB-BH06	Heirisson Island / Embankment	30/06/2022 - 4/07/2022	394490	6462780	25	40	3.24	-36.76	Target Depth	
CPCB-BH07	Heirisson Island Bridge / Pier	27-29/06/2022	394518	6462738	40	40	1.45	-38.55	Target Depth	
CPCB-BH08	McCallum Park Bridge/ Pier	23-27/06/2022	394746	6462585	40	40	1.52	-38.48	Target Depth	
CPCB-CPTU01	Point Fraser / Approach Embankment	05/07/2022	394159	6463041	30	20.48	2.15	-18.33	Refusal	Dissipation tests carried out at 7.5 m bgl (277, 137 kPa) 30 min, at 11.0 m (384, 226 kPa) 30 min and at 15.0 m (401, 295 kPa) 50 min.
CPCB-CPTU02	Point Fraser / Approach Embankment	05/07/2022	394165	6463020	30	19.1	2.03	-17.07	Refusal	Dissipation test carried out at 5.5 m bgl (218, 54 kPa) 70 min.
CPCB-CPT03	Point Fraser / Crane Pad	11/07/2022	394214	6462986	20	18	1.67	-16.33	Refusal	Groundwater encountered at around 1.5 m bgl
CPCB-CPT04	Heirisson Island / North Crane Pad	24/06/2022	394275	6462871	6	15.2	1.74	-13.46	Target Depth	
CPCB-CPT05	Heirisson Island / South Crane Pad	24/06/2022	394554	6462744	6	15.2	1.03	-14.17	Target Depth	
CPCB-CPT06	McCallum Park / Crane Pad	23/06/2022	394725	6462576	6	6.5	1.4	-5.1	Target Depth	
CPCB-CPT06A	McCallum Park / Crane Pad	24/06/2022	394725	6462576	15	15.2	1.4	-13.8	Target Depth	
CPCB-CPT06B	McCallum Park / Crane Pad	24/06/2022	394725	6462576	20	17.8	1.4	-16.4	Refusal	
CPCB-CPTU07	McCallum Park / Approach Embankment	23/06/2022	394817	6462568	30	4.7	1.52	-3.18	Refusal	Dissipation test carried out at 3.74 m bgl.
CPCB-CPTU07A	McCallum Park / Approach Embankment	23/06/2022	394816	6462568	30	4.8	1.52	-3.28	Refusal	
CPCB-CPTU07B	McCallum Park / Approach Embankment	23/06/2022	394813	6462568	30	4.7	1.52	-3.18	Refusal	
CPCB-CPTU08	McCallum Park / Approach Embankment	23/06/2022	394831	6462566	30	30.1	1.64	-28.46	Target Depth	
CPCB-CPTU09	McCallum Park / Approach Embankment	23/06/2022	394859	6462561	30	30.1	1.65	-28.45	Target Depth	
CPCB-CPTU10	McCallum Park / Approach Embankment	11/07/2022	394809	6462573	30	15.7	1.4	-14.3	Refusal	Dissipation test carried out at 12.59 m bgl (1195, 650 kPa) 16 min.
CPCB-CPT11	McCallum Park / Crane Pad	05/07/2022	394740	6462566	6	10	1.6	-8.4	Target Depth	Groundwater encountered at ~1.0 m bgl.
CPCB-CPT12	McCallum Park / Crane Pad	05/07/2022	394739	6462576	6	10	1.49	-8.51	Target Depth	Groundwater encountered at ~1.0 m bgl.
CPCB-CPT12A	McCallum Park / Crane Pad	11/07/2022	394739	6462576	6	6	1.49	-4.51	Target Depth	
CPCB-CPT13	Heirisson Island / North Crane Pad	11/07/2022	394530	6462761	6	6	1.98	-4.02	Target Depth	
CPCB-CPT14	Heirisson Island / North Crane Pad	11/07/2022	394299	6462852	6	6	2.09	-3.91	Target Depth	
CPCB-CPT15	Heirisson Island / South Crane Pad	11/07/2022	394280	6462856	6	6	1.9	-4.1	Target Depth	
CPCB-CPT16	Point Fraser / Crane Pad	11/07/2022	394222	6463008	6	6	1.48	-4.52	Target Depth	

Notes:

Total BH metrage	309.45
Total CPT metrage	267.58

Table A2 Causeway Link Pedestrian and Cyclist Bridge- Phase 2 Additional Ground Investigation (GI) - Summary of Groundwater Levels

Test Location ID	Location/Design Element	GI Phase	Operation Date	Easting (GDA2020)	Northing (GDA2020)	Ground Surface Elevation (mAHD)	Groundwater Level (mbgl)	Remarks
CPCB-CPTU09	McCallum Park	Phase 2	23/06/2022	6462561	394859	1.65	~1.5	
CPCB-CPTU08	McCallum Park	Phase 2	23/06/2022	6462566	394831	1.64	~1.5	
CPCB-CPTU07	McCallum Park	Phase 2	23/06/2022	6462568	394817	1.52	~1.5	
CPCB-CPT06	McCallum Park	Phase 2	23/06/2022	6462576	394725	1.4	~1.1	
CPCB-CPT05	Heirisson Island	Phase 2	24/06/2022	6462744	394554	1.03	~0.8	
CPCB-CPT04	Heirisson Island	Phase 2	24/06/2022	6462871	394275	1.74	–	Groundwater not encountered
CPCB-CPT02	Point Fraser	Phase 2	29/06/2022	6463020	394165	2.03	–	Groundwater not encountered
CPCB-CPT01	Point Fraser	Phase 2	29/06/2022	6463041	304159	2.15	–	Groundwater not encountered
CPCB-BH01	Point Fraser	Phase 2	29/06/2022	6463029	394190	2.23	–	Groundwater not encountered
CPCB-BH02	Point Fraser	Phase 2	29/06/2022	6463028	394220	1.71	~1.25	
CPCB-BH03	Point Fraser	Phase 2	29/06/2022	6463014	394228	1.43	–	Groundwater not encountered
CPCB-CPT03	Point Fraser	Phase 2	29/06/2022	6462989	394210	1.67	~1.5	
CPCB-CPT02	Point Fraser	Phase 2	5/07/2022	6463020	394165	2.03	1.2	
CPCB-CPT01	Point Fraser	Phase 2	5/07/2022	6463041	304159	2.15	1.3	
CPCB-CPT11	McCallum Park	Phase 2	5/07/2022	6462566	394740	1.6	~1.05	
CPCB-CPT12	McCallum Park	Phase 2	5/07/2022	6462576	394739	1.49	~1.0	
CPB-BH07	Heirisson Island	Phase 1	7/04/2022	6462767	394504	3.52	3.12	Close to CPCB-BH06
			4/08/2022				2.75	
CPB-BH02	Point Fraser	Phase 1	7/04/2022	6463012	394218	1.63	1.07	Strong odour, white powdery material observed on well tube
			4/08/2022				0.36	
CPB-BH05	Heirisson Island	Phase 1	7/04/2022	6462867	394314	1.91	1.34	
			4/08/2022				1.13	
CPB-BH14	McCallum Park	Phase 1	7/04/2022	6462565	394767	1.59	1.16	
			4/08/2022				0.65	
Telstra Cable	McCallum Park	Phase 2	7/07/2022	6462575	394836	–	1.25	Groundwater level measured during potholing (by Abaxa) to investigate location of Telstra cable during Phase 2 GI works

Notes:

APPENDIX B: BOREHOLE LOGS

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SYMBOLS

	FILL		CLAY (CL, CI or CH)
	GRAVEL (GW, GP, GM or GC)		ORGANIC SOILS (OL, OH or Pt)
	SAND (SW, SP, SM or SC)		COBBLES or BOULDERS
	SILT (ML or MH)		

Combinations of these basic symbols may be used to indicate mixed materials such as sandy clay.

CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil and Rock is classified and described in Reports of Boreholes and Test Pits using the preferred method given in AS1726-2017. The material properties are assessed in the field by visual/tactile methods.

Particle Size			Plasticity Properties
Soil Group	Sub Division	Particle Size	
BOULDERS		> 200 mm	
COBBLES		63 to 200 mm	
GRAVEL	Coarse	19 to 63 mm	
	Medium	6.7 to 19 mm	
	Fine	2.36 to 6.7 mm	
SAND	Coarse	0.6 to 2.36 mm	
	Medium	0.21 to 0.6 mm	
	Fine	0.075 to 0.21 mm	
SILT		0.002 to 0.075 mm	
CLAY		< 0.002 mm	

MOISTURE CONDITION

Symbol	Term	Description
D	Dry	Sands and gravels are free flowing. Clays and silts may be brittle or friable and powdery.
M	Moist	Soils are darker than in dry condition and may feel cool. Sands and gravels tend to cohere.
W	Wet	Soils exude free water. Sand and gravels tend to cohere.

Moisture condition for fine grained soils is described relative to the plastic limit or liquid limit as specified in AS1726-2017.

CONSISTENCY AND DENSITY

Fine Grained Soils			Coarse Grained Soils			
Symbol	Term	Undrained Shear Strength	Symbol	Term	Density Index (%)	SPN "N" *
VS	Very Soft	0 to 12 kPa	VL	Very Loose	Less than 15	0 to 4
S	Soft	12 to 25 kPa	L	Loose	15 to 35	4 to 10
F	Firm	25 to 50 kPa	MD	Medium Dense	35 to 65	10 to 30
St	Stiff	50 to 100 kPa	D	Dense	65 to 85	30 to 50
VSt	Very Stiff	100 to 200 kPa	VD	Very Dense	Above 85	Above 50
H	Hard	Above 200 kPa				
Fr	Friable	-				

In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material.

* SPT correlations are not stated in AS1726-2017, and may be subject to corrections for overburden pressure and equipment type.

CEMENTATION

Weakly Cemented	The soil may be easily disaggregated by hand in air or water.
Moderately Cemented	Effort is required to disaggregate the soil by hand in air or water.

EXPLANATION OF NOTES, ABBREVIATIONS & TERMS USED ON BOREHOLE AND TEST PIT REPORTS

DRILLING/EXCAVATION METHOD





ADH	Hollow auger drilling	EX	Excavator	PQ3	Diamond core - 83 mm
ADT	Auger drilling with tc-bit	HA	Hand auger	PT	Push tube sampling
ADV	Auger drilling with v-bit	HAND	Excavated by hand methods	RAB	Rotary air blast
AIRCORE	Aircore	HMLC	Diamond core - 63 mm	RC	Reverse circulation
AT	Air track	HQ3	Diamond core - 61 mm	RD	Rotary Drilling
BH	Backhoe bucket	JET	Jetting	RT	Rock roller
CT	Cable tool rig	MZ	Mazier tube sampling	SONIC	Sonic drilling
DTC	Diatube coring	NDD	Non-destructive digging	SPT	Standard penetration testing
EE	Existing excavation	NMLC	Diamond core - 52 mm	U	Undisturbed tube sampling
EPT	Extruded push tube	NQ3	Diamond core - 45 mm	WB	Washbore drilling

PENETRATION/EXCAVATION RESISTANCE

L	Low resistance. Rapid penetration possible with little effort from the equipment used.
M	Medium resistance. Excavation/possible at an acceptable rate with moderate effort from the equipment used.
H	High resistance to penetration/excavation. Further penetration is possible at a slow rate and requires significant effort from the equipment.
R	Refusal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine.

These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator.

WATER

	Water level at date shown		Partial water loss
	Water inflow		Complete water loss
GROUNDWATER 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.		
GROUNDWATER 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.		

SAMPLING AND TESTING

SPT	Standard Penetration Test to AS1289.6.3.1-2004
4,7,11 N=18	4,7,11 = Blows per 150mm. N = Blows per 300mm penetration following 150mm seating
30/80 mm	Where practical refusal occurs, the blows and penetration for that interval are reported
RW	Penetration occurred under the rod weight only
HW	Penetration occurred under the hammer and rod weight only
HB	Hammer double bouncing on anvil
DS	Disturbed sample
BDS	Bulk disturbed sample
G	Gas Sample
W	Water Sample
FP	Field permeability test over section noted
FV	Field vane shear test expressed as uncorrected shear strength (sv = peak value, sr = residual value)
PID	Photoionisation Detector reading in ppm
PM	Pressuremeter test over section noted
PP	Pocket penetrometer test expressed as instrument reading in kPa
U63	Thin walled tube sample - number indicates nominal sample diameter in millimetres
WPT	Water pressure test
DCP	Dynamic cone penetration test
CPT	Cone penetration test
CPTu	Cone penetration test with pore pressure (u) measurement

RANKING OF VISUALLY OBSERVABLE CONTAMINATION AND ODOUR (for specific soil contamination assessment projects)

R = 0	No visible evidence of contamination	R = A	No non-natural odours identified
R = 1	Slight evidence of visible contamination	R = B	Slight non-natural odours identified
R = 2	Visible contamination	R = C	Moderate non-natural odours identified
R = 3	Significant visible contamination	R = D	Strong non-natural odours identified

ROCK CORE RECOVERY

TCR = Total Core Recovery (%)	RQD = Rock Quality Designation (%)	SCR = Solid Core Recovery (%)	F = Fracture Frequency
$= \frac{\text{Length of core recovered}}{\text{Length of core run}} \times 100$	$= \frac{\sum \text{Axial lengths of core} > 100 \text{ mm}}{\text{Length of core run}} \times 100$	$= \frac{\sum \text{Length of cylindrical core recovered}}{\text{Length of core run}} \times 100$	$= \frac{\text{No. of defects}}{\text{Length of zone (m)}}$

TERMS FOR ROCK MATERIAL STRENGTH & WEATHERING AND ABBREVIATIONS FOR DEFECT DESCRIPTIONS

STRENGTH

Symbol	Term	UCS (MPa)	Field Guide
VL	Very Low	0.6 to 2	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 30 mm can be broken by finger pressure.
L	Low	2 to 6	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
M	Medium	6 to 20	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
H	High	20 to 60	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken with pick with a single firm blow; rock rings under hammer.
VH	Very High	60 to 200	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
EH	Extremely High	>200	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Material with strength less than 'Very Low' shall be described using soil characteristics. The presence of an original rock structure, fabric or texture should be noted, if relevant.

ROCK MATERIAL WEATHERING

Symbol	Term	Field Guide	
RS	Residual Soil	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.	
XW	Extremely Weathered	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.	
DW	HW	Highly Weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
	MW	Moderately Weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable, but shows little or no change of strength from fresh rock.
SW	Slightly Weathered	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.	
FR	Fresh	Rock shows no sign of decomposition of individual minerals or colour changes.	

ABBREVIATIONS FOR DEFECT TYPES AND DESCRIPTIONS

Defect Type		Coating or Infilling		Roughness	
P	Parting	Cn	Clean	VRo	Very Rough
X	Foliation	Sn	Stain	Ro	Rough
L	Cleavage	Ve	Veneer	Sm	Smooth
C	Contact	Ct	Coating	Po	Polished
J	Joint	In	Infill	Sl	Slicksided
SSu	Sheared Surface	Planarity		Vertical Boreholes – The dip (inclination from horizontal) of the defect is given.	
SS	Sheared Seam				
SZ	Sheared Zone	PI	Planar	Inclined Boreholes – The inclination is measured as the acute angle between the core axis and the vertical direction.	
CS	Crushed Seam	Cv	Curved		
IS	Infilled Seam	Un	Undulating		
EWS	Extremely Weathered Seam	St	Stepped		
V	Vein	Ir	Irregular		

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394186.0 m E 6463028.0 m N MGA94 50
 SURFACE RL: 2.24 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 8/7/22
 CHECKED: IB DATE: 10/8/22

Drilling				Field Material Description				Defect Information				
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH UCS MPa	LABORATORY STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations	AVERAGE DEFECT SPACING (mm)
				0	0.30		TOPSOIL: SAND (SP) fine to coarse grained, dark brown, with rootlets, loose				0.00-2.00 m: Material to 2m was logged during vacuum excavation 0.10 m: Geohex and geotextile at 0.1m 0.50 m: Geotextile at 0.5m	
				0.50	1.74		FILL: GRAVEL (GP) (GP) medium grained, sub-angular to angular, grey, medium dense to dense FILL: Sandy GRAVEL (GP) (GP) fine to coarse grained, sub-rounded to sub-angular, pale yellow, trace limestone cobbles, with, fine to coarse grained sand, medium dense to dense					
				2	2.00		Clayey SAND (Possible Fill) (SC) fine to coarse grained, brown orange, with fines, moist, medium dense				Rec = 260/450 mm SPT 2.00-2.45 m; 0, 1, 0 N=1	
				2.24	2.45		SAND (SP) fine to coarse grained, black to dark grey, very loose, trace to with fines					
				2.45	-0.21		CLAY (CL-CI) low to medium plasticity, dark grey, with silt, with fine to coarse grained sand, trace shell fragments, very soft				Rec = 200/450 mm SPT 3.50-3.95 m; 1, 0, 0 N=0	
				3.24	-1.00		SAND (SP) fine to coarse grained, dark grey, with quartz, trace shell fragments, loose, trace fines					
				4	4.37		grey					
				4.37	-2.13		white				Rec = 210/450 mm SPT 5.00-5.45 m; 1, 0, 1 N=1	
				5.20	-2.96							
				5.86	-3.76		Clayey SAND (SC) fine to coarse grained, dark grey to black, trace silt, moderate odour, loose				Rec = 450/450 mm SPT 6.50-6.95 m; 0, 0, 0 N=0	
				6	6.30		Silty CLAY (CI-CH) medium to high plasticity, dark grey, trace sand, trace shell fragments, strong odour, very soft					
				6.30	-4.06							
				8							U 8.00-8.45 m; Rec = 450/450 mm	
				9.50	-7.26		medium plasticity				Rec = 450/450 mm SPT 9.50-9.95 m; 0, 0, 0 N=0	
				10							U 11.00-11.45 m; Rec = 450/450 mm	
				12.50	-10.26		high plasticity				Rec = 450/450 mm SPT 12.50-12.95 m; 0, 0, 0 N=0	
				13.50	-11.26		trace to with shell fragments				U 14.00-14.45 m; Rec = 450/450 mm	
				14								

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance COORDS: 394186.0 m E 6463028.0 m N MGA94 50
 PROJECT: Causeway Pedestrian and Cyclist Bridge SURFACE RL: 2.24 m DATUM: AHD
 LOCATION: Point Fraser INCLINATION: -90°
 JOB NO: PS131735 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 8/7/22
 CHECKED: IB DATE: 10/8/22

Drilling					Field Material Description					Defect Information				
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH UCS MPa	LABORATORY STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations	AVERAGE DEFECT SPACING (mm)		
				16.00	-13.76	X	Silty CLAY (CI-CH) medium to high plasticity, dark grey, trace sand, trace shell fragments, strong odour, very soft				Rec = 450/450 mm SPT 15.50-15.95 m; 0, 0, 0 N=0			
				16.70	-14.76	X	low to medium plasticity, dark grey to black, trace sand							
				17.00	-14.76	X	Clayey SAND (SC) fine grained, grey, trace silt, loose				Rec = 450/450 mm SPT 17.00-17.45 m; 2, 2, 1 N=3			
				17.45	-15.21	X	CORE LOSS							
				18.00	-15.21	X	SAND (SP) fine to medium grained, grey, with fines, loose				Rec = 360/450 mm SPT 18.50-18.95 m; 4, 3, 6 N=9			
				19.72	-17.48	X	Gravelly SAND (SP) fine to coarse grained, orange brown grey mottled red and yellow, fine to coarse sub-rounded to sub-angular gravel, with fines, very dense				Rec = 350/450 mm SPT 20.00-20.45 m; 21, 27, 38 N=65			
				21.00	-19.76	X	SAND (SP) fine to medium grained, brown and grey mottled yellow, dense to very dense				Rec = 450/450 mm SPT 21.50-21.95 m; 8, 16, 21 N=37			
				22.00	-19.76	X	pale brown, black staining within depth 22.30m to 22.74m							
				22.80	-20.56	X	grey				Rec = 450/450 mm SPT 23.00-23.45 m; 5, 12, 22 N=34			
				23.45	-21.42	X	CORE LOSS							
				24.00	-21.42	X	SAND (SP) fine to medium grained, brown and grey mottled yellow, dense				Rec = 450/450 mm SPT 24.50-24.95 m; 10, 18, 19 N=37			
				24.50	-22.26	X	fine to coarse grained, yellow brown							
				25.13	-22.89	X	trace medium to coarse sub-rounded to angular gravel							
				26.00	-23.76	X	RESIDUAL SOIL: Clayey SAND (SC) fine to medium grained, medium plasticity, brown yellow and dark grey, trace silt, trace coarse angular gravel, medium dense to dense				Rec = 450/450 mm SPT 26.00-26.45 m; 4, 4, 6 N=10			
				28.00	-25.76	X	SANDSTONE fine to medium grained, massive, dark grey				Rec = 430/450 mm SPT 27.50-27.95 m; 11, 18, 27 N=45			
				30.00	-25.76	X					Rec = 450/450 mm SPT 29.00-29.45 m; 15, 27, 41 N=68			

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance

COORDS: 394186.0 m E 6463028.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 2.24 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Point Fraser

INCLINATION: -90°

LOGGED: CK

DATE: 8/7/22

JOB NO: PS131735

HOLE DEPTH: 40.00 m

CHECKED: IB

DATE: 10/8/22

Drilling					Field Material Description					Defect Information				
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH UCS MPa	LABORATORY STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations	AVERAGE DEFECT SPACING (mm)		
								WEATHERING VL 0.5 L 2.0 M 6.0 H 20 VH 60 EH 200				10 20 100 300 1000 3000		
			100 (100)	30			SANDSTONE fine to medium grained, massive, dark grey				Rec = 340/290 mm SPT 30.50-30.79 m; 23, 43/140mm HB N>43			
			100 (100)	32							Rec = 300/250 mm SPT 32.00-32.25 m; 20, 35/100mm HB N>35			
			100 (100)	34										
			100 (100)	36										
			100 (100)	38										
			100 (100)	40	40.00 -37.76		END OF BOREHOLE @ 40.00 m TARGET DEPTH GROUNDWATER NOT OBSERVED Backfilled with grout							
				42										
				44										

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394186.0 m E 6463028.0 m N MGA94 50
 SURFACE RL: 2.24 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 1 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 8/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH01 - 0.00 - 4.00 m



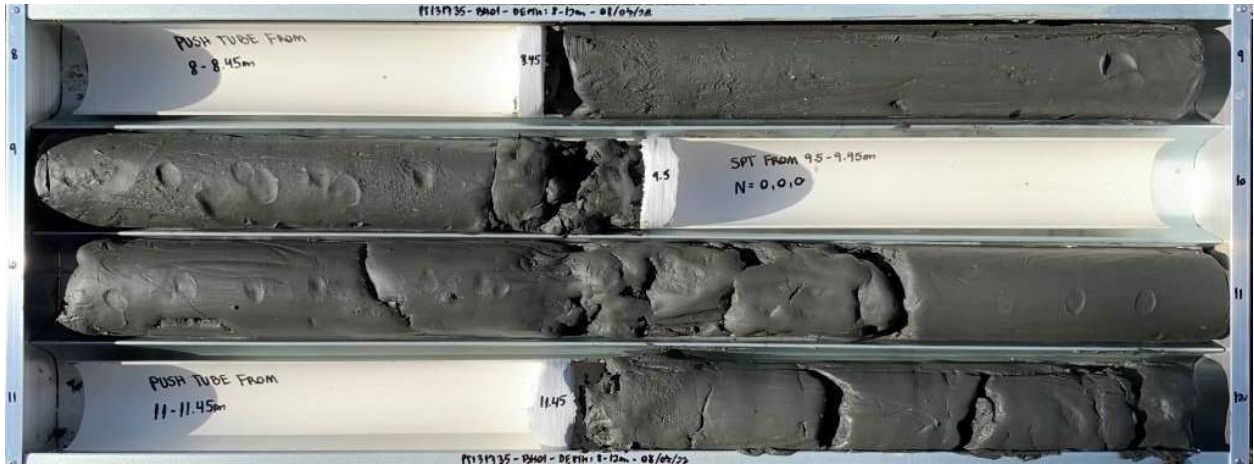
CPCB-BH01 - 4.00 - 8.00 m

This report of core photographs must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394186.0 m E 6463028.0 m N MGA94 50
 SURFACE RL: 2.24 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 8/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH01 - 8.00 - 12.00 m



CPCB-BH01 - 12.00 - 16.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394186.0 m E 6463028.0 m N MGA94 50
 SURFACE RL: 2.24 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 3 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 8/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH01 - 16.00 - 20.00 m



CPCB-BH01 - 20.00 - 24.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394186.0 m E 6463028.0 m N MGA94 50
 SURFACE RL: 2.24 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 4 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 8/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH01 - 24.00 - 28.00 m



CPCB-BH01 - 28.00 - 32.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394186.0 m E 6463028.0 m N MGA94 50
 SURFACE RL: 2.24 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 5 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 8/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH01 - 32.00 - 36.00 m



CPCB-BH01 - 36.00 - 40.00 m

This report of core photographs must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance COORDS: 394218.0 m E 6463029.0 m N MGA94 50
 PROJECT: Causeway Pedestrian and Cyclist Bridge SURFACE RL: 1.71 m DATUM: AHD
 LOCATION: Point Fraser INCLINATION: -90°
 JOB NO: PS131735 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 12/7/22
 CHECKED: IB DATE: 10/8/22

Drilling				Field Material Description					Defect Information			
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH UCS MPa	LABORATORY STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations	AVERAGE DEFECT SPACING (mm)
								<small> VL 0.8 L 2.0 M 6.0 H 2.0 VH 0.8 EH 2.0 </small>				<small> 10 20 100 300 1000 3000 </small>
				0	1.71		FILL: Gravelly SAND (SP) fine to medium grained, brown and pale grey, fine to coarse rounded to sub-angular limestone gravel, trace limestone cobbles, very loose				0.00-2.00 m: Material to 2m was logged during vacuum excavation	
				1.57	0.14		CORE LOSS					
				2	-0.29		Clayey SAND (SC) fine to medium grained, dark grey, very loose				Rec = 450/450 mm SPT 2.00-2.45 m; 1, 0, 1 N=1	
				3.50	-1.79		CLAY (CH) high plasticity, dark grey, with silt, strong odour, very soft, some yellow brown band				Rec = 450/450 mm SPT 3.50-3.95 m; 0, 0, 0 N=0	
				4	-2.29		CORE LOSS					
				4.94	-3.23		CLAY (CH) high plasticity, dark grey, with sand, with silt, very soft				Rec = 450/450 mm SPT 5.00-5.45 m; 0, 0, 0 N=0	
				6							Rec = 450/450 mm SPT 6.50-6.95 m; 0, 0, 0 N=0	
				7.70	-5.99		with shell fragments					
				8	-6.29		with fine to coarse grained sand					
				9.50	-7.79		trace fine to coarse grained sand				Rec = 450/450 mm SPT 9.50-9.95 m; 0, 0, 0 N=0	
				12							Rec = 450/450 mm SPT 12.50-12.95 m; 0, 0, 0 N=0	
				13.80	-12.09		Clayey Silty SAND (SC-SM) fine to medium grained, dark grey and brown yellow, with shell fragments, loose				Rec = 350/450 mm SPT 14.00-14.45 m; 0, 3, 5 N=8	

PQ3

GAP 10.0.7 LIB LOGO.GLB Log GAP CORED BOREHOLE ADDITIONAL CAUSEWAY BRIDGE GI (BACKUP).GPJ <<DrawingFile>> 11/08/2022 09:42 10.02.00.04 Datgel Tools

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance COORDS: 394218.0 m E 6463029.0 m N MGA94 50
 PROJECT: Causeway Pedestrian and Cyclist Bridge SURFACE RL: 1.71 m DATUM: AHD
 LOCATION: Point Fraser INCLINATION: -90°
 JOB NO: PS131735 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 12/7/22
 CHECKED: IB DATE: 10/8/22

Drilling						Field Material Description					Defect Information		
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH UCS MPa	LABORATORY STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations	AVERAGE DEFECT SPACING (mm)	
								<small> VL 0.8 L 2.0 M 6.0 H 20 VH 60 EH 200 </small>				<small> 10 20 100 300 1000 3000 </small>	
				15.50	-13.79		Clayey Silty SAND (SC-SM) fine to medium grained, dark grey and brown yellow, with shell fragments, loose brown yellow				Rec = 430/450 mm SPT 15.50-15.95 m; 1, 2, 1 N=3		
				16.10	-14.39		pale brown, trace shell fragments						
				16.80	-15.09		mottled brown				Rec = 450/450 mm SPT 17.00-17.45 m; 1, 0, 2 N=2		
				17.45	-15.74		Silty SAND (SM) fine to medium grained, brown yellow, loose						
				19.34	-17.63		trace medium to coarse sub-rounded gravel				Rec = 450/450 mm SPT 18.50-18.95 m; 1, 2, 3 N=5		
				19.86			CORE LOSS						
				20.45	-18.29		Gravelly Silty SAND (SM) fine to coarse grained, brown yellow and grey, fine to coarse sub-rounded to angular gravel, medium dense				Rec = 450/450 mm SPT 20.00-20.45 m; 10, 9, 14 N=23		
				21.00	-18.74		CORE LOSS						
				21.00	-19.29		Gravelly Silty SAND (SM) fine to coarse grained, brown yellow and grey, fine to coarse sub-rounded to angular gravel, loose to medium dense				Rec = 450/450 mm SPT 21.50-21.95 m; 5, 9, 10 N=19		
				24.50	-22.79		Clayey Silty SAND (SC) fine to coarse grained, brown yellow and grey, loose (SM)				Rec = 450/450 mm SPT 24.50-24.95 m; 7, 7, 2 N=9		
				25.64			trace fine to coarse sub-rounded to angular cobbles and gravel						
				25.81			CORE LOSS						
				26.00	-24.29		Sandy CLAY (CH) high plasticity, grey mottled brown yellow, fine to coarse grained sand, with silt, firm				Rec = 380/450 mm SPT 26.00-26.45 m; 3, 1, 1 N=2		
				26.45	-24.74		CORE LOSS						
				27.00	-25.29		Sandy CLAY high plasticity, grey mottled brown yellow, fine to coarse grained sand, with silt, firm				Rec = 430/450 mm SPT 27.50-27.95 m; 2, 4, 7 N=11		
				28.00	-26.29		SANDSTONE fine to coarse grained, massive, dark grey to black				28.10 m: orange brown staining at 28.1m		
			100	100	(100)						Rec = 420/375 mm SPT 29.00-29.38 m; 10, 21, 10/75mm HB N>31		
			100	100	(100)								

GAP 10.0.7 LIB LOGO.GLB Log GAP CORED BOREHOLE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP).GPJ <<DrawingFile>> 11/08/2022 09:42 10.02.00.04 Datgel Tools

PQ3

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance

COORDS: 394218.0 m E 6463029.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.71 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Point Fraser

INCLINATION: -90°

LOGGED: CK

DATE: 12/7/22

JOB NO: PS131735

HOLE DEPTH: 40.00 m

CHECKED: IB

DATE: 10/8/22

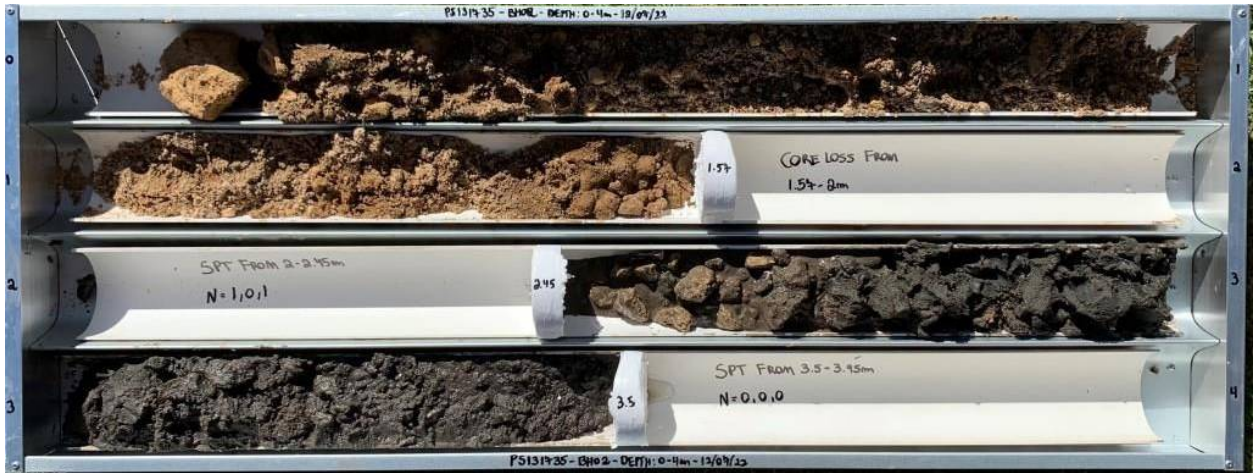
Drilling					Field Material Description					Defect Information		
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH UCS MPa	LABORATORY STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations	AVERAGE DEFECT SPACING (mm)
								<small> VL 0.8 L 2.0 M 6.0 H 20 VH 60 EH 200 </small>				<small> 10 20 100 300 1000 3000 </small>
			100 (100)	30			SANDSTONE fine to coarse grained, massive, dark grey to black				Rec = 360/350 mm SPT 30.50-30.85 m; 19, 31, 17/50mm HB N>48	
			100 (100)	32							Rec = 170/140 mm SPT 32.00-32.14 m; 32/140mm HB N=R	
			100 (100)	34								
			100 (100)	36								
			100 (100)	38								
			100 (100)	40	40.00 -38.29		END OF BOREHOLE @ 40.00 m TARGET DEPTH GROUNDWATER ENCOUNTERED @ 1.25 m DEPTH Backfilled with grout					
				42								
				44								

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394218.0 m E 6463029.0 m N MGA94 50
 SURFACE RL: 1.71 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 12/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH02 - 0.00 - 4.00 m



CPCB-BH02 - 4.00 - 8.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394218.0 m E 6463029.0 m N MGA94 50
 SURFACE RL: 1.71 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 12/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH02 - 8.00 - 12.00 m



CPCB-BH02 - 12.00 - 16.00 m

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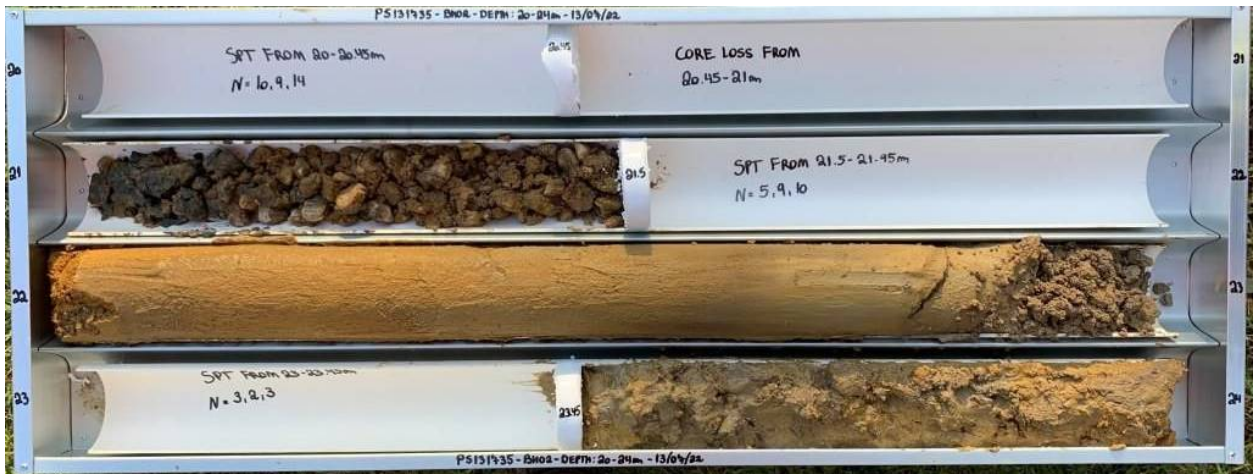
CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394218.0 m E 6463029.0 m N MGA94 50
 SURFACE RL: 1.71 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 3 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 12/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH02 - 16.00 - 20.00 m



CPCB-BH02 - 20.00 - 24.00 m

This report of core photographs must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394218.0 m E 6463029.0 m N MGA94 50
 SURFACE RL: 1.71 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 4 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 12/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH02 - 24.00 - 28.00 m



CPCB-BH02 - 28.00 - 32.00 m

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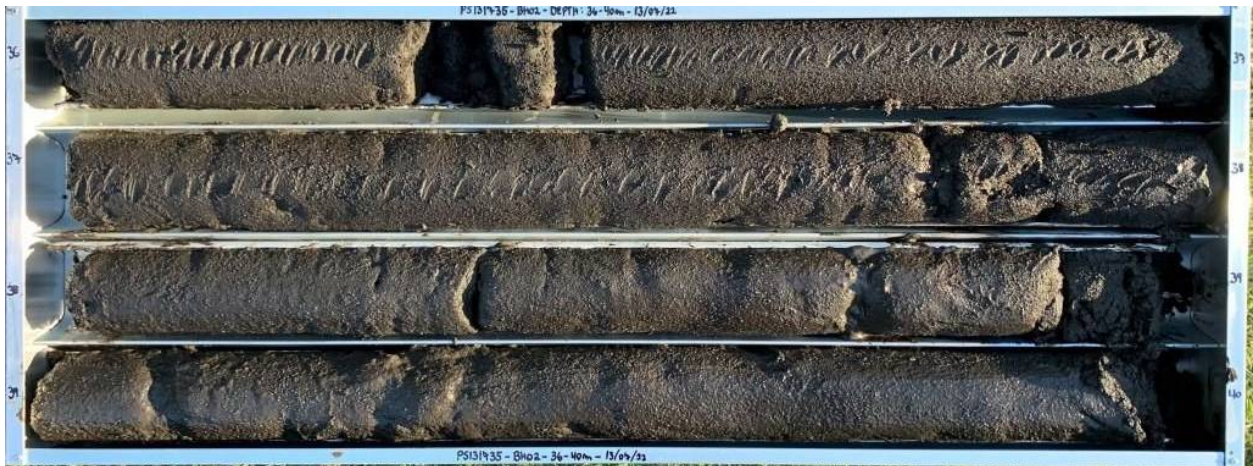
CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394218.0 m E 6463029.0 m N MGA94 50
 SURFACE RL: 1.71 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 5 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 12/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH02 - 32.00 - 36.00 m



CPCB-BH02 - 36.00 - 40.00 m

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CLIENT: Causeway Link Alliance COORDS: 394225.0 m E 6463007.0 m N MGA94 50
 PROJECT: Causeway Pedestrian and Cyclist Bridge SURFACE RL: 1.43 m DATUM: AHD
 LOCATION: Point Fraser INCLINATION: -90°
 JOB NO: PS131735 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 14/7/22
 CHECKED: IB DATE: 10/8/22

Drilling				Field Material Description					Defect Information			
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH UCS MPa	LABORATORY STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations	AVERAGE DEFECT SPACING (mm)
								<small> VL 0.8 L 2.0 M 6.0 H 20 VH 60 EH 200 </small>				<small> 10 20 100 300 1000 3000 </small>
				0	0.20		TOPSOIL: SAND (SP) fine to coarse grained, dark brown, with rootlets				0.00-2.00 m: Material to 2m was logged during vacuum excavation	
				1.23	1.23		FILL: SAND (SP) fine to coarse grained, brown orange, trace gravel, moist					
				2.00	-0.57		Silty Clayey SAND (SC-SM) fine to medium grained, brown and grey, trace gravel, trace shell fragments, loose				Rec = 80/450 mm SPT 2.00-2.45 m: 0, 0, 0 N=0	
				2.45	-1.02		Silty CLAY (CI-CH) medium to high plasticity, dark grey, trace shell fragments, strong odour, very soft				Rec = 450/450 mm SPT 3.50-3.95 m: 0, 0, 0 N=0	
				4							Rec = 450/450 mm SPT 5.00-5.45 m: 0, 0, 0 N=0	
				6	6.30		with shell fragments				Rec = 450/450 mm SPT 6.50-6.95 m: 0, 0, 0 N=0	
				8	4.87						Rec = 450/450 mm SPT 8.00-8.45 m: 0, 0, 0 N=0	
				10							Rec = 450/450 mm SPT 9.50-9.95 m: 0, 0, 0 N=0	
				12							Rec = 450/450 mm SPT 11.00-11.45 m: 0, 0, 0 N=0	
				12.50	-11.07		Clayey Silty SAND (SC-SM) fine to medium grained, pale brown, very loose to loose				Rec = 400/450 mm SPT 12.50-12.95 m: 0, 0, 0 N=0	
				14							Rec = 400/450 mm SPT 14.00-14.45 m: 0, 2, 1 N=3	

GAP 10.0.7 LIB LOGO.GLB Log GAP CORED BOREHOLE ADDITIONAL CAUSEWAY BRIDGE GI (BACKUP).GPJ <<DrawingFile>> 11/08/2022 09:42 10.02.00.04 Datgel Tools

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CLIENT: Causeway Link Alliance COORDS: 394225.0 m E 6463007.0 m N MGA94 50
 PROJECT: Causeway Pedestrian and Cyclist Bridge SURFACE RL: 1.43 m DATUM: AHD
 LOCATION: Point Fraser INCLINATION: -90°
 JOB NO: PS131735 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 14/7/22
 CHECKED: IB DATE: 10/8/22

Drilling				Field Material Description				Defect Information				
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH UCS MPa	LABORATORY STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations	AVERAGE DEFECT SPACING (mm)
				16			Clayey Silty SAND (SC-SM) fine to medium grained, pale brown, very loose to loose				Rec = 280/450 mm SPT 15.50-15.95 m; 1, 0, 0 N=0	
				16.87	-15.44		SAND (SP) fine to coarse grained, pale brown, trace silt, trace quartz, medium dense				Rec = 400/450 mm SPT 17.00-17.45 m; 3, 5, 7 N=12	
				18			brown yellow				Rec = 420/450 mm SPT 18.50-18.95 m; 3, 8, 9 N=17	
				18.50	-17.07							
				19.20	-17.77		CORE LOSS					
				20			Clayey Gravelly SAND (SP) fine to coarse grained, brown mottled red and yellow, fine to coarse sub-rounded to angular gravel, trace cobbles, medium dense				Rec = 420/450 mm SPT 20.00-20.45 m; 4, 8, 8 N=16	
				20.00	-18.57							
				20.90	-19.47		Sandy CLAY (CH) high plasticity, grey and yellow brown, fine to medium grained sand, medium dense				Rec = 420/450 mm SPT 21.50-21.95 m; 8, 10, 11 N=21	
				20.90	-19.77							
				22			Clayey Gravelly SAND (SP-SC) fine to coarse grained, brown yellow grey mottled red, medium coarse sub-rounded to angular gravel, medium dense				Rec = 430/450 mm SPT 23.00-23.45 m; 1, 5, 8 N=13	
				22.64	-21.21							
				23.00	-21.57		CORE LOSS					
				24			Silty SAND (SM) fine to coarse grained, brown yellow, trace fine to coarse sub-rounded to angular gravel, medium dense to very dense				Rec = 150/140 mm SPT 24.50-24.64 m; 39/140mm N=R	
				24.00	-22.57							
				24.68	-23.25		RESIDUAL SOIL: Clayey SAND /Sandy CLAY (SC-CH) fine to coarse grained, brown yellow and grey, high plasticity clay, very dense				Rec = 450/450 mm SPT 26.00-26.45 m; 3, 4, 10 N=14	
				26			RESIDUAL SOIL: CLAY (CH) high plasticity, dark grey, stiff					
				26.00	-24.57							
				26.50	-25.07		SANDSTONE fine to medium grained, massive, dark grey				Rec = 230/220 mm SPT 27.50-27.72 m; 20, 17/70mm HB N>17	
				28								
				30								

GAP 10.0.7 LIB LOGO.GLB Log GAP CORED BOREHOLE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP).GPJ <<DrawingFile>> 11/08/2022 09:42 10.02.00.04 Datgel Tools

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100 100 (100)
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CLIENT: Causeway Link Alliance

COORDS: 394225.0 m E 6463007.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.43 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Point Fraser

INCLINATION: -90°

LOGGED: CK

DATE: 14/7/22

JOB NO: PS131735

HOLE DEPTH: 40.00 m

CHECKED: IB

DATE: 10/8/22

Drilling					Field Material Description					Defect Information				
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH UCS MPa	LABORATORY STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations	AVERAGE DEFECT SPACING (mm)		
								VL 0.5 L 2.0 M 6.0 H 20 VH 60 EH 200				10 20 100 300 1000 3000		
			100 (100)	30			SANDSTONE fine to medium grained, massive, dark grey							
			100 (100)	32										
			100 (100)	34										
			100 (100)	36										
			100 (100)	38										
			100 (100)	40										
				40.00	-38.57				END OF BOREHOLE @ 40.00 m TARGET DEPTH GROUNDWATER NOT OBSERVED Backfilled with grout					
				42										
				44										

GAP 10.0.7 LIB LOGO.GLB Log GAP CORED BOREHOLE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP).GPJ <<DrawingFile>> 11/08/2022 09:42 10.02.00.04 Datgel Tools

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394225.0 m E 6463007.0 m N MGA94 50
 SURFACE RL: 1.43 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 14/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH03 - 0.00 - 4.00 m



CPCB-BH03 - 4.00 - 8.00 m

This report of core photographs must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

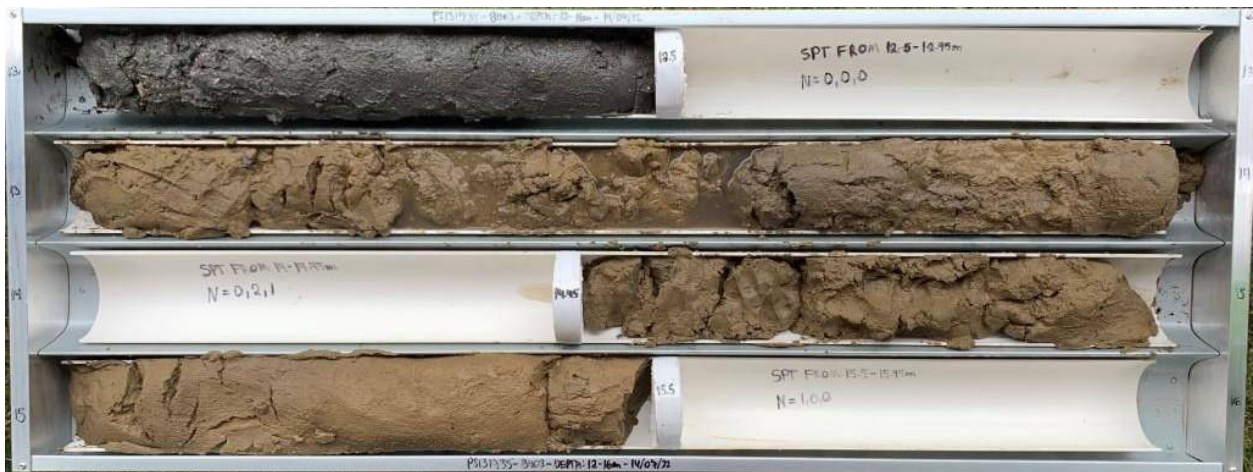
CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394225.0 m E 6463007.0 m N MGA94 50
 SURFACE RL: 1.43 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 2 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 14/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH03 - 8.00 - 12.00 m



CPCB-BH03 - 12.00 - 16.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394225.0 m E 6463007.0 m N MGA94 50
 SURFACE RL: 1.43 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 3 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 14/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH03 - 16.00 - 20.00 m



CPCB-BH03 - 20.00 - 24.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394225.0 m E 6463007.0 m N MGA94 50
 SURFACE RL: 1.43 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 4 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 14/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH03 - 24.00 - 28.00 m



CPCB-BH03 - 28.00 - 32.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser
 JOB NO: PS131735

COORDS: 394225.0 m E 6463007.0 m N MGA94 50
 SURFACE RL: 1.43 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 5 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 14/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH03 - 32.00 - 36.00 m



CPCB-BH03 - 36.00 - 40.00 m

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CLIENT: Causeway Link Alliance

COORDS: 394318.0 m E 6462881.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.83 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Heirisson Island

INCLINATION: -90°

LOGGED: CK

DATE: 5/7/22

JOB NO: PS131735

HOLE DEPTH: 44.45 m

CHECKED: IB

DATE: 10/8/22

Drilling			Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0	1.83			SP	TOPSOIL: SAND fine to medium grained, dark brown, trace rootlets				
			0.15	1.68			SP	FILL: SAND fine to coarse grained, dark brown, trace coarse sub-rounded limestone gravel				
			1.00	0.83				some yellow brown band				L
			1.50	0.33			SP	SAND fine to coarse grained, yellow orange brown				
			1.80	0.03			CH	Silty Sandy CLAY high plasticity, dark grey, fine to medium grained sand, some grey and orange brown bands				S
			2.00	-0.17	Rec = 400/450 mm SPT 2.00-2.45 m 2, 3, 2 N=5		SP	SAND fine to coarse grained, grey and dark grey to black, trace silt				L
			3.50	-1.67	Rec = 350/450 mm SPT 3.50-3.95 m 1, 1, 0 N=1			grey				VL
			4.00	-2.17			CL-CI	Silty CLAY low to medium plasticity, trace shell fragments, moderate odour				
			5.45	-3.62	Rec = 450/450 mm SPT 5.00-5.45 m 0, 0, 0 N=0			medium plasticity				
			7.00		Rec = 450/450 mm SPT 6.50-6.95 m 0, 0, 0 N=0							VS
			9.20	-7.37	Rec = 450/450 mm SPT 8.00-8.45 m 0, 0, 0 N=0			with shell fragments				
			9.50	-7.67	Rec = 450/450 mm SPT 9.50-9.95 m 0, 0, 0 N=0			low to medium plasticity				
			10.00									

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP) GPJ <-DrawingFile>> 11/08/2022 09:42 10.02.00.04 Datagel Tools

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CLIENT: Causeway Link Alliance

COORDS: 394318.0 m E 6462881.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.83 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Heirisson Island

INCLINATION: -90°

LOGGED: CK

DATE: 5/7/22

JOB NO: PS131735

HOLE DEPTH: 44.45 m

CHECKED: IB

DATE: 10/8/22

Drilling			Sampling			Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			10	-8.17			CL-CI	Silty CLAY low to medium plasticity, trace shell fragments, moderate odour				
			10.35					trace fine grained sand				
				-8.52			CL-CI	CLAY medium to high plasticity, grey, with fine to medium grained sand		VS		
			11		Rec = 450/450 mm SPT 11.00-11.45 m 1, 1, 1 N=2							
				11.45				CORE LOSS				
				11.60			CI/SP	INTERBEDDED SAND and Silty CLAY fine to medium grained, medium plasticity, brown				
				-9.77				with fine to coarse grained sand		VS		
			12		Rec = 450/450 mm SPT 12.50-12.95 m 1, 0, 0 N=0							
				12.00			SM/SC	Silty Clayey SAND fine to coarse grained, brown		VL		
				-10.17			CI-CH	Silty Sandy CLAY medium to high plasticity, brown, fine to medium grained sand		S		
			13		Rec = 450/450 mm SPT 14.00-14.45 m 1, 2, 3 N=5							
				13.00			SP	SAND fine to medium grained, brown, trace silt		MD		
				-11.17								
			14		Rec = 450/450 mm SPT 15.50-15.95 m 2, 4, 6 N=10							
				14.00								
				-12.17								
			15		Rec = 450/450 mm SPT 17.00-17.45 m 4, 7, 16 N=23							
				15.60								
				-13.77								
			16									
				17.45								
				-15.62								
			17									
				17.86			CH	Silty CLAY high plasticity, brown, with fine to medium grained sand				
				-16.03								
			18		Rec = 450/450 mm SPT 18.50-18.95 m 4, 6, 8 N=14							
				18.50			CH	Silty Gravelly CLAY high plasticity, brown and grey, medium to coarse sub-rounded to sub-angular gravel, trace sand		St		
				-16.67								
			19									
			20									

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G (BACKUP) GPJ <-DrawingFile>> 11/08/2022 09:42 10.02.00.04 Datgel Tools

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CLIENT: Causeway Link Alliance

COORDS: 394318.0 m E 6462881.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.83 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Heirisson Island

INCLINATION: -90°

LOGGED: CK

DATE: 5/7/22

JOB NO: PS131735

HOLE DEPTH: 44.45 m

CHECKED: IB

DATE: 10/8/22

Drilling			Sampling			Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			20		Rec = 450/450 mm SPT 20.00-20.45 m 4, 4, 5 N=9		CH	Silty Gravelly CLAY high plasticity, brown and grey, medium to coarse sub-rounded to sub-angular gravel, trace sand				
			21									
			22	22.00 -20.17	Rec = 450/450 mm SPT 21.50-21.95 m 3, 4, 6 N=10		CH	Silty Sandy CLAY fine to medium, high plasticity, brown and grey, fine to medium grained sand, trace gravel		F		
			23	22.70 -20.87				mottled red, sand content increases with depth				
			24	23.20 -21.37 23.45 -21.62	Rec = 450/450 mm SPT 23.00-23.45 m 7, 13, 19 N=32			mottled red				
			25	24.50 -22.67	Rec = 450/450 mm SPT 24.50-24.95 m 3, 3, 4 N=7		CH	CLAY high plasticity, grey mottled yellow, trace gravel, trace fine grained sand		F		
			26	26.00 -24.17	Rec = 450/450 mm SPT 26.00-26.45 m 4, 5, 6 N=11			mottled yellow and brown				
			27	26.70 -24.87				trace sand		St		
			28	27.50 -25.67	Rec = 450/450 mm SPT 27.50-27.95 m 3, 1, 2 N=3		SC	Clayey SAND fine to medium grained, grey and mottled yellow		L		
			29	28.50 -26.67	SPT 29.00-29.45 m 0, 0, 4 N=4		Cl-CH	CLAY medium to high plasticity, grey				
			30				SP	SAND fine to coarse grained, yellow brown, trace fines, trace to with sub-rounded to angular gravel		D		

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP) GPJ <-DrawingFile>> 11/08/2022 09:42 10.02.00.04 Datgel Tools

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394318.0 m E 6462881.0 m N MGA94 50
 SURFACE RL: 1.83 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 44.45 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 5/7/22
 CHECKED: IB DATE: 10/8/22

Drilling			Sampling			Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			30	30.30			CL-CH	CLAY medium to high plasticity, grey				S
				-28.47								
				30.50	Rec = 450/450 mm SPT 30.50-30.95 m 8, 14, 16 N=30		SP	SAND fine to coarse grained, yellow brown, trace rock fragments, with fines grey				
				-28.67								
			31									
				32.00	Rec = 450/450 mm SPT 32.00-32.45 m 10, 10, 6 N=16			dark grey to black				MD
				-30.17								
			32									
				33.45	Rec = 330/450 mm SPT 33.50-33.95 m 4, 12, 26 N=38			some orange brown bands				D
				-31.62								
			33									
				34.00				CORE LOSS				
				-32.17								
			34									
				34.47	Rec = 300/380 mm SPT 35.00-35.38 m 2, 25, 30/80mm HB N>55		SP	SAND fine to coarse grained, pale brown, some orange brown bands				
				-32.64								
			35									
				36.70	Rec = 220/240 mm SPT 36.50-36.74 m 6, 30/90mm HB N>30			trace fines				VD
				-34.87								
			36									
				38.30	Rec = 300/240 mm SPT 38.00-38.24 m 9, 30/90mm HB N>30			fine to medium grained, white				
				-36.47								
			37									
				39.60	Rec = 230/170 mm SPT 39.50-39.67 m 35, 24/20mm HB N>24			fine to coarse grained, some yellow brown bands				
				-37.77								
			38									
			39									
			40									

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP).GPJ <-DrawingFile>> 11/08/2022 09:42 10.02.00.04 Datgel Tools

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394318.0 m E 6462881.0 m N MGA94 50
 SURFACE RL: 1.83 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 44.45 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 5/7/22
 CHECKED: IB DATE: 10/8/22

Drilling				Sampling			Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			40			SP	SAND fine to coarse grained, pale brown, some orange brown bands				
			41	Rec = 250/200 mm SPT 41.00-41.20 m 14, 30/50mm HB N>30			trace fines				VD
			42				CORE LOSS				
			43	Rec = 300/250 mm SPT 42.50-42.75 m 11, 30/100mm HB N>30		SP	SAND fine to coarse grained, yellow brown				VD
			44	Rec = 450/450 mm SPT 44.00-44.45 m 7, 11, 0 N=11		SC	some yellow brown bands Clayey SAND fine to coarse grained, black, with silt				MD
			45				END OF BOREHOLE @ 44.45 m TARGET DEPTH GROUNDWATER NOT OBSERVED Backfilled with grout				
			46								
			47								
			48								
			49								
			50								

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP) GPJ <<DrawingFile>> 11/08/2022 09:42 10.02.00.04 Datgell Tools

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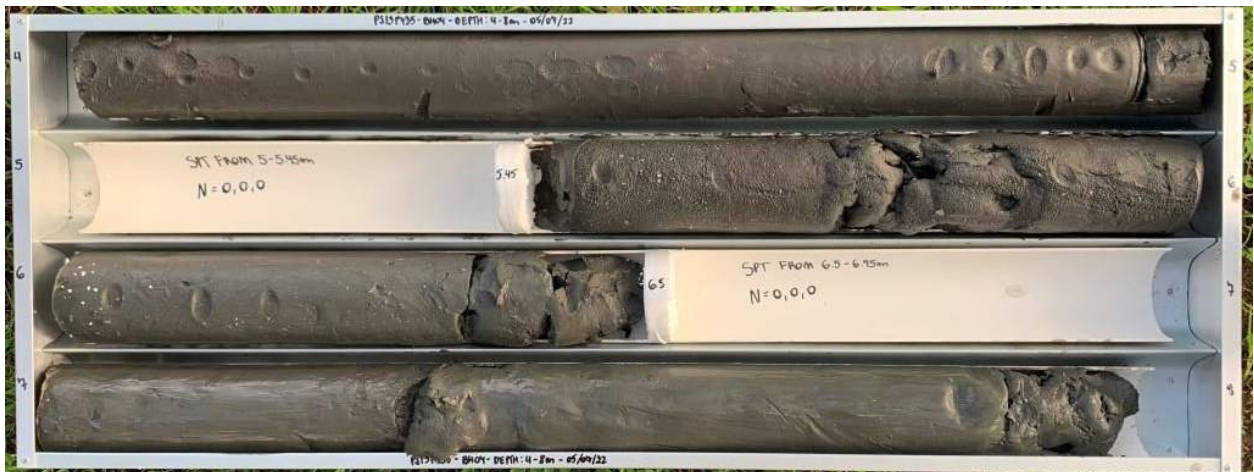
CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394318.0 m E 6462881.0 m N MGA94 50
 SURFACE RL: 1.83 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 44.45 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 5/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH04 - 0.00 - 4.00 m



CPCB-BH04 - 4.00 - 8.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394318.0 m E 6462881.0 m N MGA94 50
 SURFACE RL: 1.83 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 44.45 m

SHEET: 2 OF 6
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 5/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH04 - 8.00 - 12.00 m



CPCB-BH04 - 12.00 - 16.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394318.0 m E 6462881.0 m N MGA94 50
 SURFACE RL: 1.83 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 44.45 m

SHEET: 3 OF 6
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 5/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH04 - 16.00 - 20.00 m



CPCB-BH04 - 20.00 - 24.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394318.0 m E 6462881.0 m N MGA94 50
 SURFACE RL: 1.83 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 44.45 m

SHEET: 4 OF 6
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 5/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH04 - 24.00 - 28.00 m



CPCB-BH04 - 28.00 - 32.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394318.0 m E 6462881.0 m N MGA94 50
 SURFACE RL: 1.83 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 44.45 m

SHEET: 5 OF 6
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 5/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH04 - 32.00 - 36.00 m



CPCB-BH04 - 36.00 - 40.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394318.0 m E 6462881.0 m N MGA94 50
 SURFACE RL: 1.83 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 44.45 m

SHEET: 6 OF 6
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 5/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH04 - 40.00 - 44.00 m

CLIENT: Causeway Link Alliance

COORDS: 394375.0 m E 6462859.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.84 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Heirisson Island

INCLINATION: -90°

LOGGED: CK

DATE: 4/7/22

JOB NO: PS131735

HOLE DEPTH: 25.00 m

CHECKED: IB

DATE: 10/8/22

Drilling			Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0	0.15			SP	TOPSOIL: SAND fine to coarse grained, dark brown				
				1.69			SM/SC	FILL: Silty Clayey SAND fine to medium grained, dark brown and orange brown, trace shell fragments, trace wood				
			1	1.00			SP	FILL: SAND fine to medium grained, orange brown dark brown and yellow brown, with shell fragments				
				0.84								
			2	1.50			SM/SC	Silty Clayey SAND fine to medium grained, dark brown and brown		L		
				0.34								
				2.35	Rec = 380/450 mm SPT 2.00-2.45 m 3, 3, 4 N=7		SP	SAND fine to coarse grained, orange grey brown, small red band				
				-0.61								
			3	2.80			SM	Silty SAND fine to coarse grained, dark grey				
				-0.96								
				3.35	SPT 3.50-3.95 m 0, 0, 0 N=0		SC	Clayey SAND fine to coarse grained, dark grey		VL		
				-1.51								
			4	4.00			CI-CH	Silty CLAY medium to high plasticity, dark grey, trace shell fragments, strong odour				
				-2.16								
			5		U 5.00-5.45 m Rec = 450/450 mm							
			6									
			7		Rec = 450/450 mm SPT 6.50-6.95 m 0, 0, 0 N=0					VS		
			8									
			9									
			10	9.50	Rec = 450/450 mm SPT 9.50-9.95 m 0, 1, 2 N=3			mottled brown		S		
				-7.66								

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G I (BACKUP) GPJ <-DrawingFile>> 11/08/2022 09:43 10.02.00.04 Datgel Tools

PQ3

GWNO

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance

COORDS: 394375.0 m E 6462859.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.84 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Heirisson Island

INCLINATION: -90°

LOGGED: CK

DATE: 4/7/22

JOB NO: PS131735

HOLE DEPTH: 25.00 m

CHECKED: IB

DATE: 10/8/22

Drilling			Sampling			Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			10									
			10.60	-8.76			Cl-CH	Silty CLAY medium to high plasticity, dark grey, trace shell fragments, strong odour				
					U 11.00-11.45 m Rec = 450/450 mm		Cl	Silty SANDY CLAY medium plasticity, brown, fine grained sand		S		
			11.50	-9.66								
					Rec = 330/450 mm SPT 12.50-12.95 m 0, 1, 2 N=3		SC	Clayey SAND fine to medium grained, brown, trace silt				
			12									
					Rec = 400/450 mm SPT 14.00-14.45 m 2, 1, 3 N=4							
			13							L		
					Rec = 400/450 mm SPT 15.50-15.95 m 2, 5, 7 N=12							
			14									
					Rec = 400/450 mm SPT 17.00-17.45 m 4, 7, 9 N=16		SM	Silty SAND fine to coarse grained, brown yellow				MD
			15									
			16									
			17.00	-15.16								
			18.20	-16.36								
			18.50	-16.66								
					Rec = 350/450 mm SPT 18.50-18.95 m 21, 4, 2 N=6		GM/GC	Silty Clayey GRAVEL fine to coarse grained, sub-rounded to sub-angular, grey and brown, medium to high plasticity clay				L
			19									
			19.30	-17.46			CH	Silty CLAY high plasticity, grey				F
			20									

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance

COORDS: 394375.0 m E 6462859.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.84 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Heirisson Island

INCLINATION: -90°

LOGGED: CK

DATE: 4/7/22

JOB NO: PS131735

HOLE DEPTH: 25.00 m

CHECKED: IB

DATE: 10/8/22

Drilling			Sampling			Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
PQ3	GWNO		20		Rec = 450/450 mm SPT 20.00-20.45 m 2, 4, 5 N=9		CH	Silty CLAY high plasticity, grey		F		
			20.45	-18.61			SP	SAND fine to coarse grained, brown yellow		L		
			21						fine to medium grained, pale grey			
			21.30	-19.46		Rec = 450/450 mm SPT 21.50-21.95 m 2, 9, 9 N=18						
			22					SM	Silty SAND fine to coarse grained, pale grey mottled red and yellow brown, with fine to medium sub-rounded to sub-angular gravel		MD	
			22.50	-20.66								
			23									
			23.45	-21.61			CH	Silty CLAY high plasticity, grey mottled yellow				
			24					mottled red, trace gravel		VSt		
			24.00	-22.16								
			25									
			25	-23.16				END OF BOREHOLE @ 25.00 m TARGET DEPTH GROUNDWATER NOT OBSERVED Backfilled with grout				
			26									
			27									
			28									
			29									
			30									

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP).GPJ <<DrawingFile>> 11/08/2022 09:43 10.02.00.04 Datgell Tools

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394375.0 m E 6462859.0 m N MGA94 50
 SURFACE RL: 1.84 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 25.00 m

SHEET: 1 OF 4
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 4/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH05 - 0.00 - 4.00 m



CPCB-BH05 - 4.00 - 8.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394375.0 m E 6462859.0 m N MGA94 50
 SURFACE RL: 1.84 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 25.00 m

SHEET: 2 OF 4
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 4/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH05 - 8.00 - 12.00 m



CPCB-BH05 - 12.00 - 16.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394375.0 m E 6462859.0 m N MGA94 50
 SURFACE RL: 1.84 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 25.00 m

SHEET: 3 OF 4
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 4/7/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH05 - 16.00 - 20.00 m



CPCB-BH05 - 20.00 - 24.00 m

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CLIENT: Causeway Link Alliance
PROJECT: Causeway Pedestrian and Cyclist Bridge
LOCATION: Heirisson Island
JOB NO: PS131735

COORDS: 394375.0 m E 6462859.0 m N MGA94 50
SURFACE RL: 1.84 m DATUM: AHD
INCLINATION: -90°
HOLE DEPTH: 25.00 m

SHEET: 4 OF 4
DRILL RIG: Geoprobe 7822DT
CONTRACTOR: National Geotech
LOGGED: CK DATE: 4/7/22
CHECKED: IB DATE: 10/8/22



CPCB-BH05 - 24.00 - 25.00 m

CLIENT: Causeway Link Alliance

COORDS: 394490.0 m E 6462780.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 3.24 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Heirisson Island

INCLINATION: -90°

LOGGED: CK

DATE: 30/6/22

JOB NO: PS131735

HOLE DEPTH: 40.00 m

CHECKED: IB

DATE: 10/8/22

Drilling			Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0	0.15			SP	TOPSOIL: SAND fine to medium grained, dark brown, trace rootlets				
				3.09			SP	FILL: SAND fine to medium grained, dark brown, with fines				L
			1.50	1.74				with 20-30% fines				
			2	2.50	Rec = 400/450 mm SPT 2.00-2.45 m 5, 10, 12 N=22		SC	Clayey SAND fine to medium grained, orange brown and red, medium plasticity clay				MD
				3.20				shell & sand fine to coarse grained, dark white				VL
				3.80	Rec = 350/450 mm SPT 3.50-3.95 m 1, 2, 1 N=3		CL-CI	Sandy CLAY low to medium plasticity, grey, fine to coarse grained sand, with shell fragments, strong odour				S
				4.50			SP	SAND fine to coarse grained, dark grey, trace shell fragments				L
				5.20	Rec = 450/450 mm SPT 5.00-5.45 m 0, 0, 1 N=1			medium plasticity clay small lense from 5.2 m to 5.4m				
				5.45				CORE LOSS				
				6.00			SC	Clayey SAND fine to coarse grained, dark grey, low to medium plasticity clay				MD
				6.40			CL-CI	with shell fragments Sandy CLAY low to medium plasticity, dark grey, fine to medium grained sand, trace shell fragments, strong odour				
				7.20				with shell fragments				
				7.20								
				8	U 8.00-8.45 m Rec = 450/450 mm							S
				9.50			CL-ML	Silty Sandy CLAY low to medium plasticity, grey and yellow brown, fine to medium grained sand, strong odour				
				10.50			SC	Clayey SAND fine to coarse grained, brown and grey				VL
				11.00	Rec = 450/450 mm SPT 11.00-11.45 m 0, 0, 0 N=0		CL-CI	Sandy CLAY low to medium plasticity, grey, fine grained sand				
				12.00				medium to high plasticity				VS
				13.80	U 12.50-12.95 m Rec = 450/450 mm							
				14	Rec = 450/450 mm SPT 14.00-14.45 m 1, 3, 12 N=15		SP	SAND fine to coarse grained, grey and yellow brown				MD
				14.70				yellow				

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance

COORDS: 394490.0 m E 6462780.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 3.24 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Heirisson Island

INCLINATION: -90°

LOGGED: CK

DATE: 30/6/22

JOB NO: PS131735

HOLE DEPTH: 40.00 m

CHECKED: IB

DATE: 10/8/22

Drilling			Sampling		Field Material Description								
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			15.95	-12.71	Rec = 450/450 mm SPT 15.50-15.95 m 11, 16, 29 N=45		SP	SAND fine to coarse grained, grey and yellow brown				MD	
			16	-12.71				CORE LOSS				D	
			16	-16.25									
			17.00	-13.76	Rec = 380/450 mm SPT 17.00-17.45 m 7, 11, 20 N=31		SC	Clayey SAND fine to medium grained, yellow brown and grey, with silt				MD - D	
			18	-14.76									
			18.50	-15.26	Rec = 450/450 mm SPT 18.50-18.95 m 1, 2, 3 N=5		CH-MH	Silty CLAY high plasticity, red and grey mottled yellow brown, trace sand grey mottled yellow brown				F	
			20	-18.96	Rec = 450/450 mm SPT 20.00-20.45 m 0, 0, 1 N=1							S	
			22	-21.56	Rec = 450/450 mm SPT 21.50-21.95 m 2, 2, 4 N=6								
			22	-18.96				dark grey, trace shell fragments					
			24	-23.21	Rec = 450/450 mm SPT 23.00-23.45 m 1, 2, 3 N=5							F	
			24	-21.56	Rec = 450/450 mm SPT 24.50-24.95 m 2, 9, 13 N=22		SC	Clayey SAND fine to medium grained, yellow brown, low to medium plasticity clay				MD	
			26	-23.21	Rec = 410/450 mm SPT 26.00-26.45 m 2, 3, 2 N=5		CL-CI	Silty SANDY CLAY low to medium plasticity, yellow brown, fine to medium grained sand				F	
			26	-23.21				mottled orange brown					
			26	-23.21				Clayey SAND fine to medium grained, brown mottled orange brown, trace silt				MD	
			28	-24.76	Rec = 330/450 mm SPT 27.50-27.95 m 2, 5, 6 N=11								
			28	-24.76				brown yellow					
			28	-24.76				CORE LOSS					
			28	-25.26				Clayey SAND fine to medium grained, brown yellow, low to medium plasticity clay				MD	
			29.45	-26.21	Rec = 450/450 mm SPT 29.00-29.45 m 2, 2, 10 N=12		SP	SAND fine to medium grained, grey brown				MD	

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP) GPJ <-DrawingFile>> 11/08/2022 09:43 10.02.00.04 Datgell Tools

PQ3

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance

COORDS: 394490.0 m E 6462780.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 3.24 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Heirisson Island

INCLINATION: -90°

LOGGED: CK

DATE: 30/6/22

JOB NO: PS131735

HOLE DEPTH: 40.00 m

CHECKED: IB

DATE: 10/8/22

Drilling			Sampling			Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			30				SP	SAND fine to medium grained, grey brown				MD
			30.50									
			-27.26		Rec = 450/450 mm SPT 30.50-30.95 m 1, 4, 13 N=17		CH	Sandy CLAY high plasticity, dark grey and yellow brown, fine to coarse grained sand, with silt				VSt
			31.50									
			-28.26				SC	Clayey SAND fine to coarse grained, brown, medium plasticity clay				MD - D
			32									
			-28.76		Rec = 370/450 mm SPT 32.00-32.45 m 7, 9, 22 N=31			trace gravel, trace silt, some yellow brown and red band				
			32.00									
			-29.26				GC	Clayey Sandy GRAVEL medium to coarse grained, sub-rounded to sub-angular, grey brown, fine to medium grained sand, medium plasticity clay, with silt				
			32.50									
			-29.76									
			33.00									
			-29.76									
			33.50					CORE LOSS				
			-30.26		Rec = 300/450 mm SPT 33.50-33.95 m 2, 5, 17 N=22		SP	SAND fine to coarse grained, brown and yellow brown, trace gravel, trace silt				MD - D
			34									
					Rec = 230/230 mm SPT 35.00-35.23 m 29, 30/80mm HB N>30							
			36									
					Rec = 200/200 mm SPT 36.50-36.70 m 18, 30/50mm HB N>30							D
			38									
					Rec = 220/220 mm SPT 38.00-38.22 m 30, 30/70mm HB N>30							
			40									
			-36.76		Rec = 270/270 mm SPT 39.50-39.77 m 23, 34/120mm HB N>34			END OF BOREHOLE @ 40.00 m TARGET DEPTH GROUNDWATER ENCOUNTERED @ 1.50 m DEPTH Backfilled with grout				
			42									
			44									

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP).GPJ <-DrawingFile>> 11/08/2022 09:43 10.02.00.04 Datagel Tools PQ3

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394490.0 m E 6462780.0 m N MGA94 50
 SURFACE RL: 3.24 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 1 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 30/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH06 - 0.00 - 4.00 m



CPCB-BH06 - 4.00 - 8.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394490.0 m E 6462780.0 m N MGA94 50
 SURFACE RL: 3.24 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.0 m

SHEET: 2 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 30/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH06 - 8.00 - 12.00 m



CPCB-BH06 - 12.00 - 16.00 m

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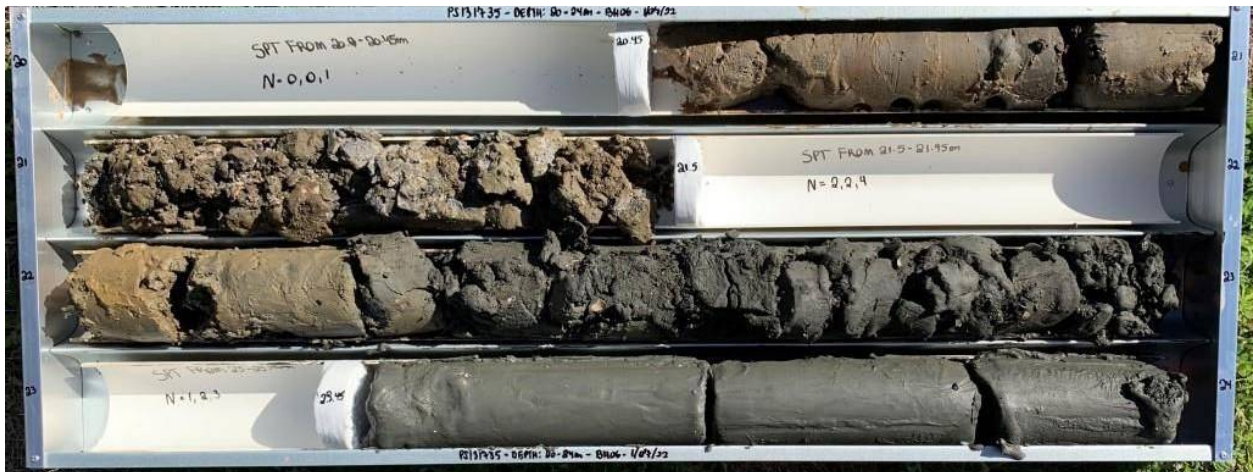
CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394490.0 m E 6462780.0 m N MGA94 50
 SURFACE RL: 3.24 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 3 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 30/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH06 - 16.00 - 20.00 m



CPCB-BH06 - 20.00 - 24.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394490.0 m E 6462780.0 m N MGA94 50
 SURFACE RL: 3.24 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 4 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 30/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH06 - 24.00 - 28.00 m



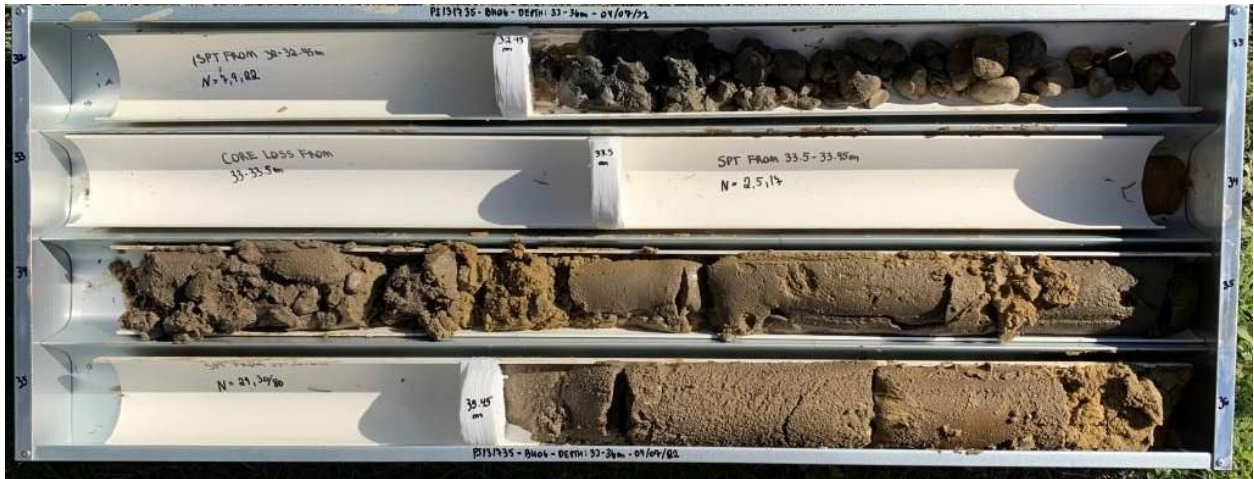
CPCB-BH06 - 28.00 - 32.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394490.0 m E 6462780.0 m N MGA94 50
 SURFACE RL: 3.24 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 5 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 30/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH06 - 32.00 - 36.00 m



CPCB-BH06 - 36.00 - 40.00 m

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CLIENT: Causeway Link Alliance

COORDS: 394518.0 m E 6462738.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.45 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Heirisson Island

INCLINATION: -90°

LOGGED: CK

DATE: 27/6/22

JOB NO: PS131735

HOLE DEPTH: 40.00 m

CHECKED: IB

DATE: 10/8/22

Drilling			Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0	0.25			SP	TOPSOIL: SAND fine to medium grained, brown, trace gravel, trace rootlets				
				1.20			SP	FILL: SAND fine to medium grained, brown mottled orange brown, trace gravel, trace crushed limestone, trace shell fragments pale grey, many shell fragments				L
				0.60								
				0.85								
			2	2.00	SPT 2.00-2.45 m 0, 0, 0 N=0		CL / CH	CLAY low plasticity, grey, presence of odour, trace shell fragments				VS
				-0.55								
				3.00				CORE LOSS				
				-1.55								
			4	3.50	Rec = 160/450 mm SPT 3.50-3.95 m 0, 0, 1 N=1		CL / CH	CLAY low plasticity, grey many shell fragments trace shell fragments				
				-2.05								
				4.00								
				-2.55								
				4.50								
				-3.05								
				5.45	SPT 5.00-5.45 m 0, 0, 0 N=0							
				-4.00								
			6	6.00								
				-4.55								
				7.20	Rec = 450/450 mm SPT 6.50-6.95 m 0, 0, 0 N=0							VS
				-5.75								
				8.00								
				-6.55								
				8.45	Rec = 410/450 mm U 8.00-8.50 m Rec = /500 mm SPT 8.00-8.45 m 0, 0, 0 N=0							
				-7.00								
				9.00								
				-7.55								
				10.00	Rec = 420/450 mm SPT 9.50-9.95 m 1, 1, 2 N=3							S
				-8.55								
				10.70								
				-9.25								
				11.50	Rec = 450/450 mm SPT 11.00-11.45 m 3, 3, 5 N=8							F
				-10.05								
				12.80	Rec = 440/450 mm U 12.50-13.00 m Rec = /500 mm SPT 12.50-12.95 m 3, 6, 9 N=15							St
				-11.55								yellow staining at 13.3m and 13.7m
				14.25	Rec = 450/450 mm SPT 14.00-14.45 m 2, 3, 5 N=8							F
				-12.80								
				14.75								
				-13.30								

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394518.0 m E 6462738.0 m N MGA94 50
 SURFACE RL: 1.45 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 27/6/22
 CHECKED: IB DATE: 10/8/22

Drilling			Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			15.30	-13.85			CL / CH	CLAY low plasticity, grey				
			16.00	-14.55	Rec = 450/450 mm SPT 15.50-15.95 m 2, 3, 4 N=7			high plasticity, mottled red, some yellow and black bands				
			17.70	-16.25	Rec = 450/450 mm SPT 17.00-17.45 m 1, 3, 4 N=7			high plasticity, mottled yellow brown yellow and red				F
			18.00	-16.55				mottled yellow brown				
			18.00	-16.55				dark grey				presence of crystalline mineral at the depth of 18-18.15m and 18.35-18.5m
			20.00	-18.55	Rec = 450/450 mm SPT 18.50-18.95 m 1, 1, 2 N=3			trace shell fragments				S
			22.00	-20.00	Rec = 450/450 mm SPT 20.00-20.45 m 1, 1, 3 N=4							
			22.00	-20.00	Rec = 450/450 mm SPT 21.50-21.95 m 11, 5, 5 N=10							F
			23.70	-22.25	Rec = 450/450 mm SPT 23.00-23.45 m 1, 3, 3 N=6							
			24.00	-22.25			SP	SAND fine to medium grained, pale brown				L
			25.40	-23.96	Rec = 450/450 mm SPT 24.50-24.95 m 1, 2, 2 N=4							
			25.40	-23.96				fine to coarse grained, brown yellow				
			25.40	-23.96				fine to medium grained, pale grey and white				
			26.00	-24.35	Rec = 450/450 mm SPT 26.00-26.45 m 9, 15, 21 N=36			fine to coarse grained, brown yellow pale white and brown				D
			26.00	-24.35			CH	CLAY high plasticity, dark grey, with fine to medium grained sand				VST
			26.00	-24.35			SP / CH	INTERBEDDED SAND AND CLAY fine to coarse grained, high plasticity, grey dark grey and brown, some red brown bands, rock fragments (cobbles), some quartz fragments				D
			28.00	-26.75	Rec = 250/450 mm SPT 27.50-27.95 m 6, 9, 10 N=19							
			28.00	-26.75			SP	SAND fine to medium grained, grey				
			28.80	-27.35			GP	GRAVEL coarse grained, sub-rounded to sub-angular				MD
			29.45	-28.00	Rec = 380/450 mm SPT 29.00-29.45 m 3, 5, 8 N=13							
			29.45	-28.00			SP / CH	INTERBEDDED SAND AND CLAY fine to coarse grained, high plasticity, dark grey and red brown				

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP) GPJ <-DrawingFile>> 11/08/2022 11:50 10.02.00.04 Datgell Tools PQ3

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance

COORDS: 394518.0 m E 6462738.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.45 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: Heirisson Island

INCLINATION: -90°

LOGGED: CK

DATE: 27/6/22

JOB NO: PS131735

HOLE DEPTH: 40.00 m

CHECKED: IB

DATE: 10/8/22

Drilling			Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			30	30.20 -28.75	Rec = 280/450 mm SPT 30.50-30.95 m 7, 12, 16 N=28		SP	SAND fine to coarse grained, sub-rounded to sub-angular, brown orange				
				31.00 -29.55			GP	GRAVEL coarse grained, sub-rounded to sub-angular		MD		
			32	32.00 -30.55	Rec = 280/450 mm SPT 32.00-32.45 m 2, 3, 6 N=9		SC	INTERBEDDED SAND AND CLAY fine to coarse grained, black brown yellow and, trace quartz fragments				
				32.50 -31.05			GP	Sandy GRAVEL coarse grained, brown grey and grey, fine to coarse grained sand, sub-rounded to angular		L		
				33.50 -32.05	Rec = 400/450 mm SPT 33.50-33.95 m 6, 20, 46 N=66		SP	brown grey and grey, trace fine				
			34		Rec = 380/450 mm SPT 35.00-35.45 m 6, 26, 30 N=56					VD		
			36		Rec = 250/450 mm SPT 36.50-36.95 m 26, 30, 0 N=30							
			38		Rec = 300/450 mm SPT 38.00-38.45 m 13, 50, 0 N=50							
				39.70 -38.25	Rec = 400/450 mm SPT 39.50-39.95 m 13, 50, 0 N=50			pale grey white				
			40	-38.55				END OF BOREHOLE @ 40.00 m TARGET DEPTH GROUNDWATER ENCOUNTERED @ 1.50 m DEPTH Backfilled with grout				
			42									
			44									

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP) GPJ <-DrawingFile>> 11/08/2022 11:50 10.02.00.04 Datgel Tools PQ3

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394518.0 m E 6462738.0 m N MGA94 50
 SURFACE RL: 1.45 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 1 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 27/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH07 - 0.00 - 4.00 m



CPCB-BH07 - 4.00 - 8.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394518.0 m E 6462738.0 m N MGA94 50
 SURFACE RL: 1.45 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 2 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 27/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH07 - 8.00 - 12.00 m



CPCB-BH07 - 12.00 - 16.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394518.0 m E 6462738.0 m N MGA94 50
 SURFACE RL: 1.45 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 3 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 27/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH07 - 16.00 - 20.00 m



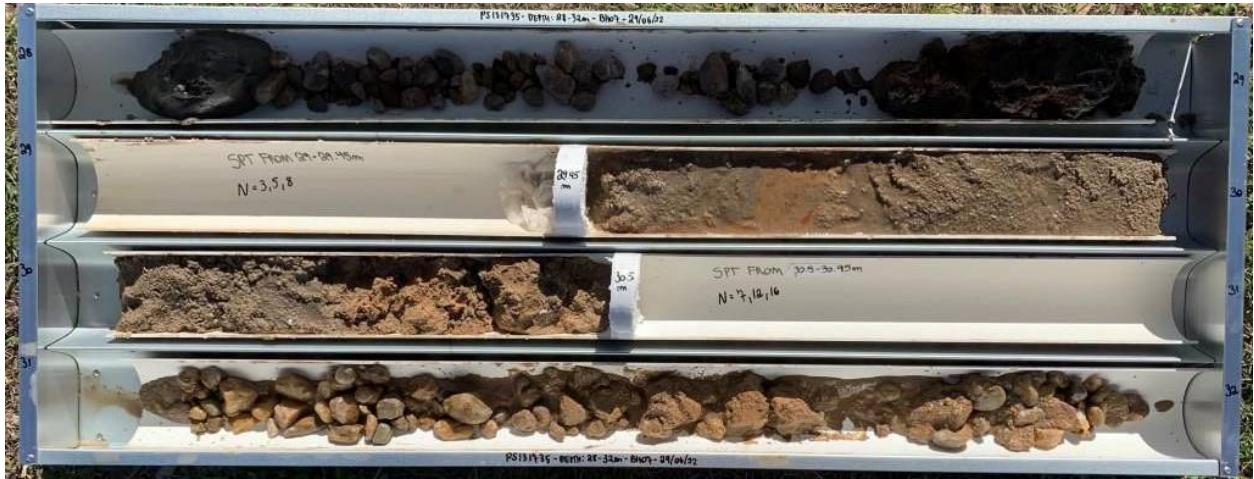
CPCB-BH07 - 24.00 - 28.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island
 JOB NO: PS131735

COORDS: 394518.0 m E 6462738.0 m N MGA94 50
 SURFACE RL: 1.45 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.0 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 27/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH07 - 28.00 - 32.00 m



CPCB-BH07 - 32.00 - 36.00 m

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CLIENT: Causeway Link Alliance
PROJECT: Causeway Pedestrian and Cyclist Bridge
LOCATION: Heirisson Island
JOB NO: PS131735

COORDS: 394518.0 m E 6462738.0 m N MGA94 50
SURFACE RL: 1.45 m DATUM: AHD
INCLINATION: -90°
HOLE DEPTH: 40.00 m

SHEET: 5 OF 5
DRILL RIG: Geoprobe 7822DT
CONTRACTOR: National Geotech
LOGGED: CK DATE: 27/6/22
CHECKED: IB DATE: 10/8/22



CPCB-BH07 - 36.00 - 40.00 m

CLIENT: Causeway Link Alliance

COORDS: 394746.0 m E 6462585.0 m N MGA94 50

DRILL RIG: Geoprobe 7822DT

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.52 m DATUM: AHD

CONTRACTOR: National Geotech

LOCATION: McCallum Park

INCLINATION: -90°

LOGGED: CK

DATE: 23/6/22

JOB NO: PS131735

HOLE DEPTH: 40.00 m

CHECKED: IB

DATE: 10/8/22

Drilling			Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0	0.15			SP	TOPSOIL: SAND fine to medium grained, dark brown, trace rootlets				
				1.37			SP	FILL: SAND fine to medium grained, yellow brown				L
			1.40									
				0.02			CL	CLAY low plasticity, yellow brown				S
			2	2.00	Rec = 250/450 mm SPT 2.00-2.45 m 0, 0, 0 N*=0		SC / CI- CH	CORE LOSS Clayey SAND /Sandy CLAY fine to medium grained, grey mottled yellow brown, medium to high plasticity clay				L
				-0.48								
				3.20				dark grey				
				-1.68								
			4	4.00	Rec = 450/450 mm SPT 3.50-3.95 m 0, 0, 2 N*=2		CI- CH	CLAY medium to high plasticity, grey mottled yellow brown				
				-2.48								
					U 5.00-5.45 m Rec = 450/450 mm							St
					5.75 m 5.75 m PP = 564 kPa Rec = 450/450 mm SPT 6.00-6.45 m 5, 8, 8 N*=16							
					6.70 m 6.70 m PP = 412 kPa		CI- CH	Sandy CLAY medium to high plasticity, grey mottled yellow brown dark grey, fine to medium grained sand, trace shell fragments				
					7.20 m 7.20 m PP = 407 kPa							
				7.00								
				-5.48								
					8.00		SP	CORE LOSS				
					Rec = 400/450 mm U 8.00-8.45 m			SAND fine to medium grained, grey mottled yellow brown				L
					8.50		CI- CH	Sandy CLAY medium to high plasticity, grey mottled yellow brown, fine to medium grained sand				F
					Rec = 450/450 mm SPT 8.00-8.45 m 0, 6, 3 N*=9							
					9.00		SP	SAND fine to medium grained, grey mottled orange brown and brown				L
					Rec = 450/450 mm SPT 9.50-9.95 m 0, 6, 3 N*=9							
					10.50		CI- CH	CLAY medium to high plasticity, grey mottled orange brown				F
					Rec = 450/450 mm SPT 11.00-11.45 m 3, 4, 6 N*=10							
					11.45			CORE LOSS				
					Rec = 450/450 mm SPT 12.50-13.00 m Rec = 500/500 mm			mottled red				
					12.30							
					13.60							
					13.50 m 13.50 m PP = 235 kPa			mottled red orange brown				F
					Rec = 450/450 mm SPT 14.00-14.45 m 2, 2, 4 N*=6							
					14.80 m							

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: McCallum Park
 JOB NO: PS131735

COORDS: 394746.0 m E 6462585.0 m N MGA94 50
 SURFACE RL: 1.52 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 23/6/22
 CHECKED: IB DATE: 10/8/22

Drilling				Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			14.80 m PP = 470 kPa	Rec = 450/450 mm SPT 15.50-15.95 m 1, 3, 5 N*=8			mottled red orange brown			
			17.00 -15.48	U 17.00-17.45 m Rec = 450/450 mm			grey		F	
			18.00 -16.48	18.20 m 18.20 m PP = 127 kPa Rec = 450/450 mm SPT 18.50-18.95 m 2, 2, 3 N*=5			dark grey			
			19.00 -17.48				CORE LOSS			
			20.00 -18.98	U 20.00-20.45 m Rec = 450/450 mm						
			21.00 -19.48			SP	SAND fine to coarse grained, sub-rounded to sub-angular, grey			
			22.00 -20.48	Rec = 450/450 mm SPT 21.50-21.95 m 8, 20, 36 N*=56			mottled brown and yellow		VD	
			23.50 -21.98	Rec = 450/450 mm SPT 23.00-23.45 m 8, 15, 26 N*=41			some orange brown bands and yellow brown and grey			
			24.00 -22.48				yellow brown grey mottled orange brown		D	
			25.00 -23.48	Rec = 450/450 mm SPT 24.50-24.95 m 8, 12, 18 N*=30			brown and black mottled orange brown			
			26.00 -24.98	Rec = 450/450 mm SPT 26.00-26.45 m 7, 10, 12 N*=22		SC / SM	Silty Clayey SAND fine to coarse grained, black			
			27.00 -25.98	Rec = 400/450 mm SPT 27.50-27.95 m 2, 7, 11 N*=18			fine to medium grained		MD	clay content becoming more predominant from 26.5m to 27.5m
			28.00 -29.98	Rec = 400/450 mm SPT 29.00-29.45 m 0, 2, 7 N*=9		SP	SAND fine to medium grained, yellow brown			
			30.00						L	

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP) GPJ <-DrawingFile>> 11/08/2022 09:43 10.02.00.04 Datgel Tools

PQ

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: McCallum Park
 JOB NO: PS131735

COORDS: 394746.0 m E 6462585.0 m N MGA94 50
 SURFACE RL: 1.52 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 23/6/22
 CHECKED: IB DATE: 10/8/22

Drilling				Sampling			Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			30	Rec = 400/450 mm SPT 30.50-30.95 m 1, 4, 7 N=11		SP	SAND fine to medium grained, yellow brown				
			32	Rec = 450/450 mm SPT 32.00-32.45 m 2, 7, 17 N=24			pale brown				
			34	Rec = 380/450 mm SPT 33.50-33.95 m 2, 8, 16 N=24			yellow brown and brown			MD	
			36	Rec = 370/450 mm SPT 35.00-35.45 m 3, 7, 17 N=24			brown				
			38	Rec = 450/450 mm SPT 36.50-36.95 m 4, 10, 23 N=33			yellow brown				
			40	Rec = 450/450 mm SPT 38.00-38.45 m 2, 8, 18 N=26			black staining			MD - D	
			40	Rec = 450/450 mm SPT 39.50-39.95 m 9, 12, 23 N=35			END OF BOREHOLE @ 40.00 m TARGET DEPTH GROUNDWATER ENCOUNTERED @ 1.50 m DEPTH Backfilled with grout				

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP).GPJ <-DrawingFile>> 11/08/2022 09:43 10.02.00.04 Datgell Tools

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: McCallum Park
 JOB NO: PS131735

COORDS: 394746.0 m E 6462585.0 m N MGA94 50
 SURFACE RL: 1.52 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 23/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH08 - 0.00 - 4.00 m



CPCB-BH08 - 4.00 - 8.00 m

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CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: McCallum Park
 JOB NO: PS131735

COORDS: 394746.0 m E 6462585.0 m N MGA94 50
 SURFACE RL: 1.52 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.0 m

SHEET: 2 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 23/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH08 - 8.00 - 12.00 m



CPCB-BH08 - 12.00 - 16.00 m

This report of core photographs must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: McCallum Park
 JOB NO: PS131735

COORDS: 394746.0 m E 6462585.0 m N MGA94 50
 SURFACE RL: 1.52 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 3 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 23/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH08 - 16.00 - 20.00 m



CPCB-BH08 - 20.00 - 24.00 m

This report of core photographs must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: McCallum Park
 JOB NO: PS131735

COORDS: 394746.0 m E 6462585.0 m N MGA94 50
 SURFACE RL: 1.52 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 23/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH08 - 24.00 - 28.00 m



CPCB-BH08 - 28.00 - 32.00 m

This report of core photographs must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: McCallum Park
 JOB NO: PS131735

COORDS: 394746.0 m E 6462585.0 m N MGA94 50
 SURFACE RL: 1.52 m DATUM: AHD
 INCLINATION: -90°
 HOLE DEPTH: 40.00 m

SHEET: 5 OF 5
 DRILL RIG: Geoprobe 7822DT
 CONTRACTOR: National Geotech
 LOGGED: CK DATE: 23/6/22
 CHECKED: IB DATE: 10/8/22



CPCB-BH08 - 32.00 - 36.00 m



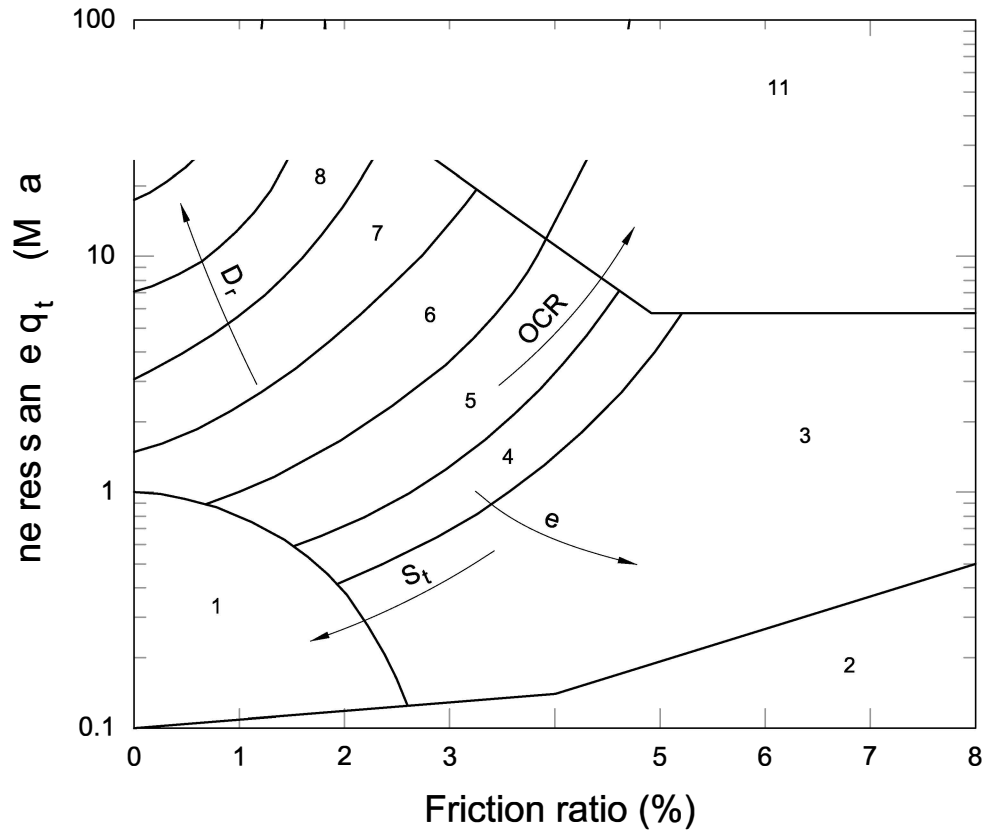
CPCB-BH08 - 36.00 - 40.00 m

This report of core photographs must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

APPENDIX C: CONE PENETRATION TEST LOGS

DRAFT

INTERPRETATION OF SOIL TYPE FROM CONE PENETRATION TEST DATA



ZONE NUMBERS AND SOIL BEHAVIOUR TYPE:

- | | | |
|---------------------------|------------------------------|------------------------------|
| 1. SENSITIVE FINE GRAINED | 5. CLAYEY SILT TO SILTY CLAY | 9. SAND |
| 2. ORGANIC MATERIAL | 6. SANDY SILT TO CLAYEY SILT | 10. GRAVELLY SAND TO SAND |
| 3. CLAY | 7. SILTY SAND TO SANDY SILT | 11. VERY STIFF FINE GRAINED* |
| 4. SILTY CLAY TO CLAY | 8. SAND TO SILTY SAND | 12. SAND TO CLAYEY SAND* |

DEFINITIONS:

- q_t - CONE TIP RESISTANCE CORRECTED FOR PORE PRESSURE
- S_t - SENSITIVITY
- e - VOID RATIO
- D_r - RELATIVE DENSITY
- OCR - OVERCONSOLIDATION RATIO

* OVERCONSOLIDATED OR CEMENTED.

DIRECTION OF ARROWS INDICATES PARAMETER INCREASING.

EXPECT SOME OVERLAP IN SOIL TYPE-ZONES.
LOCAL CORRELATIONS ARE PREFERRED AND MAY INDICATE SOIL TYPE BOUNDARIES THAT DIFFER FROM THOSE SHOWN.

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

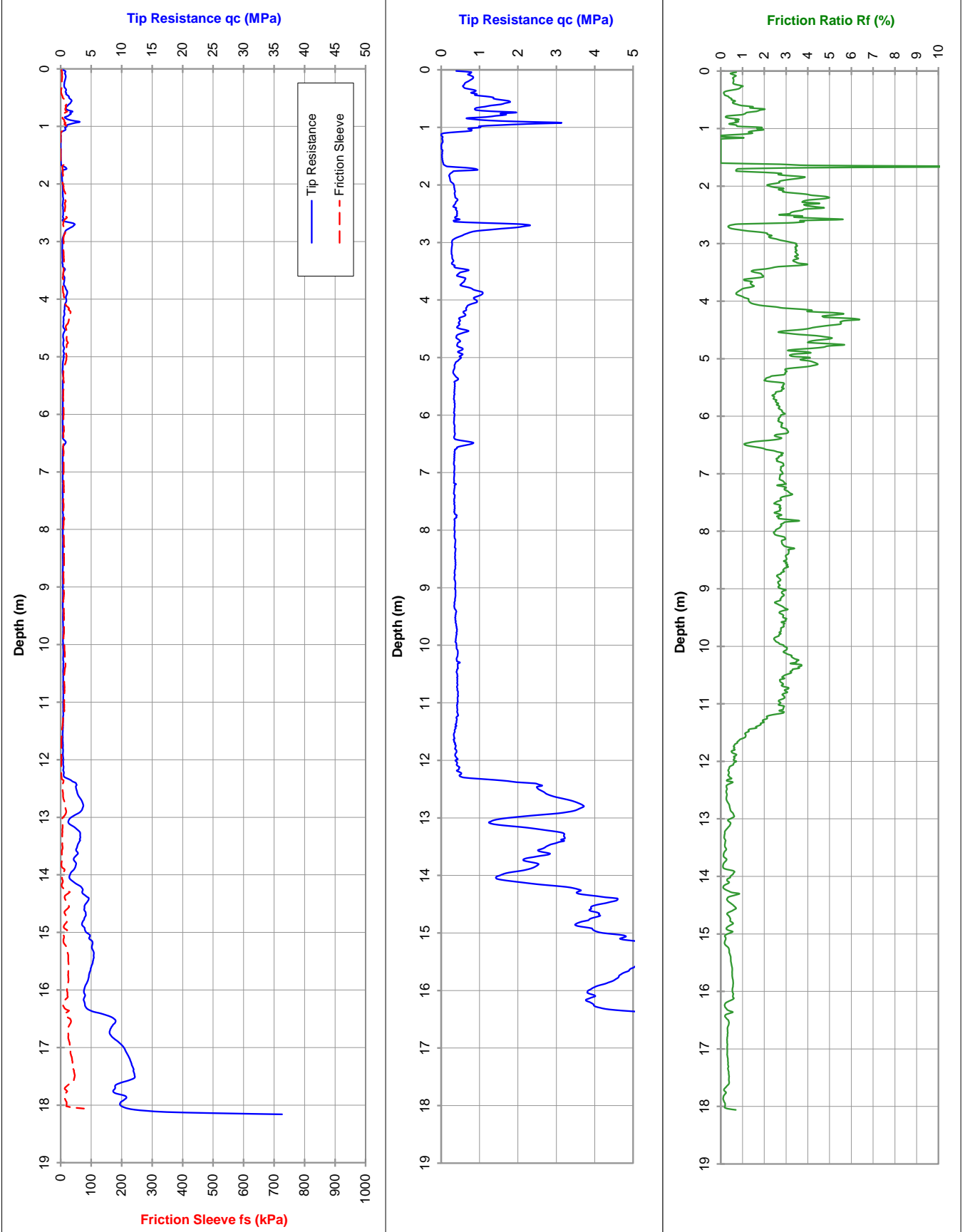
RL (m): 1.67 (mAHD)

LOCATION: Point Fraser

Co-ords: 394214mE, 6462986mN

CPT 03

11-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.3

Pre-drilled and backfilled to (m): 2.0

Refusal: 40 MPa + Inclination

Cone I.D.: EC28

File: WS0066T

Rig Type: 7t track

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

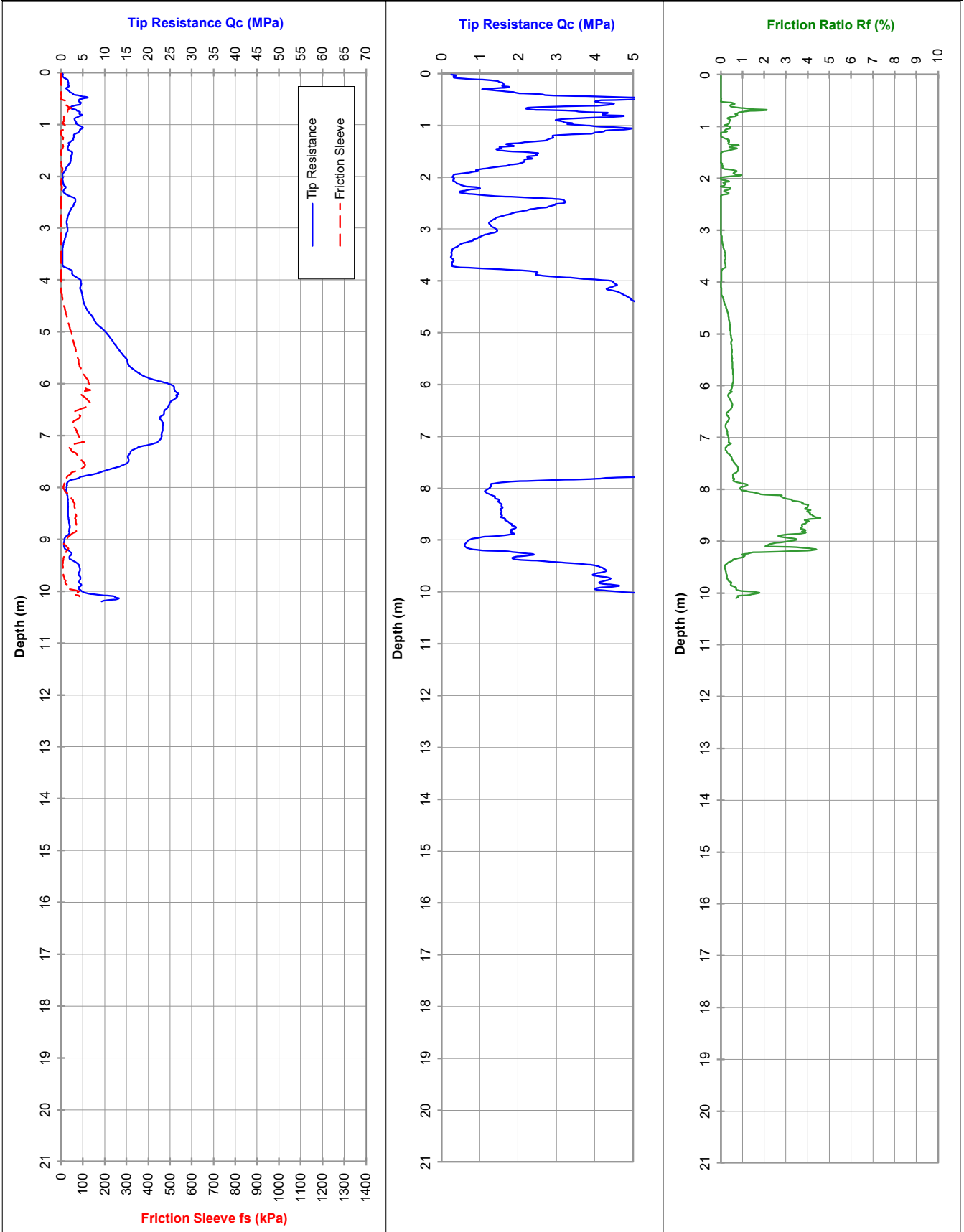
RL (m): 1.6

LOCATION: McCallum Park

Co-ords: 394740mE, 6462566mN

**CPCB-
CPT 11**

05-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.2

Hand Auger to (m): 1.5

Refusal:

Cone I.D.: EC144

File: WS0003R

Rig Type: 25t truck (RFW)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

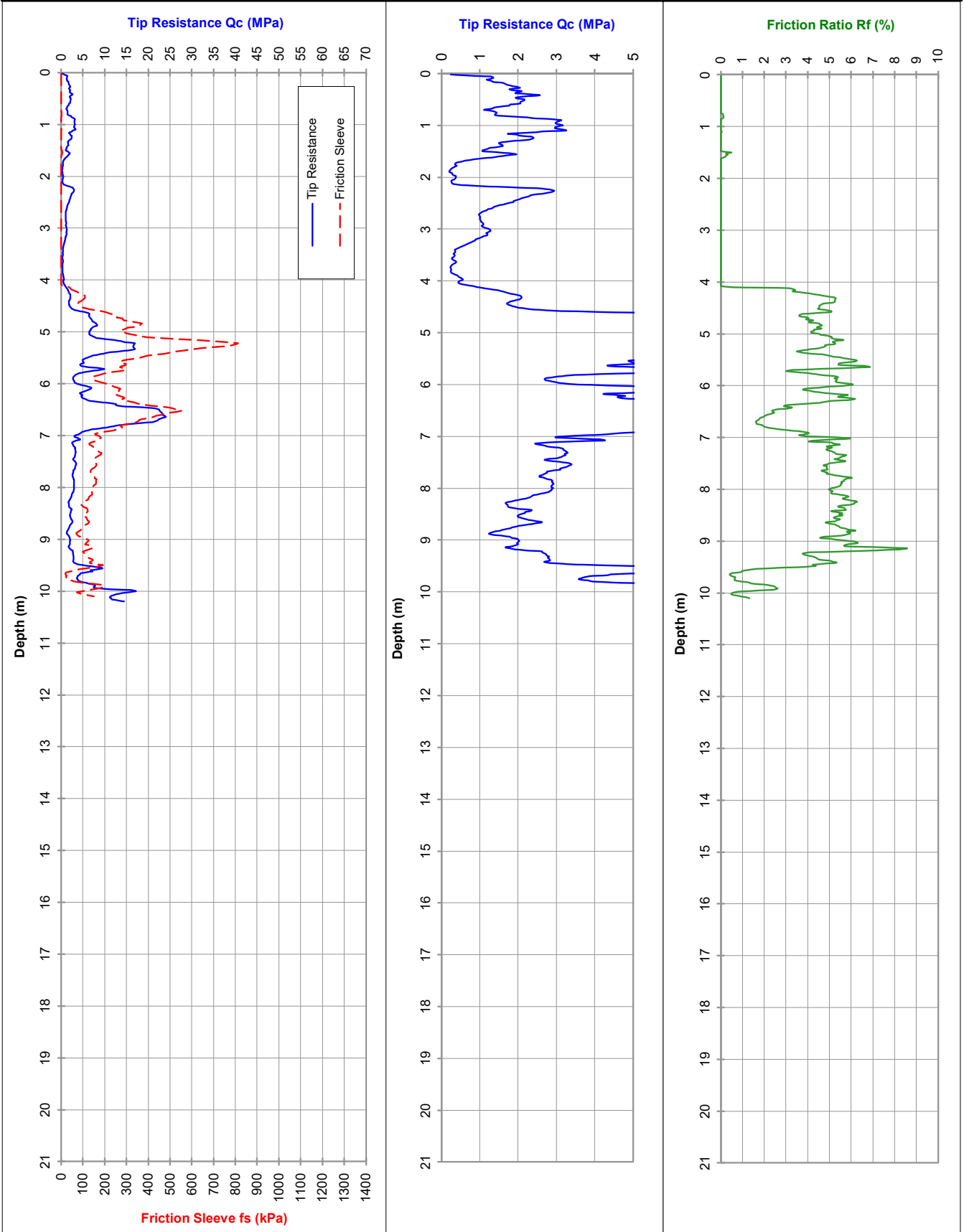
RL (m): 1.49

LOCATION: McCallum Park

Co-ords: 394739mE, 6462576mN

**CPCB-
CPT 12**

05-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.3

Hand Auger to (m): 1.5

Refusal:

Cone I.D.: EC144

File: WS0004R

Rig Type: 25t truck (RFW)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

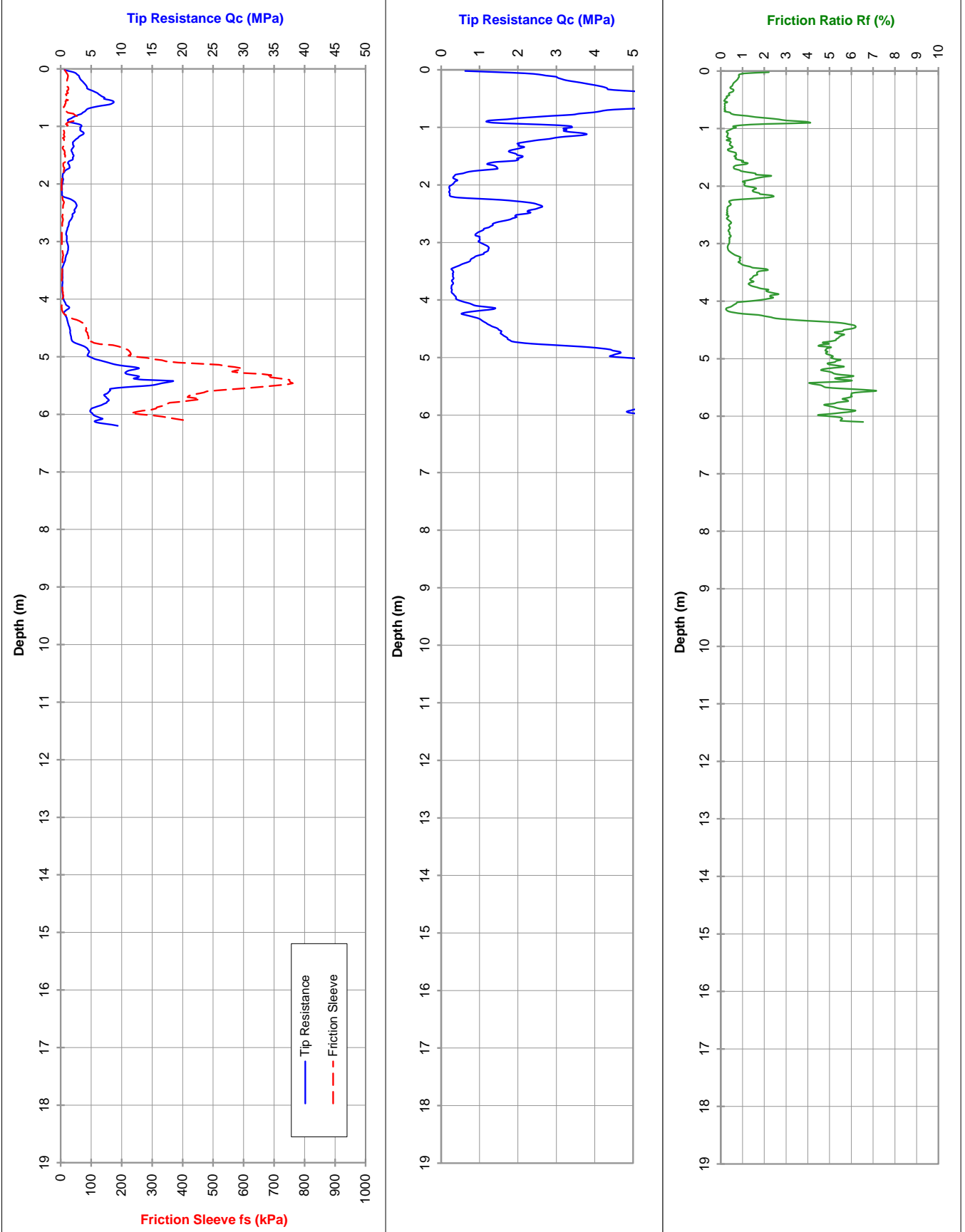
RL (m): 1.49 (mAHD)

LOCATION: McCallum Park / Crane Pad

Co-ords: 394739mE, 6462576mN

CPT 12A

11-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 0.9

Dummy probe to (m):

Refusal:

Cone I.D.: EC28

File: WS0072TT

Rig Type: 22t truck (Track-Truck)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

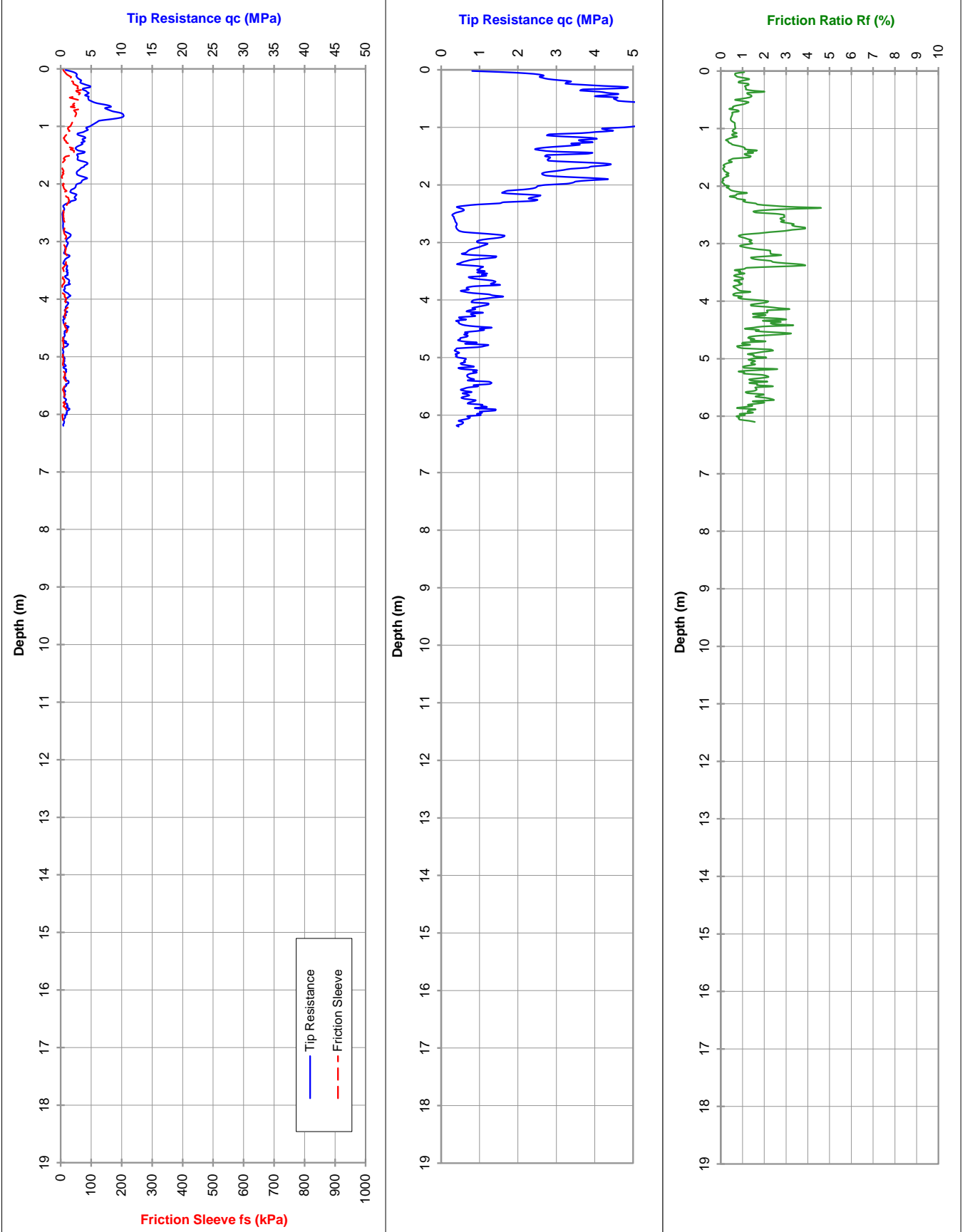
RL (m): 1.98 (mAHD)

CPT 13

LOCATION: Heirison Island

Co-ords: 394530mE, 6462761mN

11-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 3.6

Dummy probe to (m):

Refusal:

Cone I.D.: EC28

File: WS0068TT

Rig Type: 22t truck (Track-Truck)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

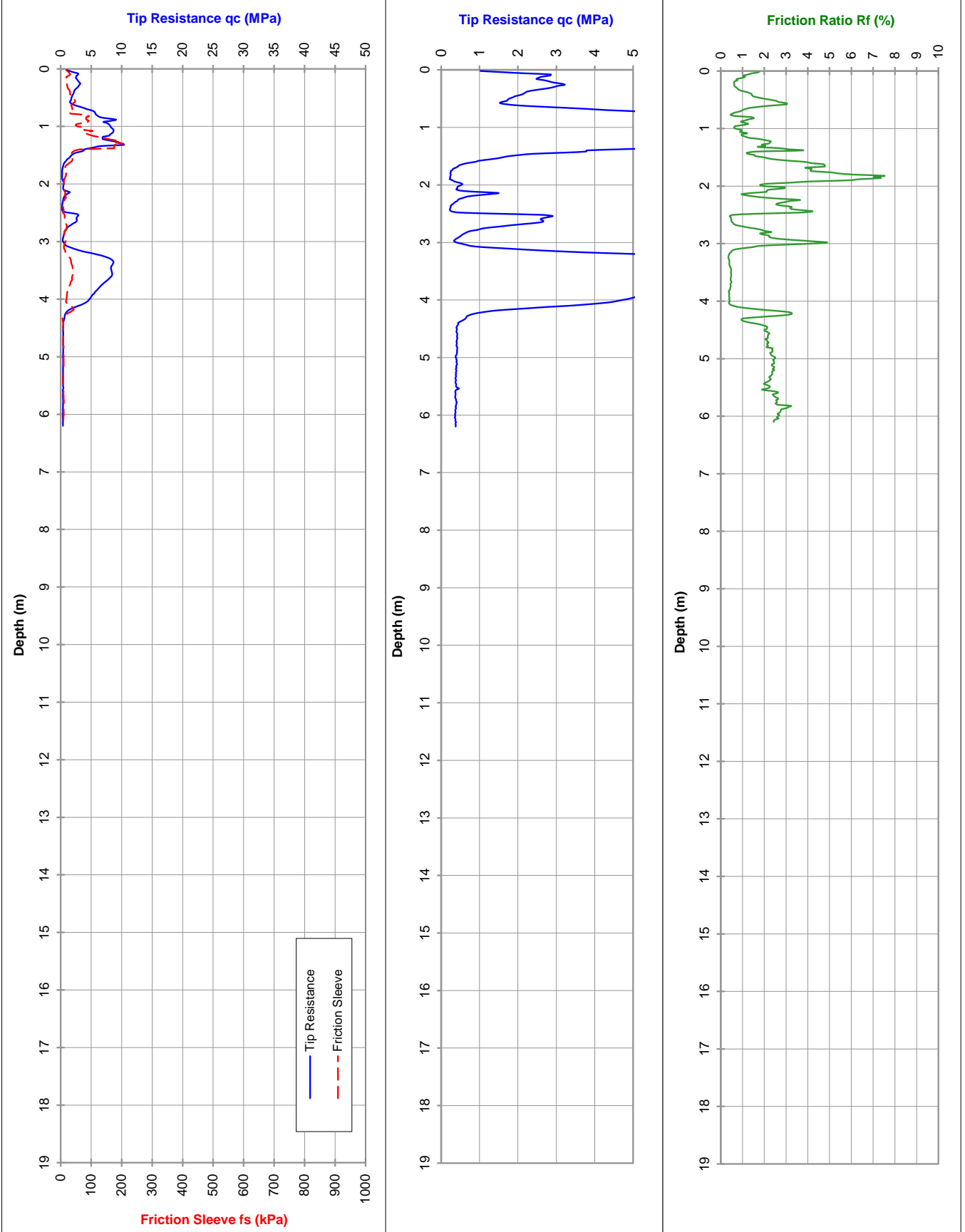
RL (m): 2.09 (mAHD)

CPT 14

LOCATION: Heirison Island

Co-ords: 394299mE, 6462852mN

11-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 1.3

Dummy probe to (m):

Refusal:

Cone I.D.: EC28

File: WS0070TT

Rig Type: 22t truck (Track-Truck)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

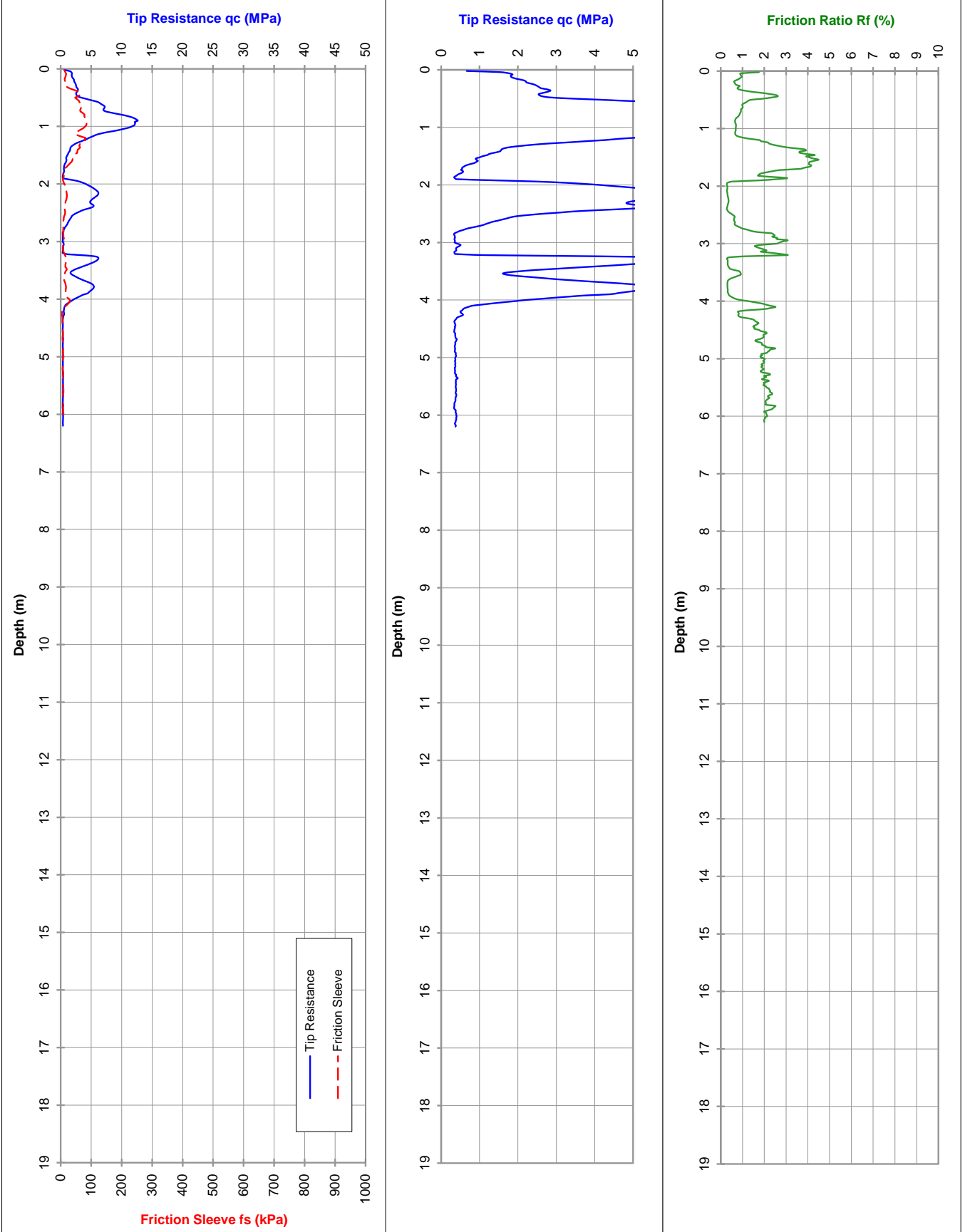
RL (m): 1.9 (mAHD)

CPT 15

LOCATION: Heirison Island

Co-ords: 394280mE, 6462856mN

11-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 1.4

Dummy probe to (m):

Refusal:

Cone I.D.: EC28

File: WS0069TT

Rig Type: 22t truck (Track-Truck)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

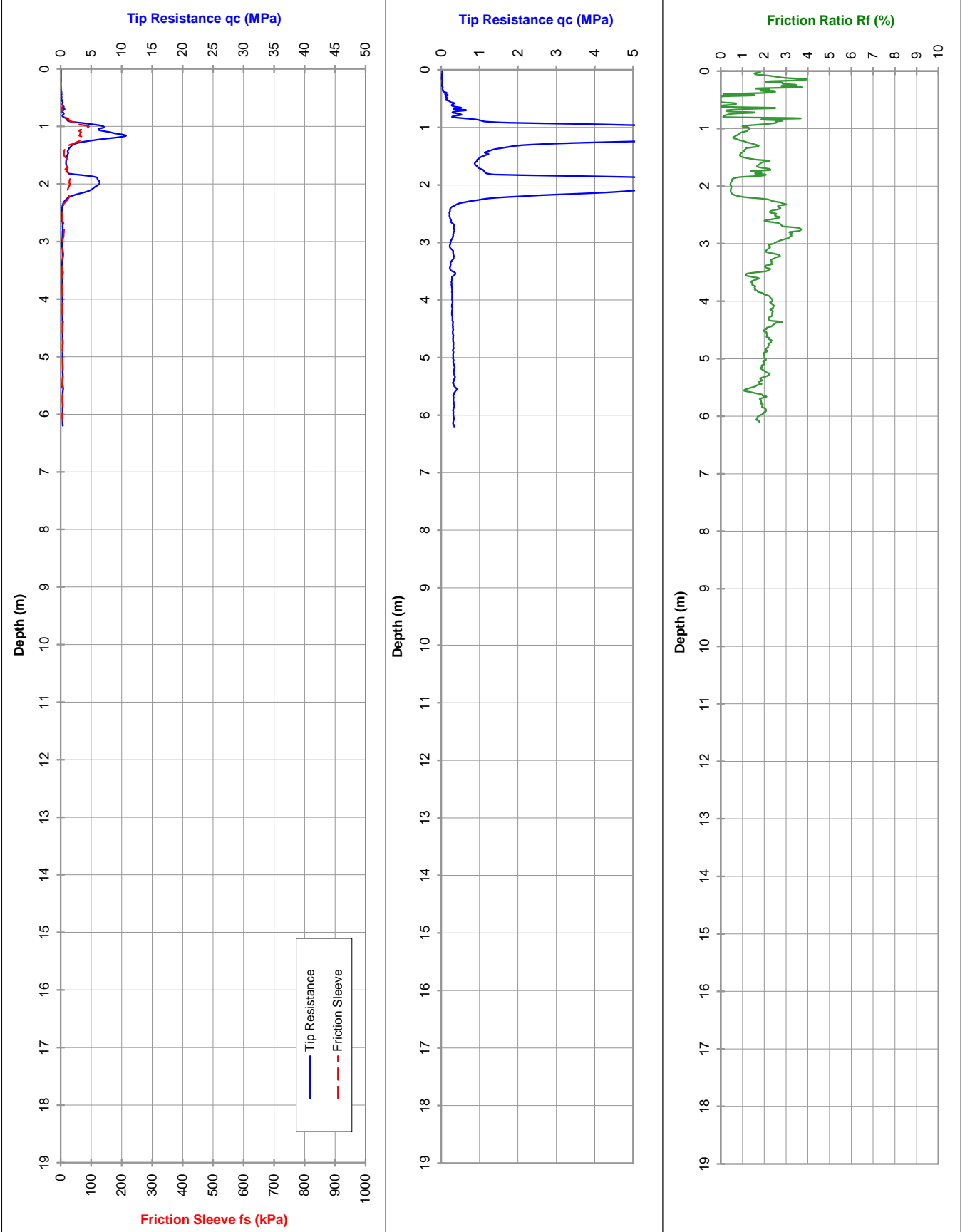
RL (m): 1.48 (mAHD)

CPT 16

LOCATION: Point Fraser/Crane Pad

Co-ords: 394222mE, 6463008mN

11-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 1.3
 Hand Auger to (m): 1.0
 Refusal:

Cone I.D.: EC28
 File: WS0067T
 Rig Type: 7t track

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

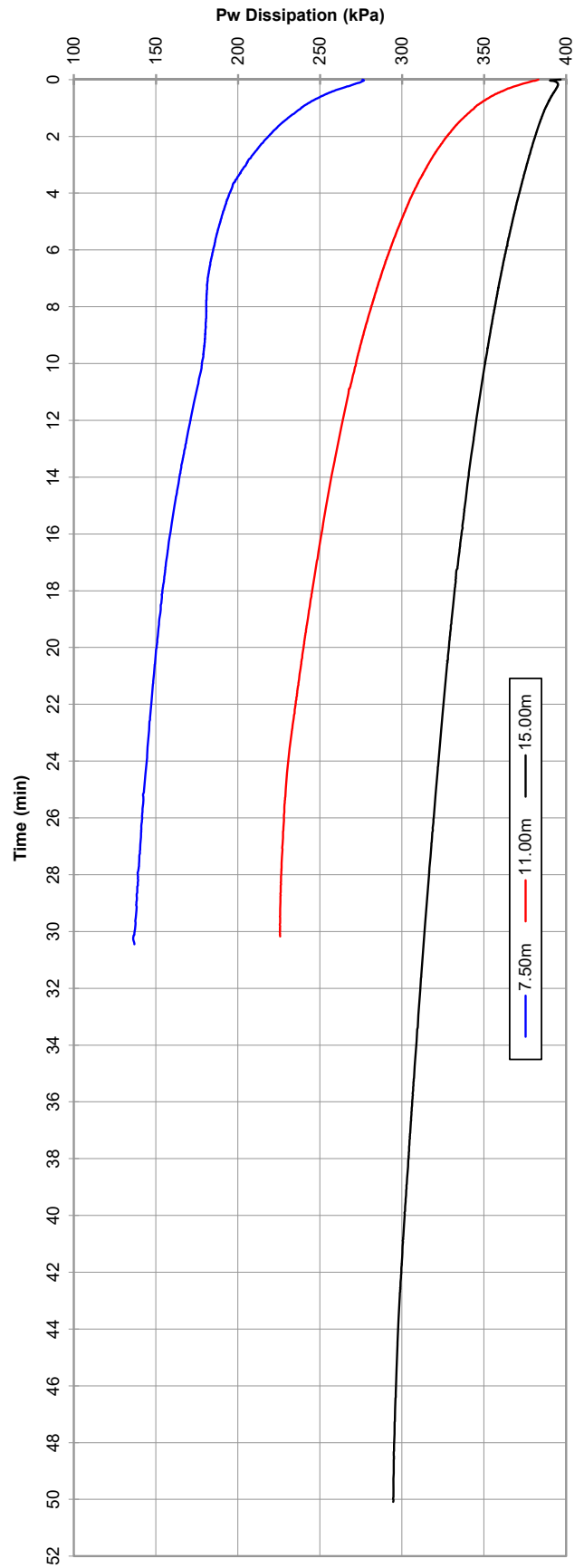
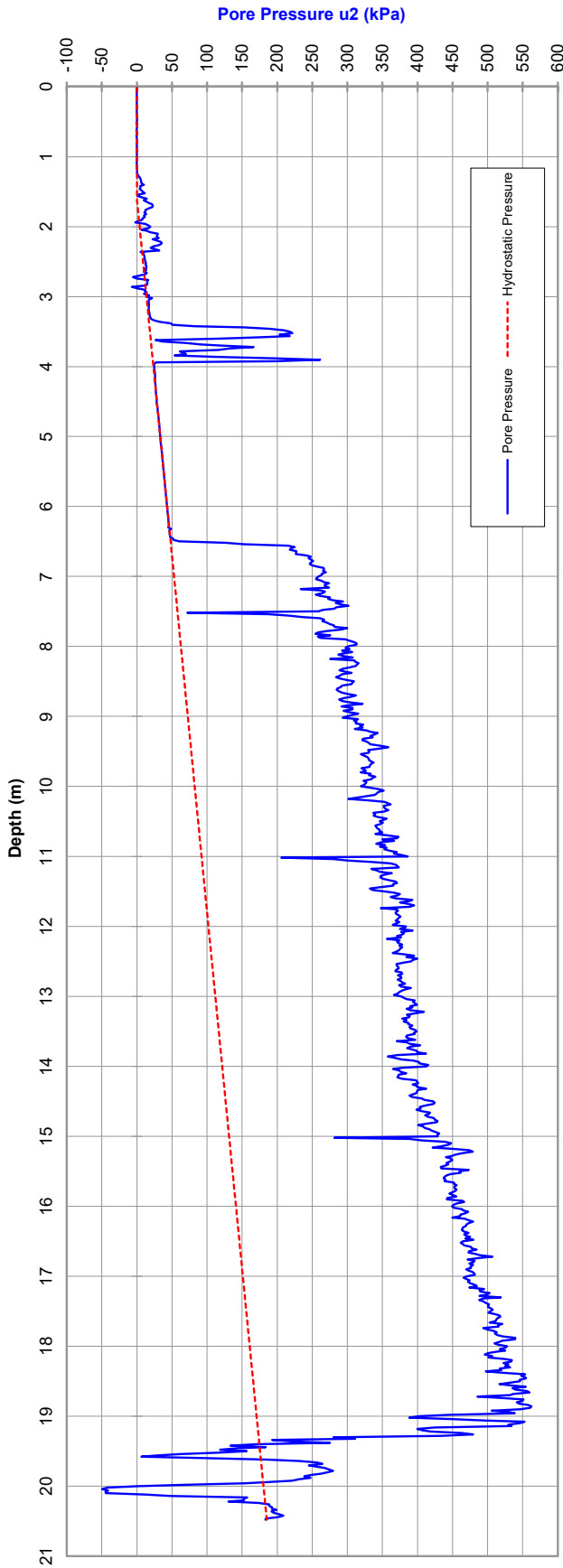
RL (m): 2.15

LOCATION: Point Fraser, Heirisson Island

Co-ords: 394159mE, 6463041mN

**CPCB-
CPTU 01**

05-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

Approx. Water (m): 1.6

File: WS0002R.txt

Rig type: 25t truck (RFW)

ELECTRIC FRICTION-CONE PENETROMETER

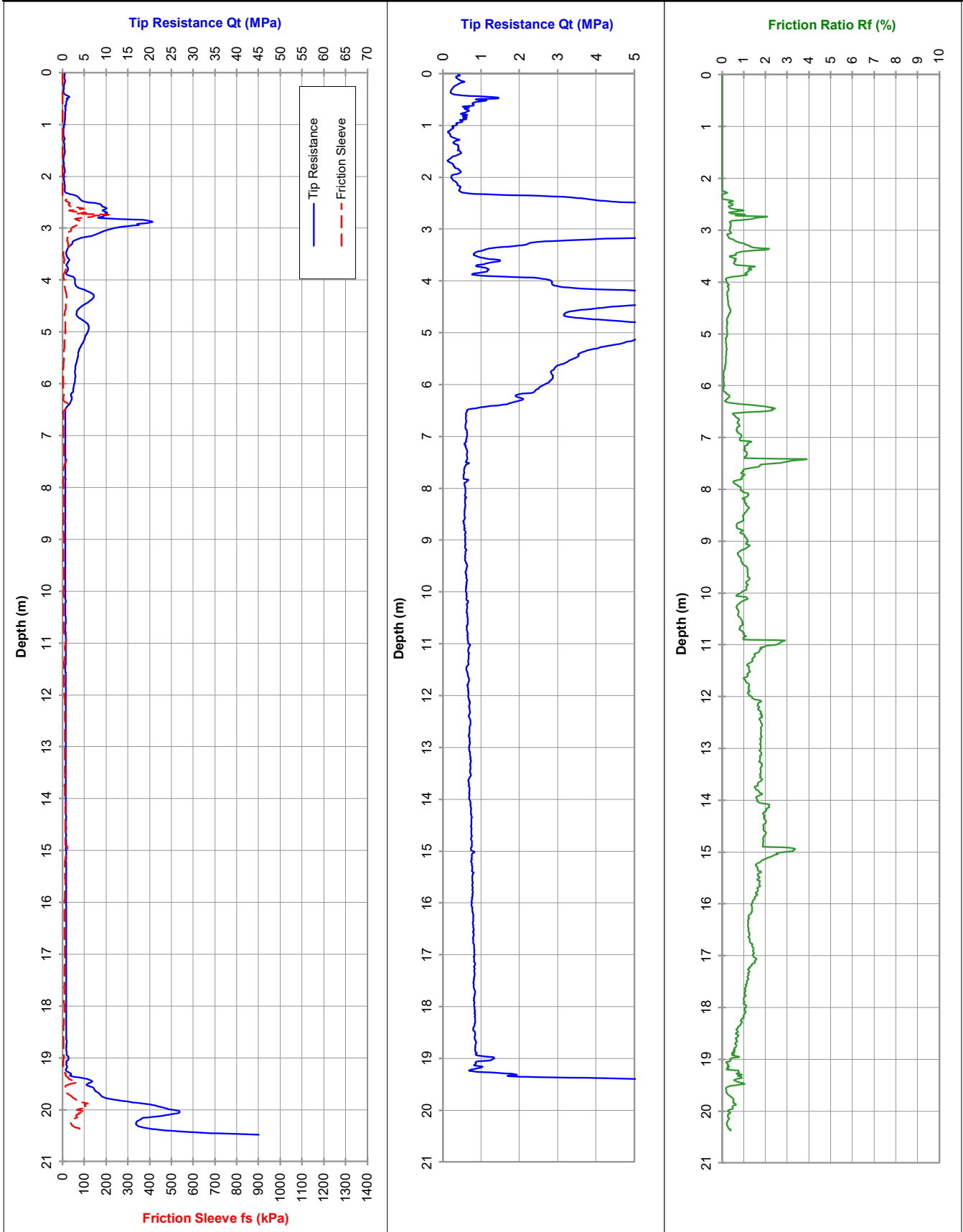
CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser, Heirisson Island

Job No.: PS131735
 RL (m): 2.15
 Co-ords: 394159mE, 6463041mN

Probe I.D

**CPCB-
CPTU 01**

05-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.6
 Vacuum Holed to (m): 2.0 Back Filled
 Refusal: 45 MPa + Lateral Rod Support

Cone I.D.: EC144

File: WS0002R

Rig Type: 25t truck (RFW)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

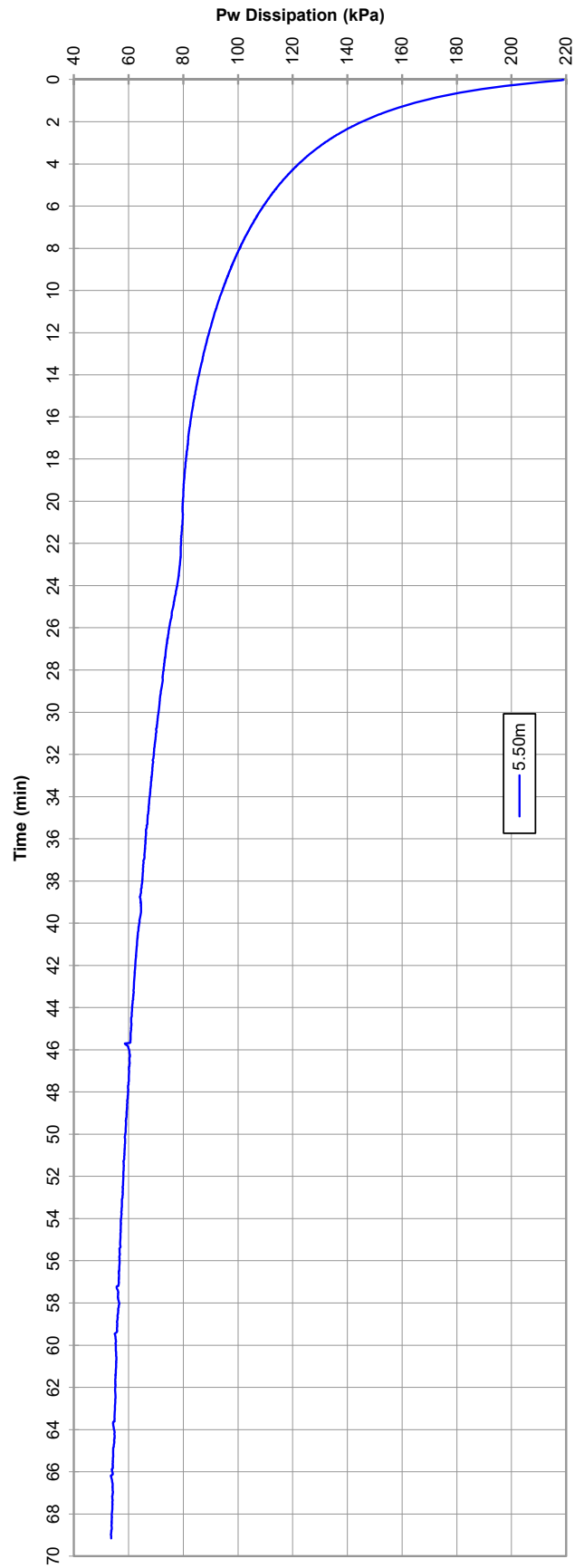
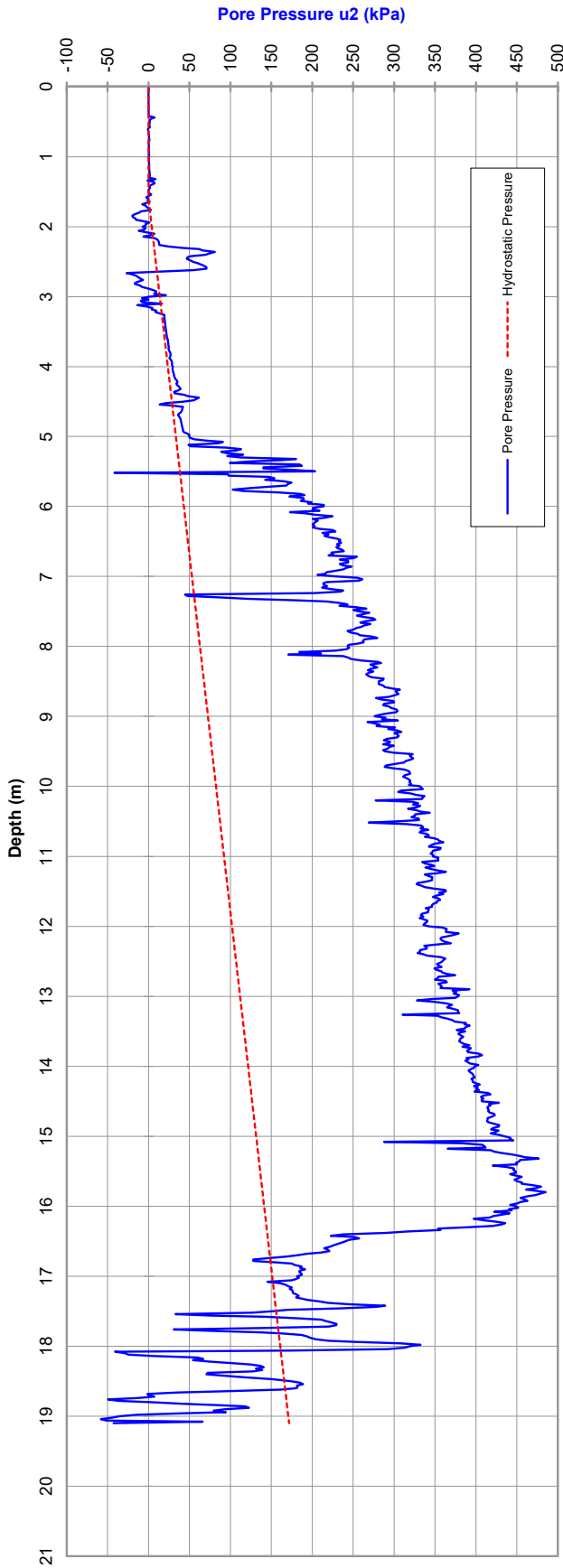
RL (m): 2.03

LOCATION: Point Fraser, Heirisson Island

Co-ords: 394165mE, 6463020mN

**CPCB-
CPTU 02**

05-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

Approx. Water (m): 1.6

File: WS0001R.txt

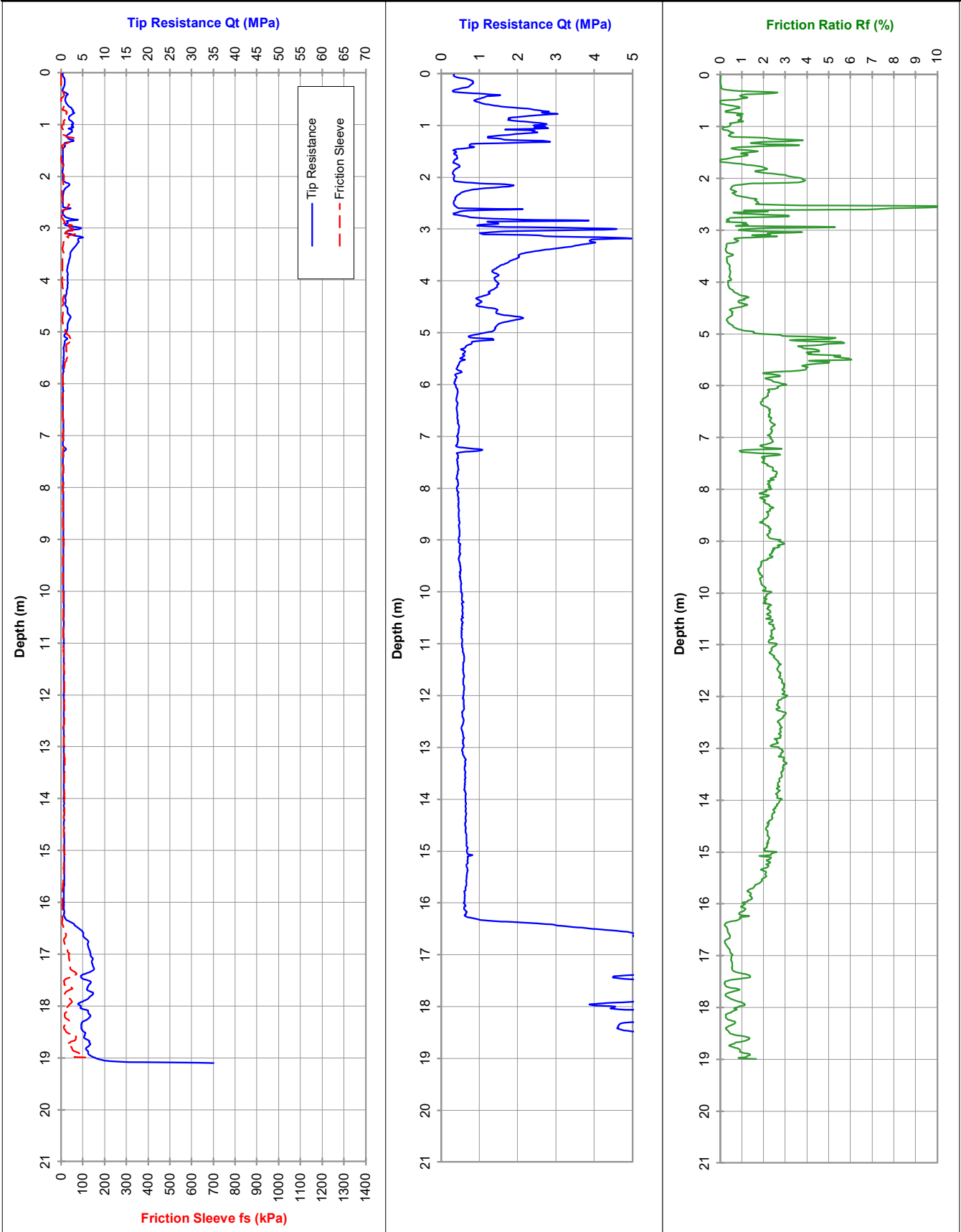
Rig type: 25t truck (RFW)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Point Fraser, Heirisson Island

Job No.: PS131735
 RL (m): 2.03
 Co-ords: 394165mE, 6463020mN

Probe I.D
**CPCB-
 CPTU 02**
 05-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.6
 Vacuum Holed to (m): 2.0 Back Filled
 Refusal: 35 MPa

Cone I.D.: EC144
 File: WS0001R
 Rig Type: 25t truck (RFW)

ELECTRIC FRICTION-CONE PENETROMETER

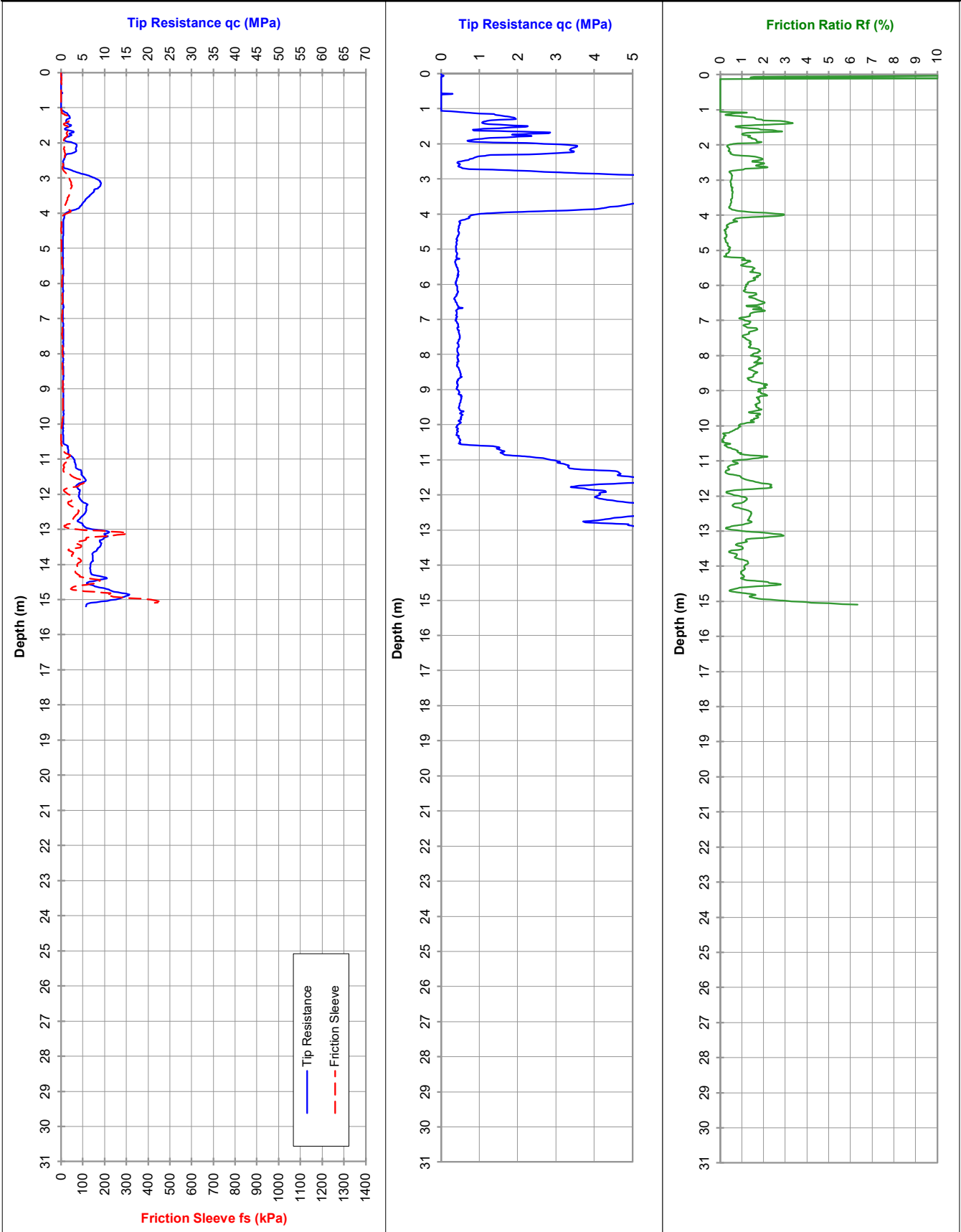
CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: Heirisson Island

Job No.: PS131735
 RL (m): 1.74
 Co-ords: 6462871mE, 394275mN

Probe I.D

**CPCB-
CPT04**

24-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.3

Hand Auger to (m): 1.5

Refusal:

Cone I.D.: EC20

File: WS0061G

Rig Type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

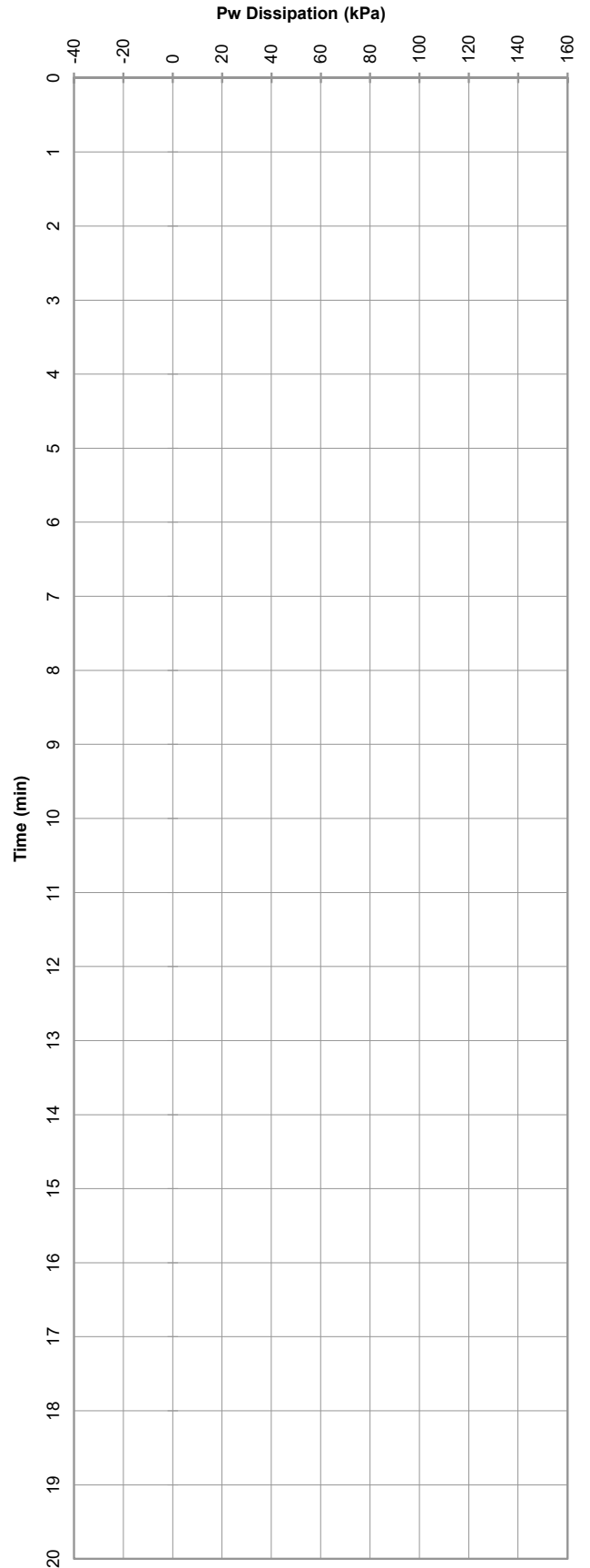
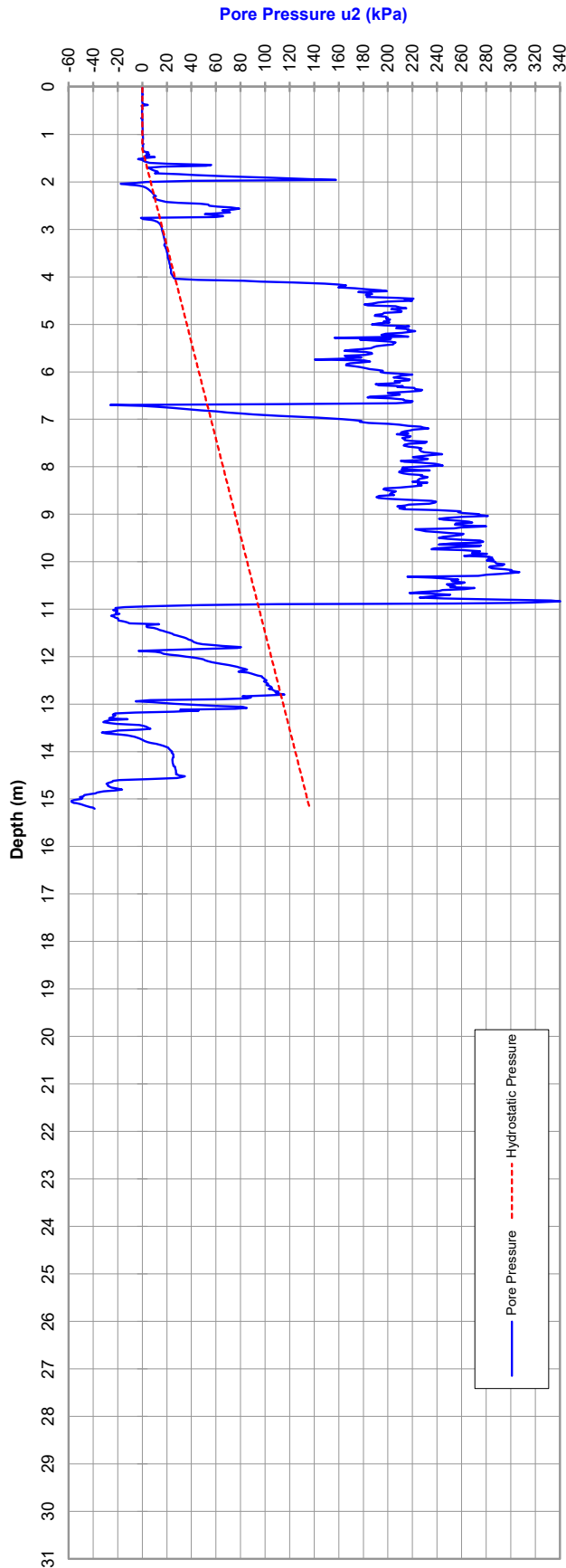
RL (m): 1.74

LOCATION: Heirisson Island

Co-ords: 6462871mE, 394275mN

**CPCB-
CPT04**

24-Jun-22



ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

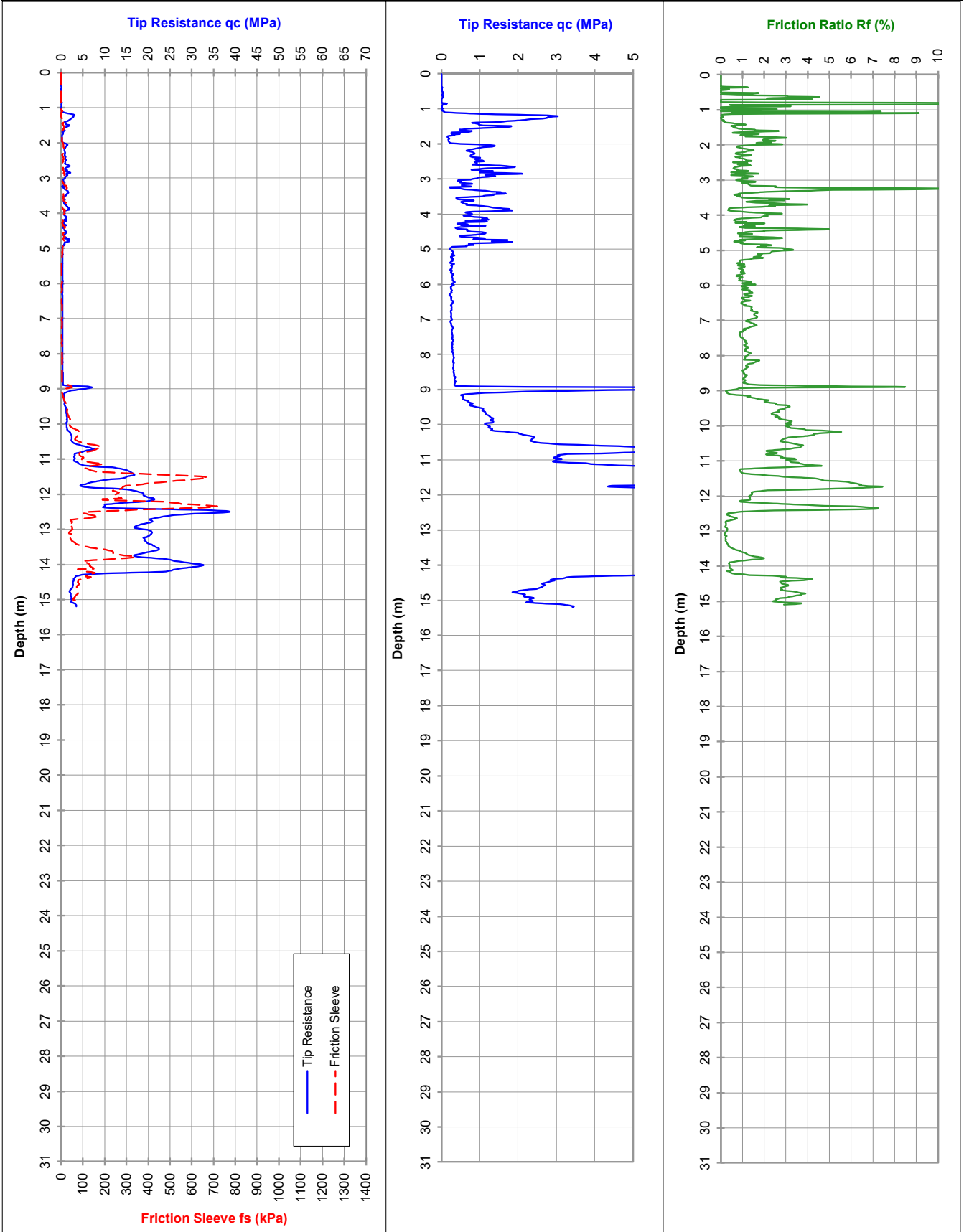
RL (m): 1.03

LOCATION: Heirisson Island

Co-ords: 6462744mE, 394554mN

**CPCB-
CPT05**

24-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 0.9

Hand Auger to (m): 1.5

Refusal:

Cone I.D.: EC20

File: WS0060G

Rig Type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

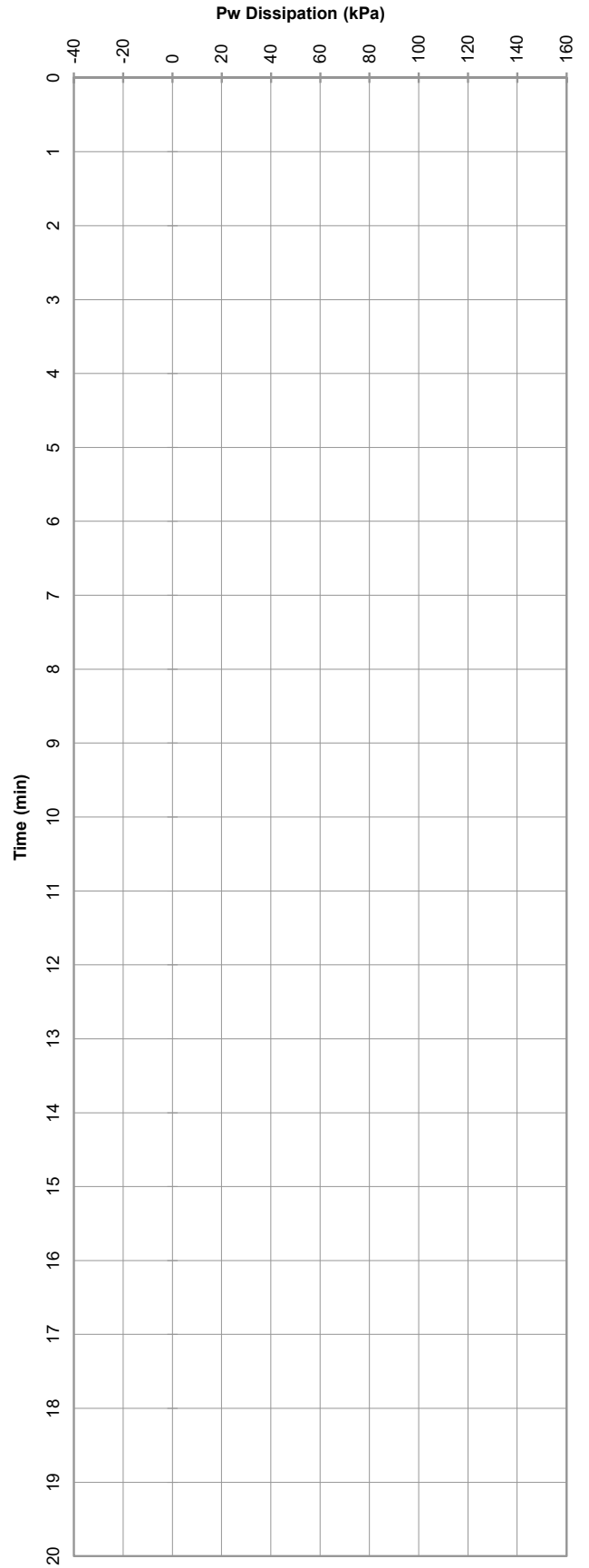
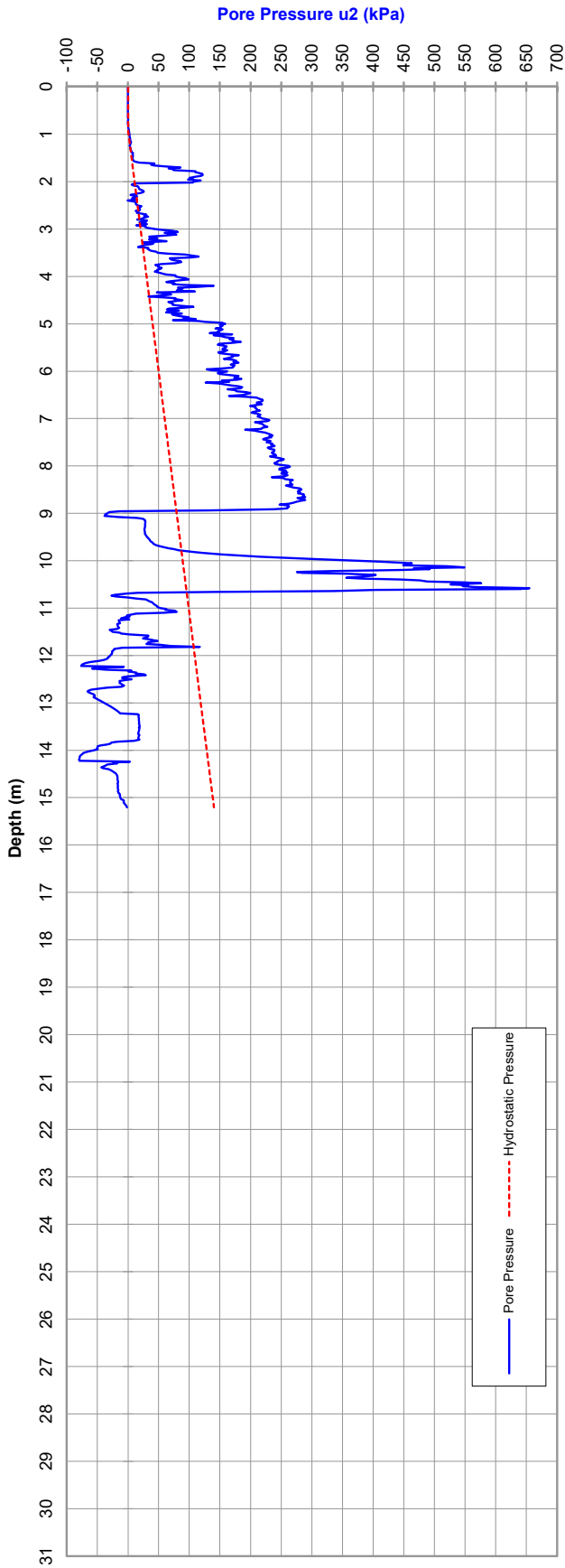
RL (m): 1.03

LOCATION: Heirisson Island

Co-ords: 6462744mE, 394554mN

**CPCB-
CPT05**

24-Jun-22



ELECTRIC FRICTION-CONE PENETROMETER

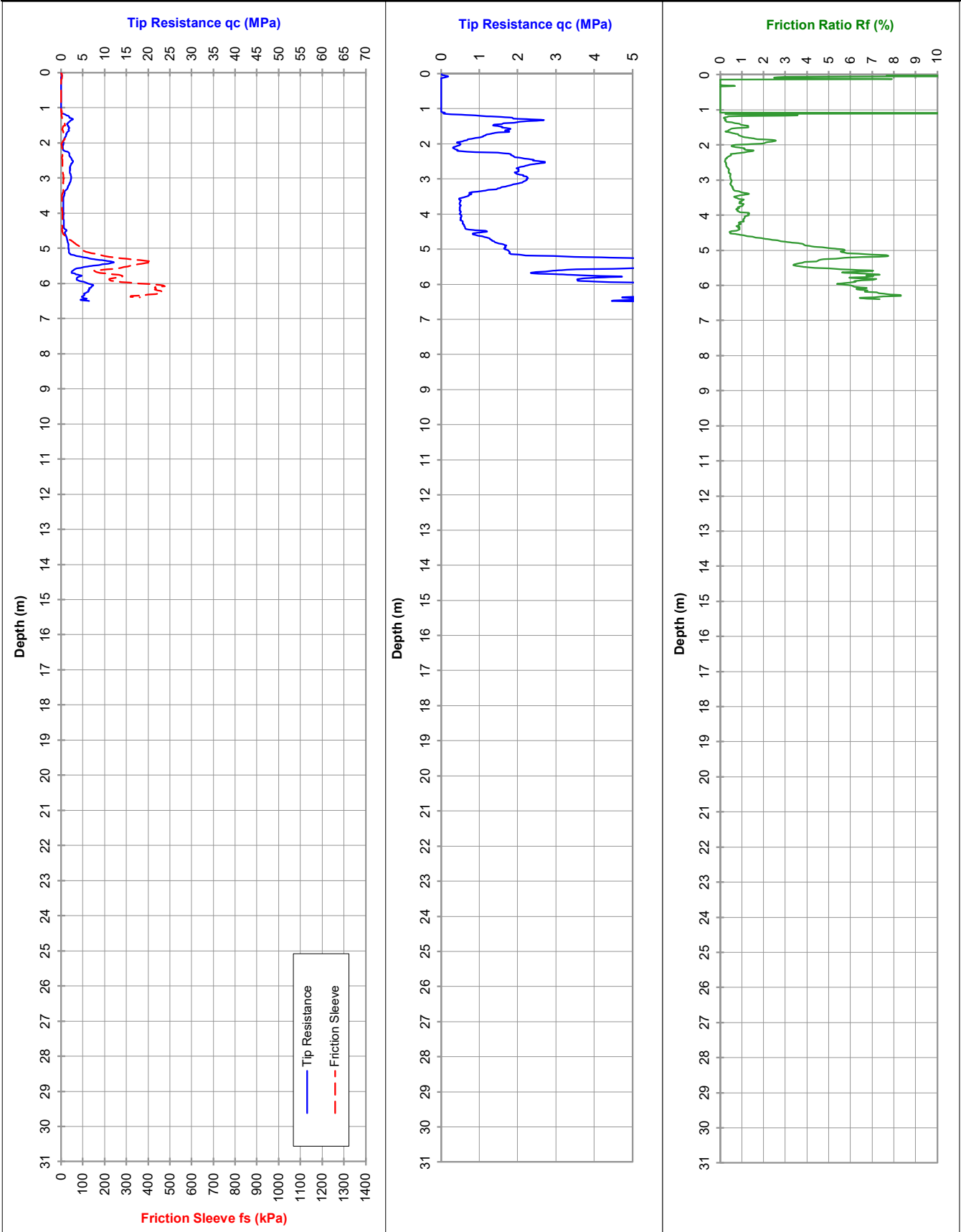
CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: McCallum Park

Job No.: PS131735
 RL (m): 1.4
 Co-ords: 6462570mE, 394816mN

Probe I.D

**CPCB-
CPT06**

23-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.4

Hand Auger to (m): 1.5

Refusal:

Cone I.D.: EC20

File: WS0057G

Rig Type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

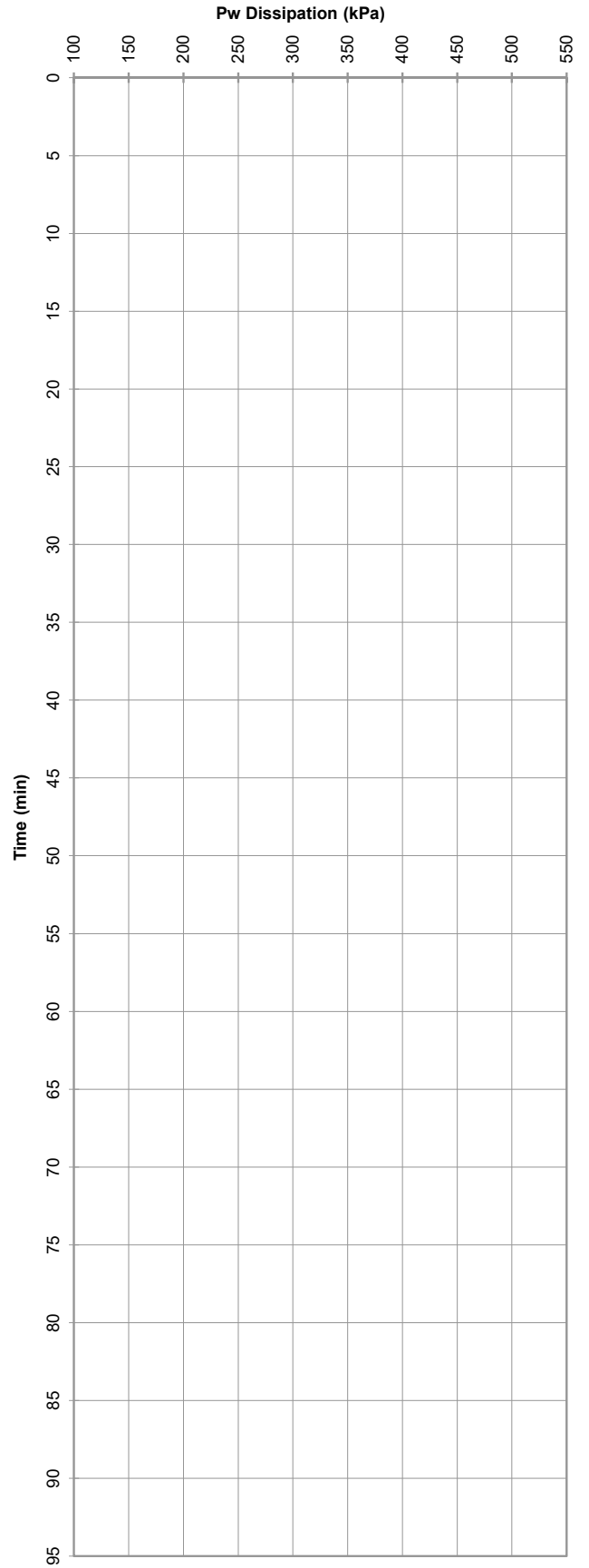
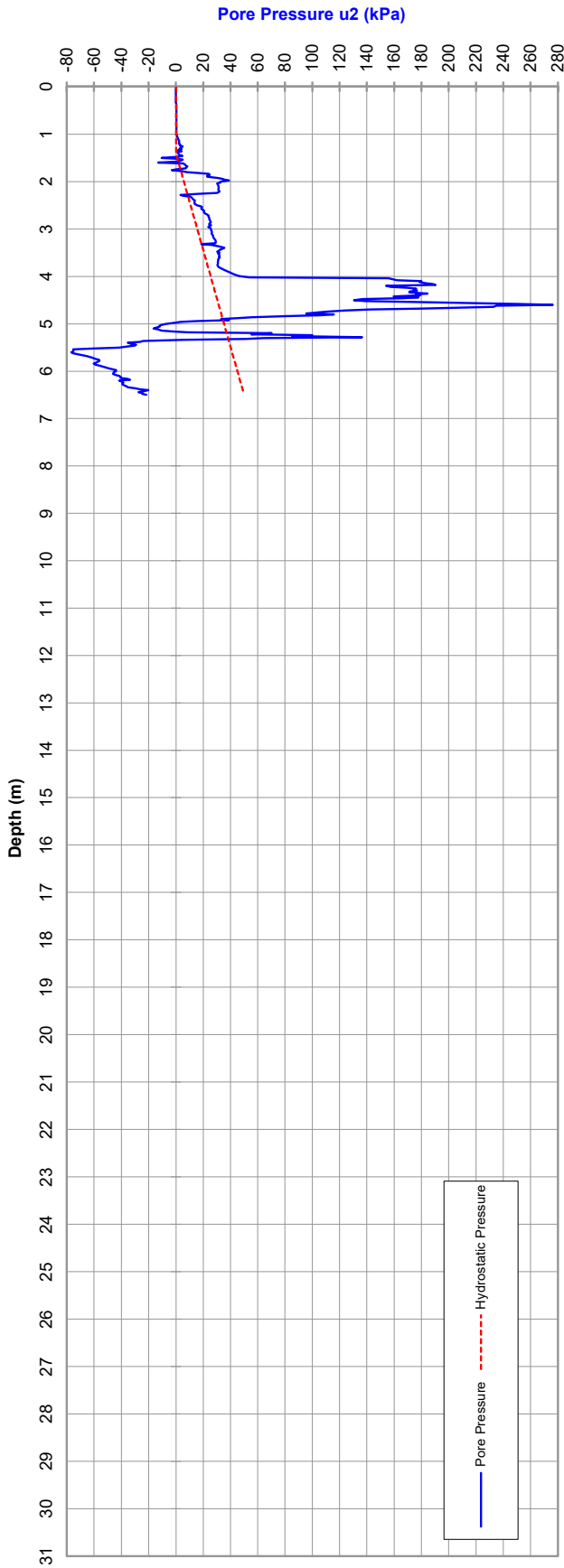
RL (m): 1.4

LOCATION: McCallum Park

Co-ords: 6462570mE, 394816mN

**CPCB-
CPT06**

23-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

Approx. Water (m): 1.4

File: WS0057G.txt

Rig type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

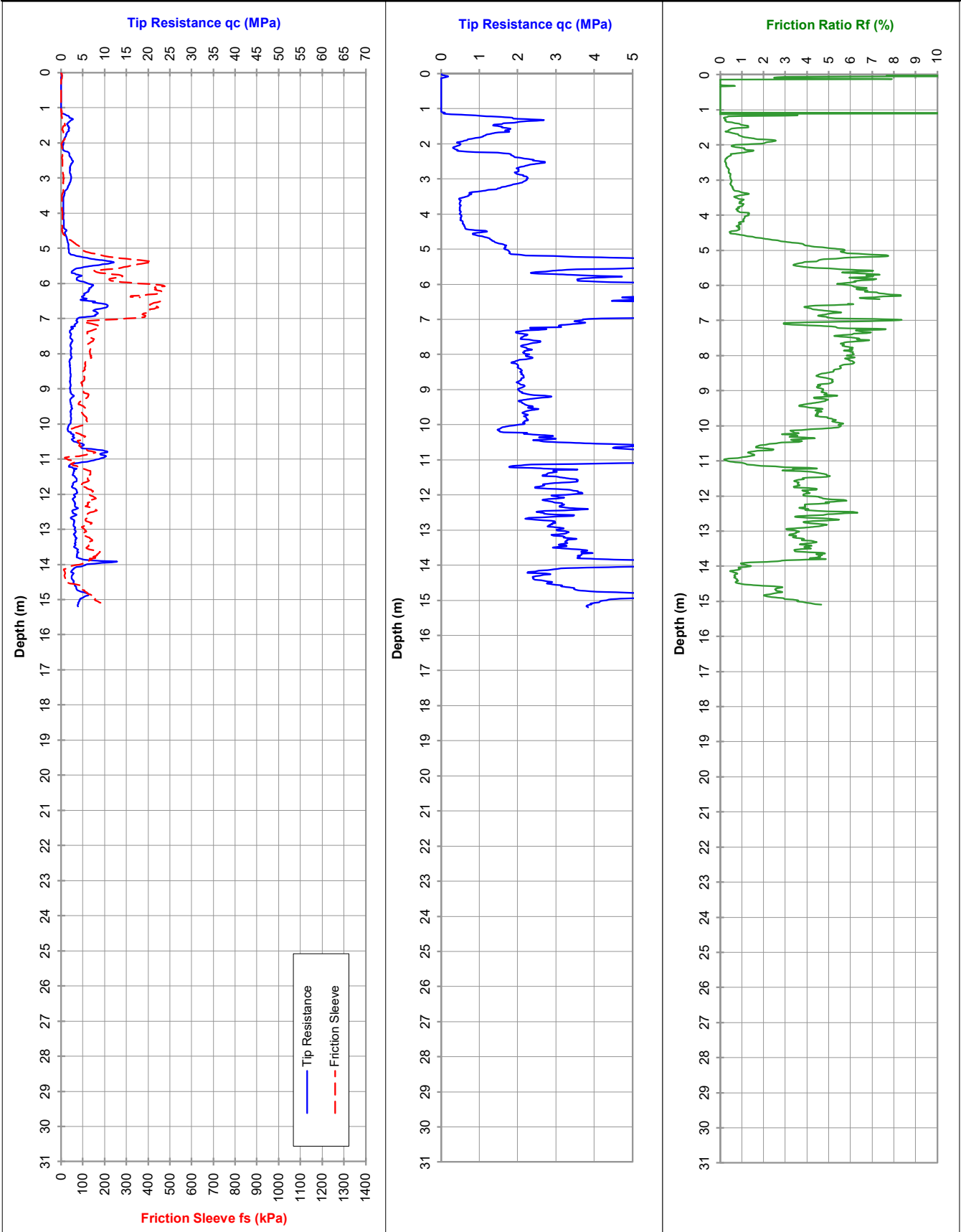
CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: McCallum Park

Job No.: PS131735
 RL (m): 1.4
 Co-ords: 6462570mE, 394816mN

Probe I.D

**CPCB-
CPT06A**

24-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.4
 Hand Auger to (m): 1.5
 Refusal:

Cone I.D.: EC20

File: WS0059G

Rig Type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

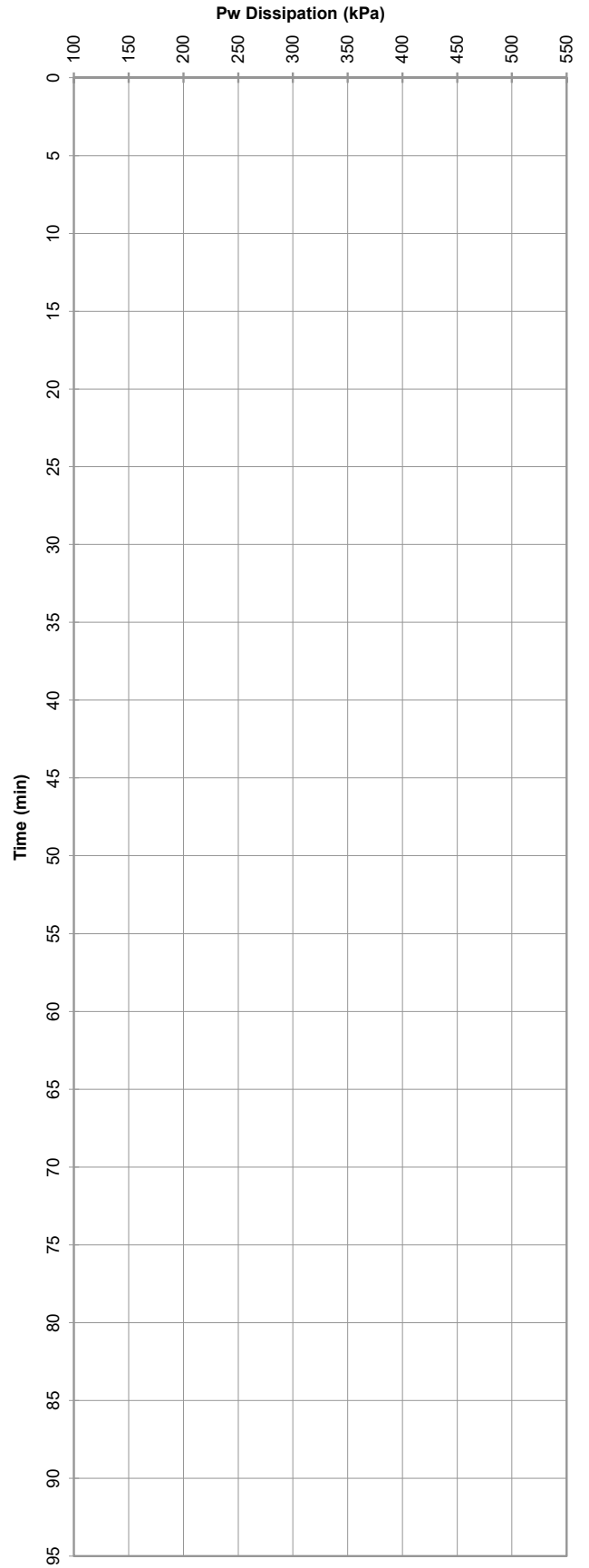
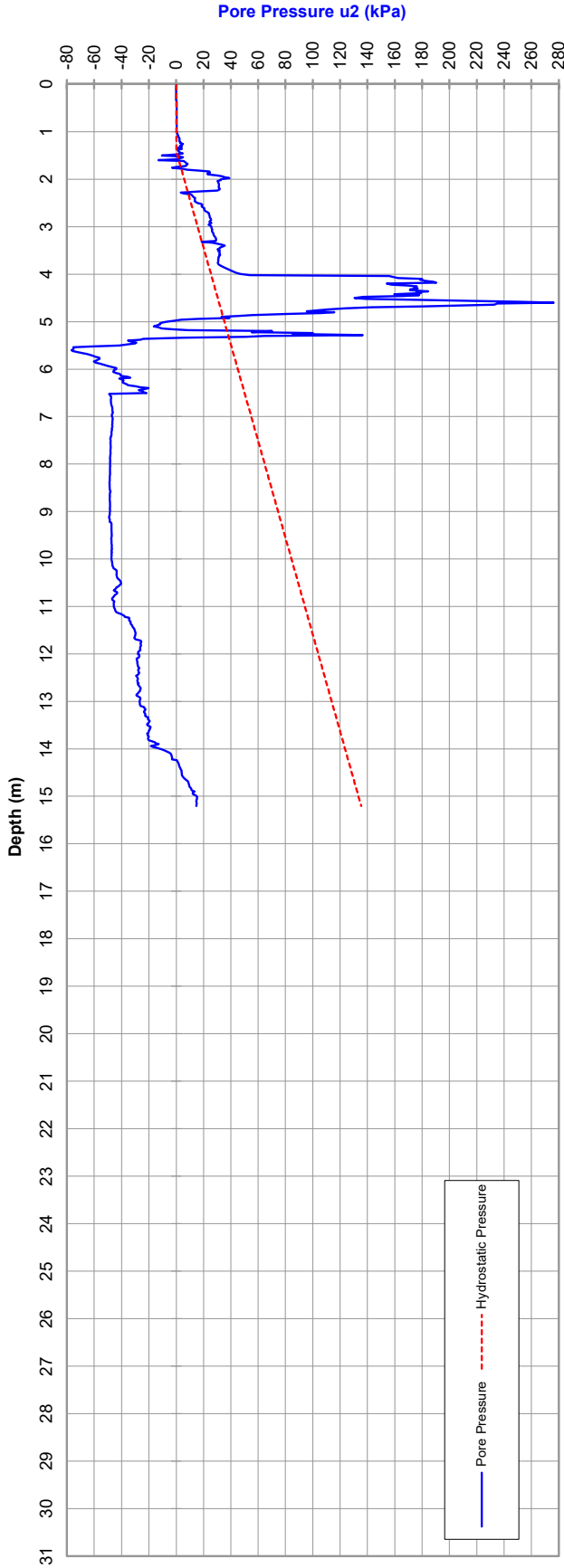
RL (m): 1.4

LOCATION: McCallum Park

Co-ords: 6462570mE, 394816mN

**CPCB-
CPT06**

23-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

Approx. Water (m): 1.4

File: WS0057.59G Merged.txt

Rig type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

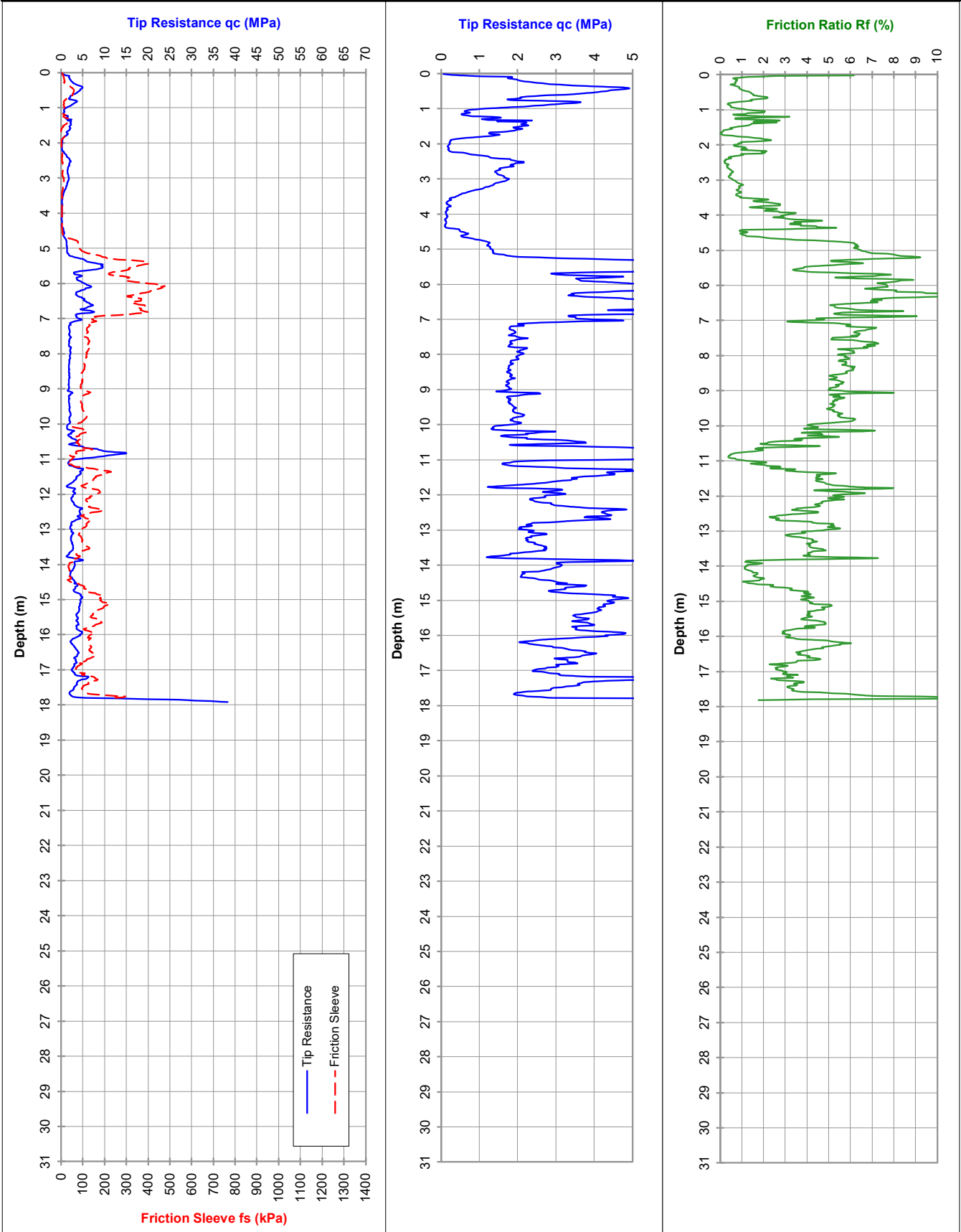
RL (m): 1.4

LOCATION: McCallum Park

Co-ords: 6462570mE, 394816mN

**CPCB-
CPT06B**

24-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.40

Dummy probe to (m):

Refusal: 58 MPa + Inclination + Lateral Rod Support

Cone I.D.: EC20

File: WS0062G

Rig Type: 22t truck (Merc)

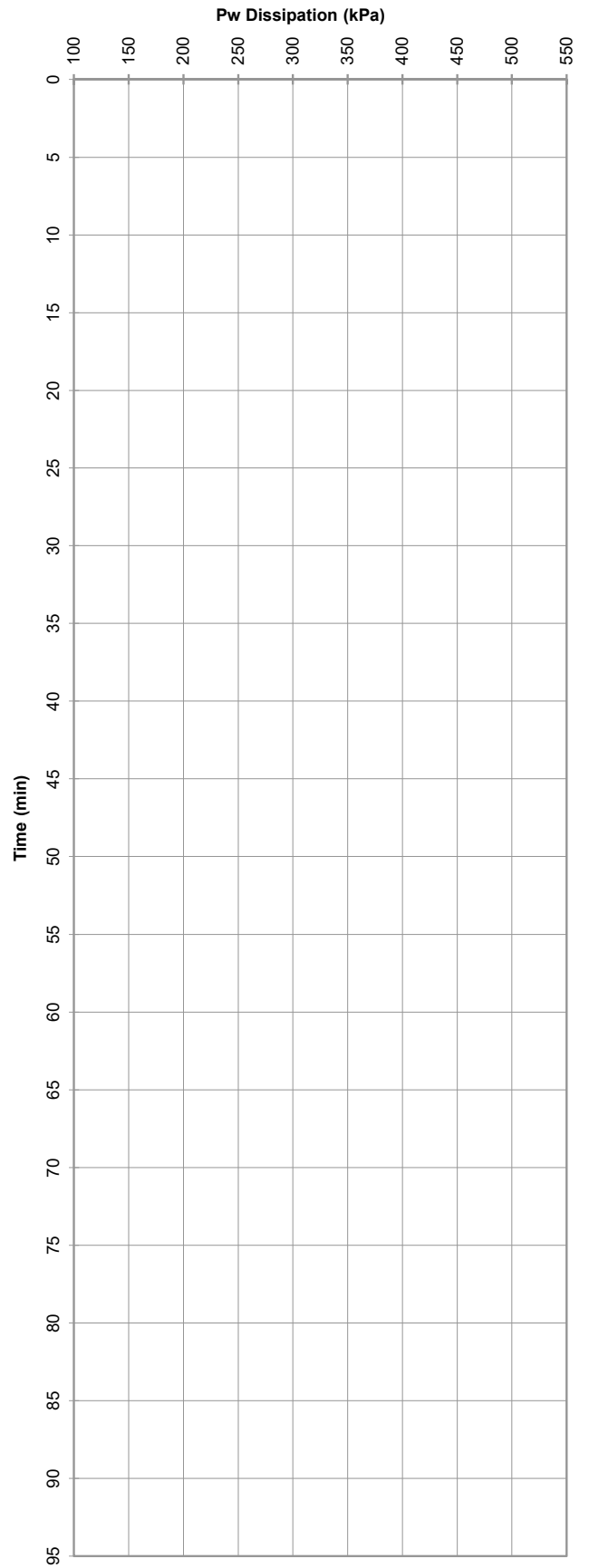
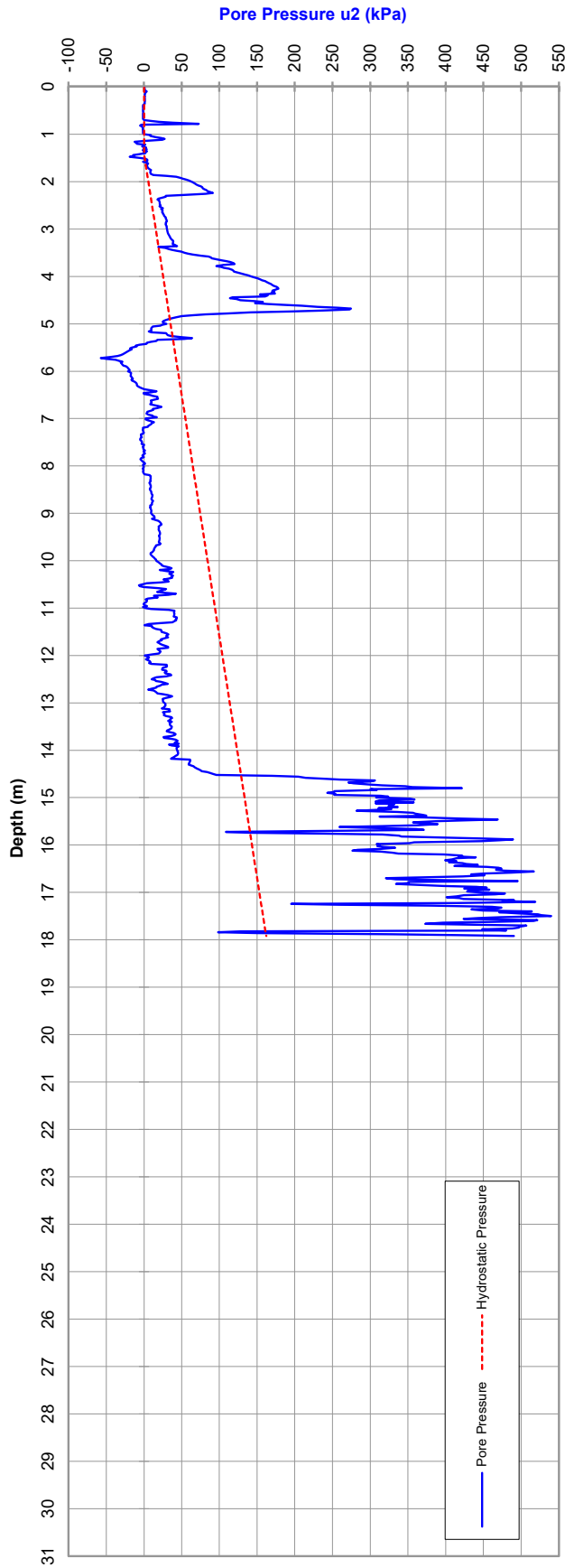
ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance
PROJECT: Causeway Pedestrian and Cyclist Bridge
LOCATION: McCallum Park

Job No.: PS131735
RL (m): 1.4
Co-ords: 6462570mE, 394816mN

**CPCB-
CPTU06B**
24-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

Approx. Water (m): 1.4

File: WS0062G.txt

Rig type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

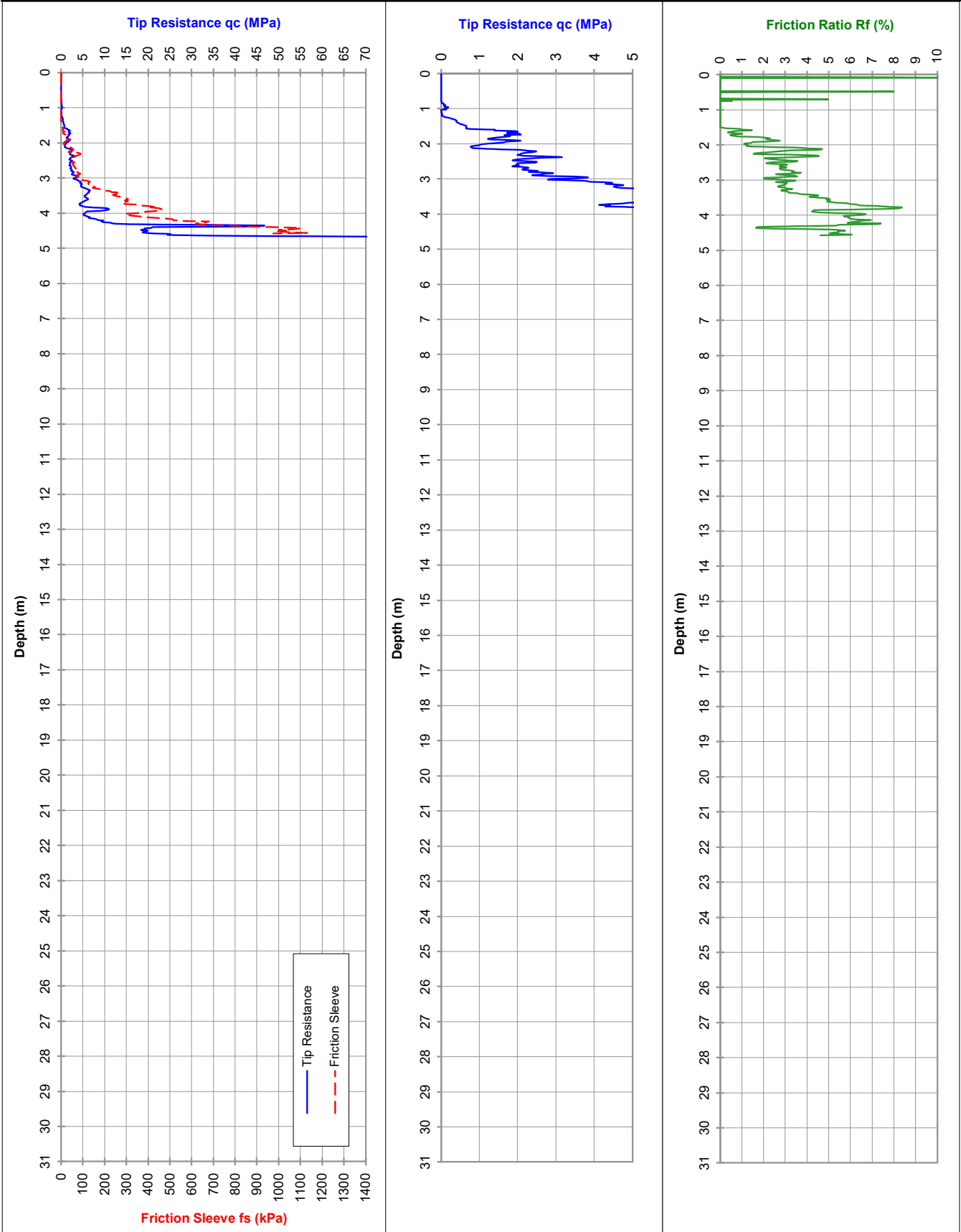
RL (m): 1.52

LOCATION: McCallum Park

Co-ords: 6462578mE, 394725mN

**CPCB-
CPTU07**

23-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.5

Hand Auger to (m): 1.5

Refusal: 90 MPa

Cone I.D.: EC20

File: WS0055G

Rig Type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

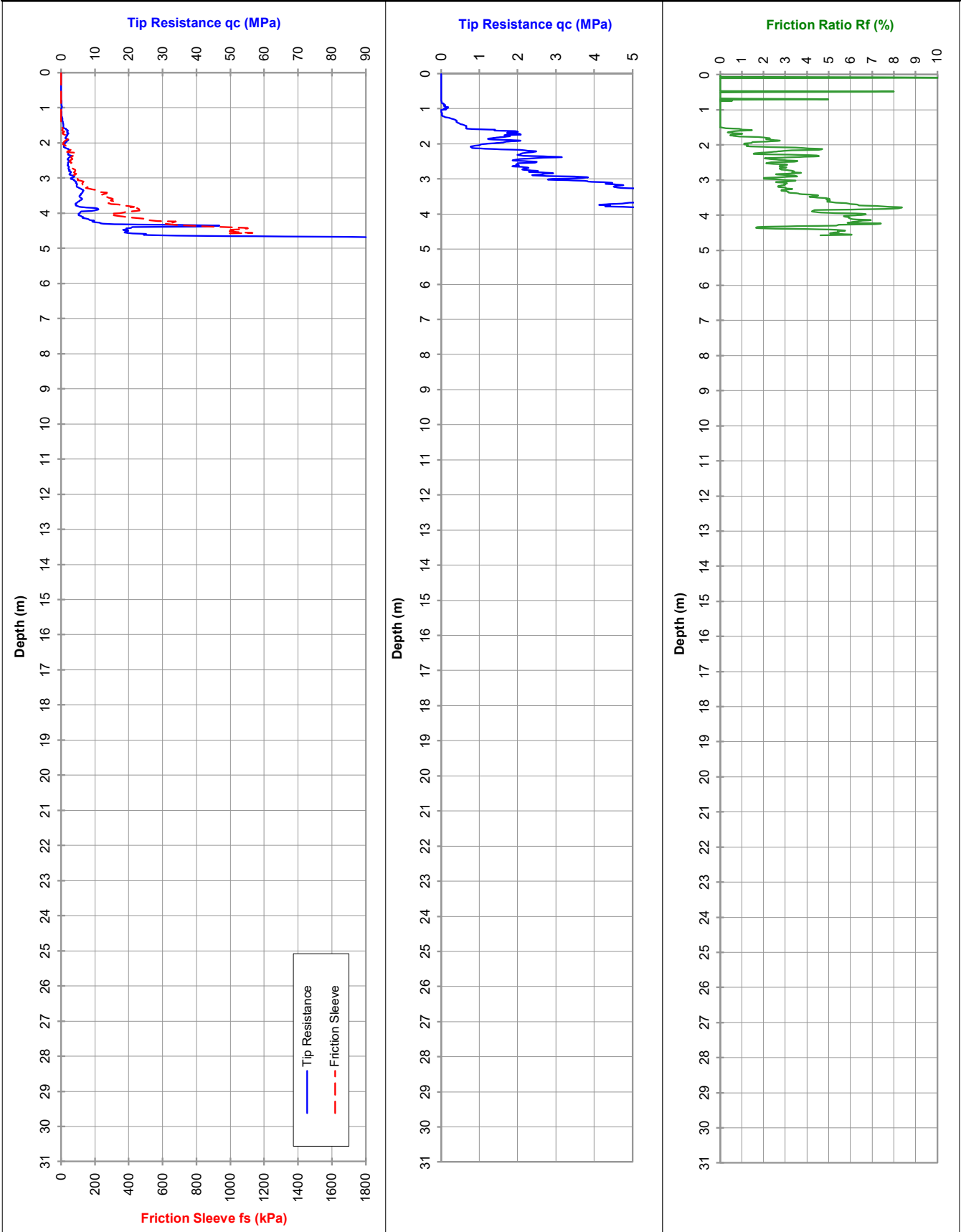
RL (m): 1.52

LOCATION: McCallum Park

Co-ords: 6462578mE, 394725mN

**CPCB-
CPTU07**

23-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTTP 2001 for friction reducer

Approx. water (m): 1.5

Hand Auger to (m): 1.5

Refusal: 90 MPa

Cone I.D.: EC20

File: WS0055G

Rig Type: 22t truck (Merc)

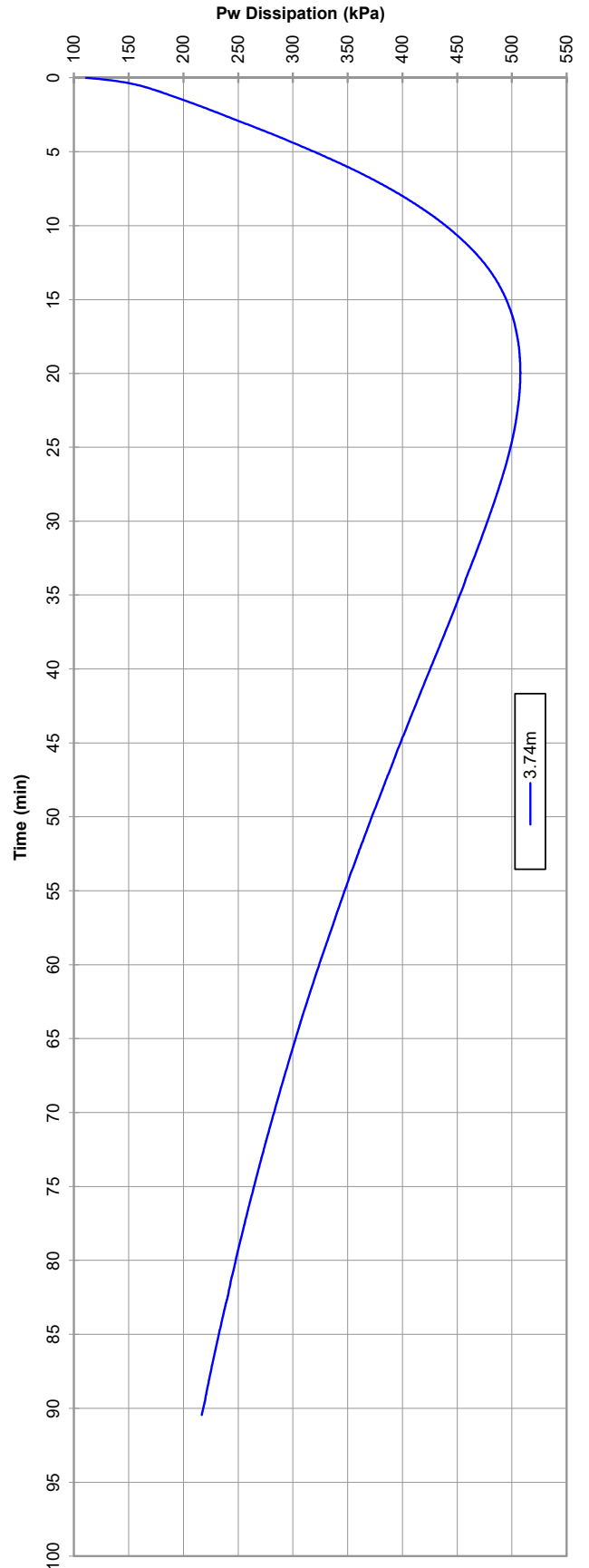
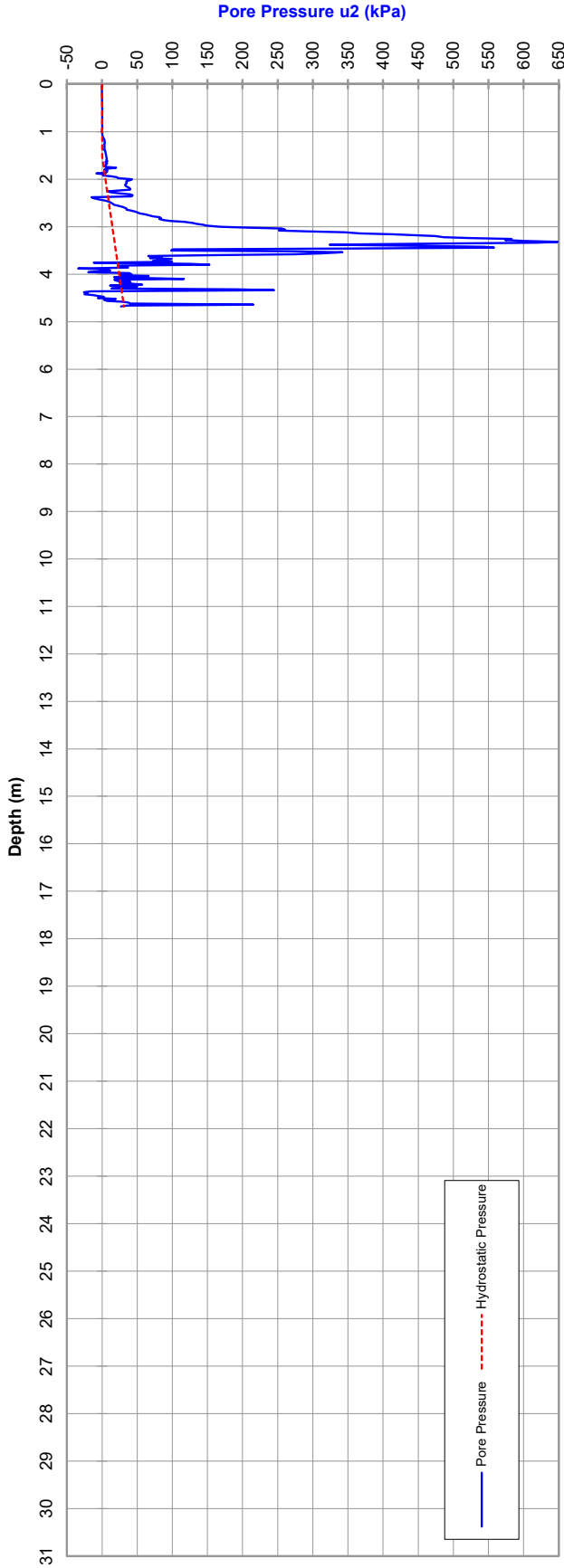
ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: McCallum Park

Job No.: PS131735
 RL (m): 1.52
 Co-ords: 6462578mE, 394725mN

**CPCB-
CPTU07**
 23-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

Approx. Water (m): 1.5

File: WS0055G.txt

Rig type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

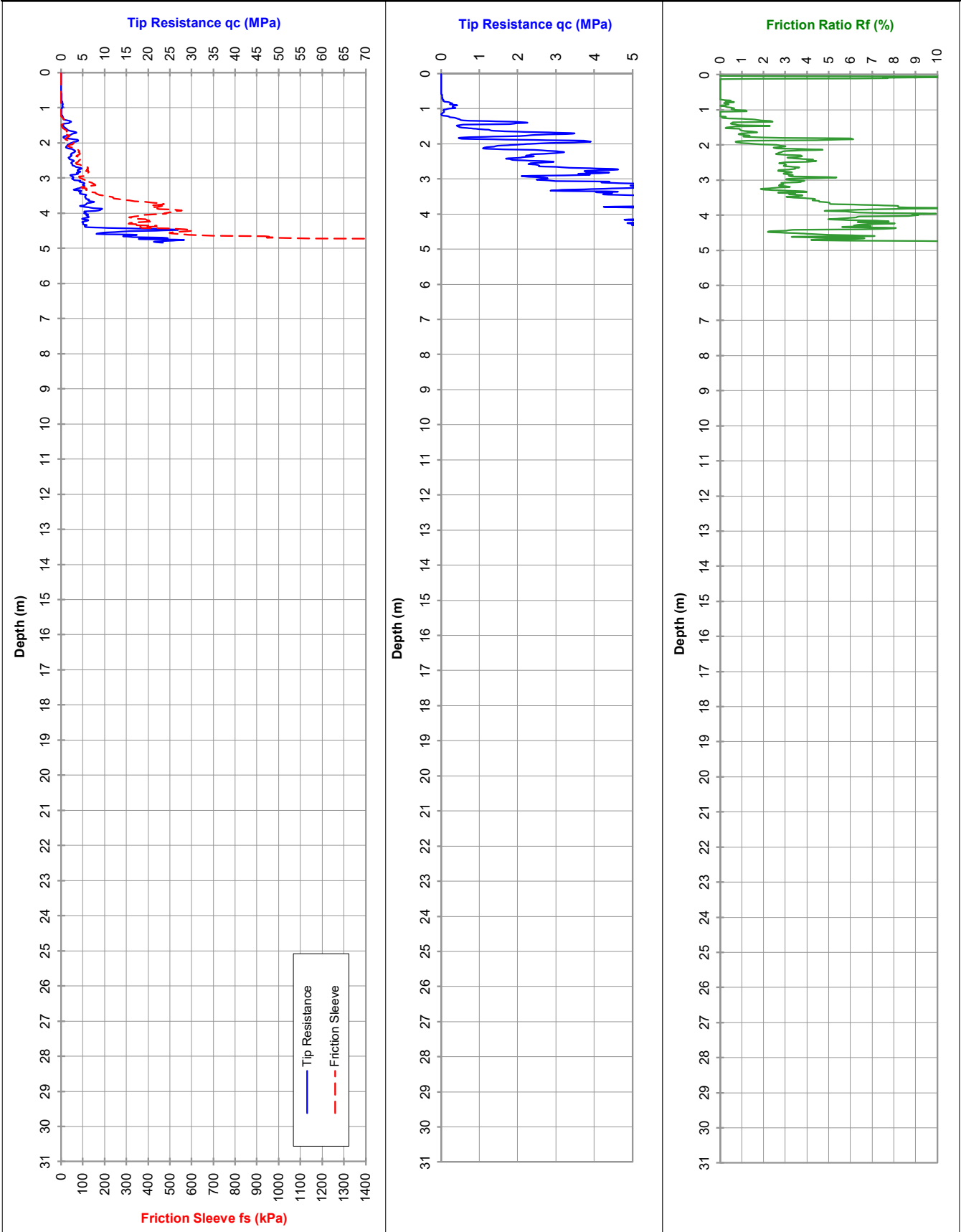
RL (m): 1.52

LOCATION: McCallum Park

Co-ords: 6462578mE, 394725mN

**CPCB-
CPTU07A**

23-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.5

Hand Auger to (m): 1.5

Refusal: Inclination

Cone I.D.: EC20

File: WS0056G

Rig Type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

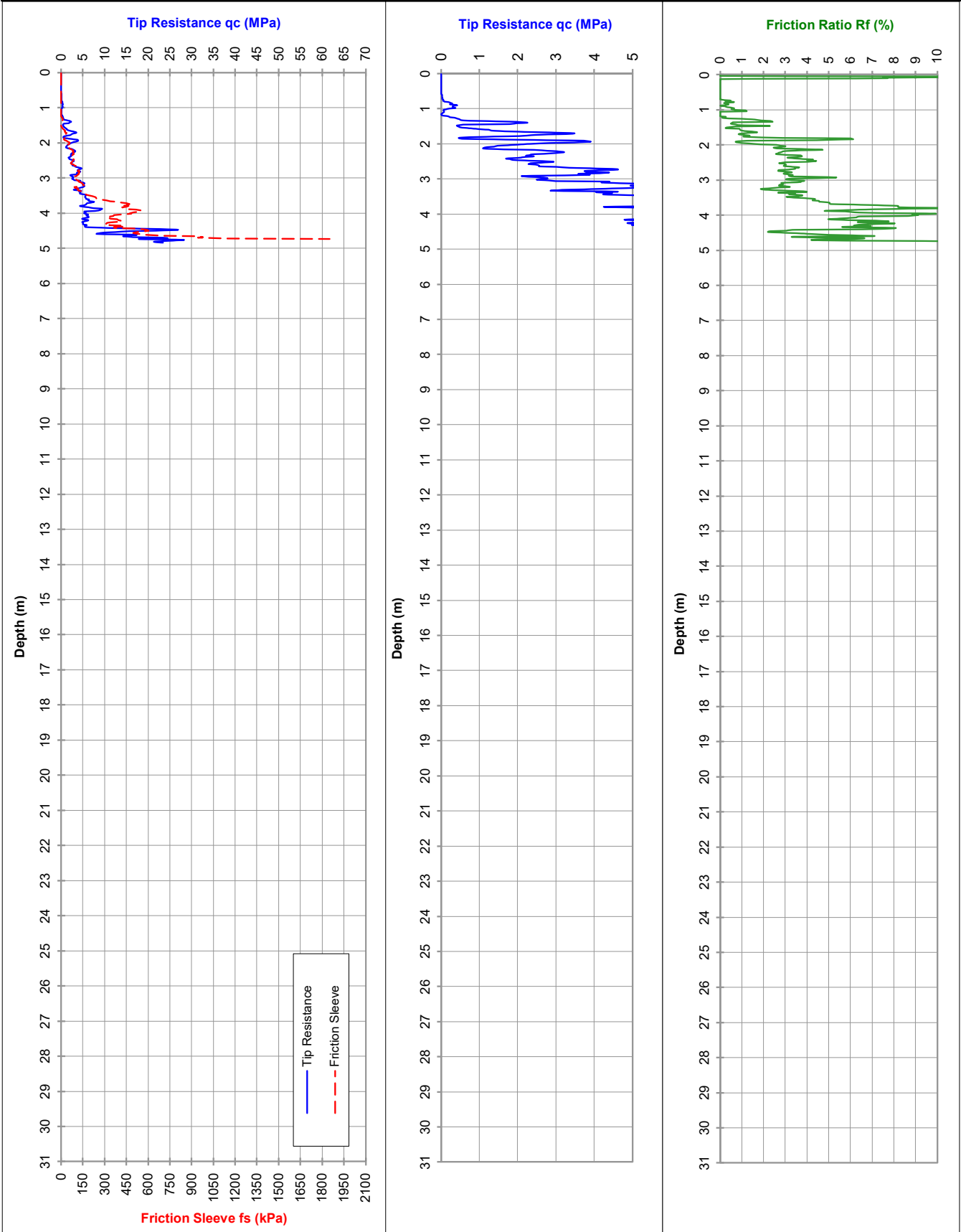
RL (m): 1.52

LOCATION: McCallum Park

Co-ords: 6462578mE, 394725mN

**CPCB-
CPTU07A**

23-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.5

Hand Auger to (m): 1.5

Refusal: Inclination

Cone I.D.: EC20

File: WS0056G

Rig Type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

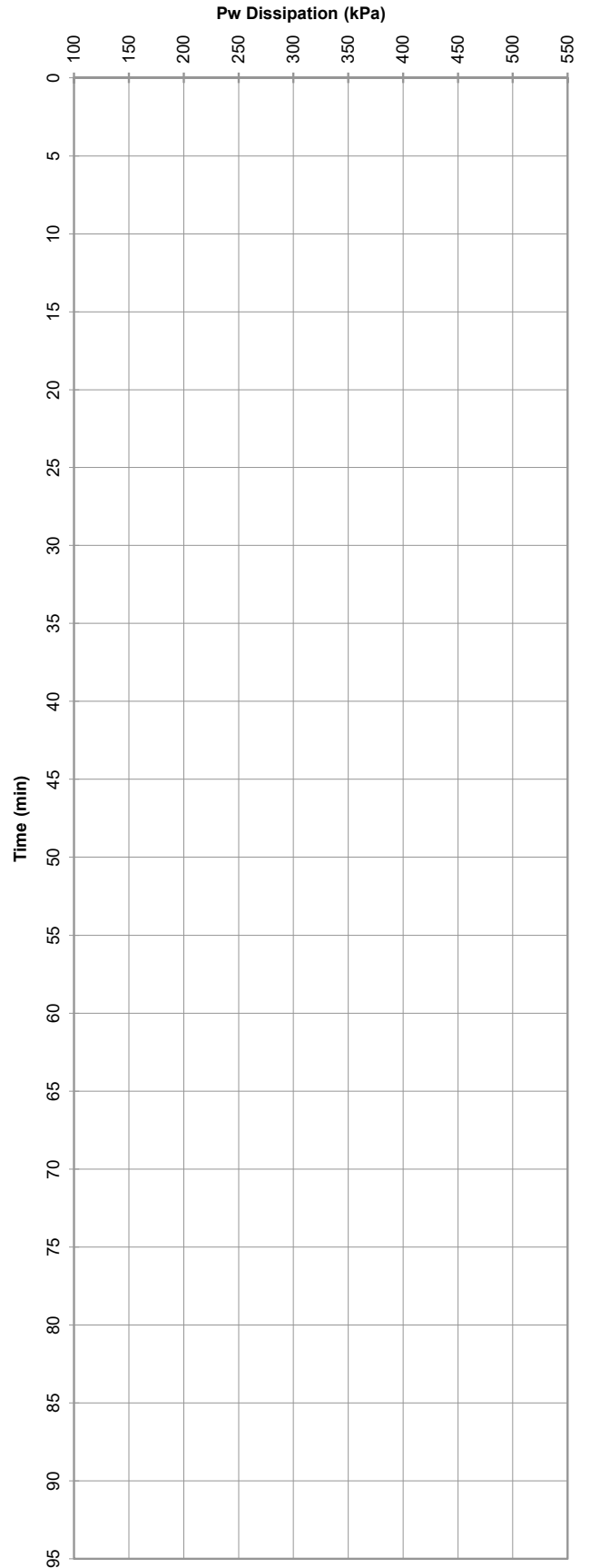
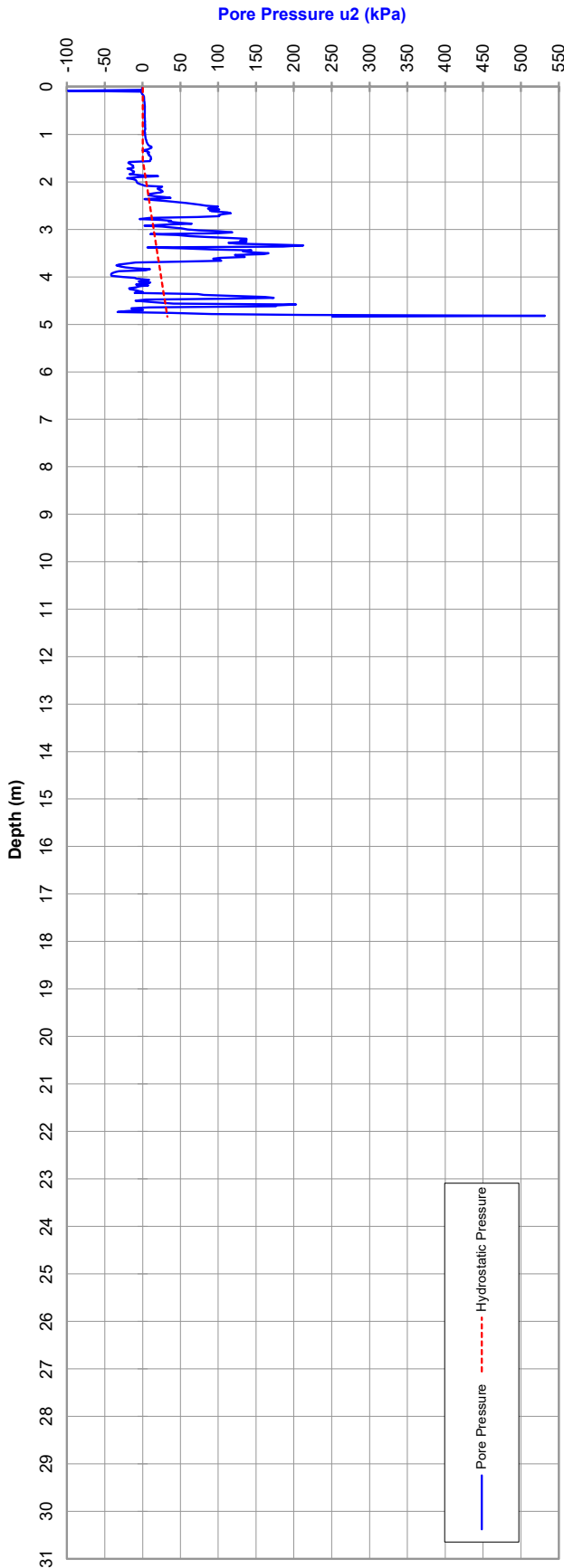
RL (m): 1.52

LOCATION: McCallum Park

Co-ords: 6462578mE, 394725mN

**CPCB-
CPTU07A**

23-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

Approx. Water (m): 1.5

File: WS0056G.txt

Rig type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

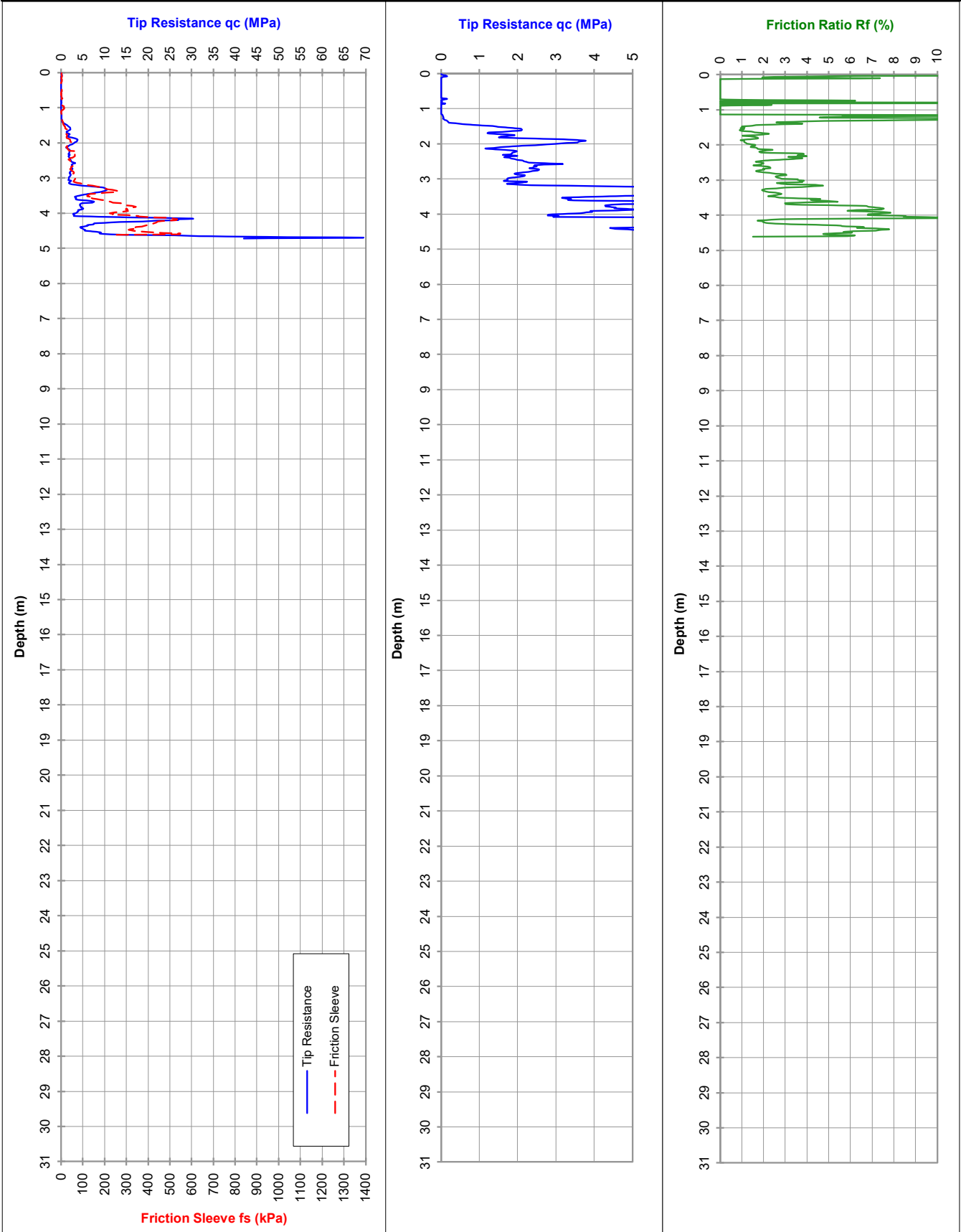
RL (m): 1.52

LOCATION: McCallum Park

Co-ords: 6462578mE, 394725mN

**CPCB-
CPTU07B**

24-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.4

Dummy probe to (m):

Refusal: 75 MPa + Inclination

Cone I.D.: EC20

File: WS0058G

Rig Type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

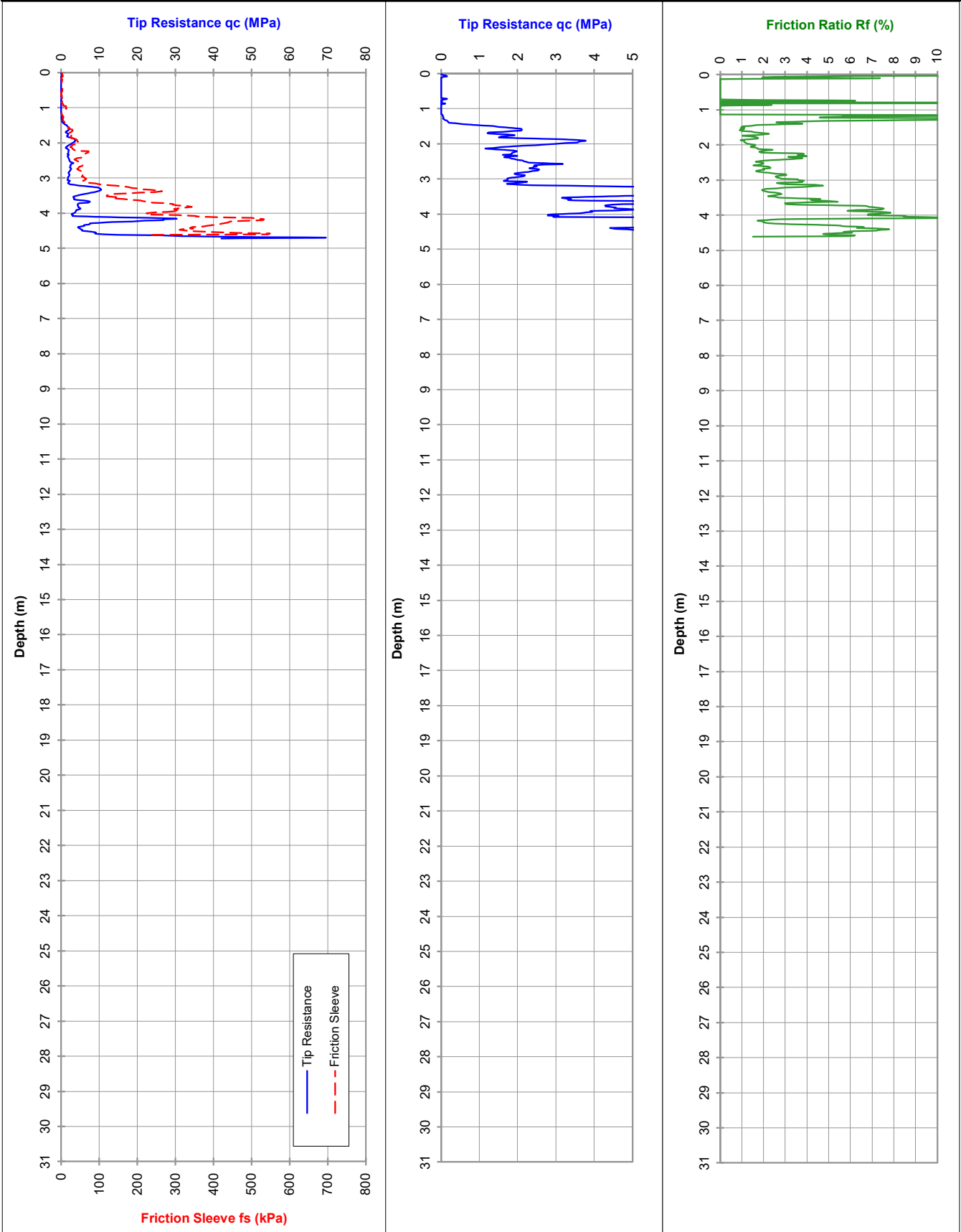
RL (m): 1.52

LOCATION: McCallum Park

Co-ords: 6462578mE, 394725mN

**CPCB-
CPTU07B**

24-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.4

Dummy probe to (m):

Refusal: 75 MPa + Inclination

Cone I.D.: EC20

File: WS0058G

Rig Type: 22t truck (Merc)

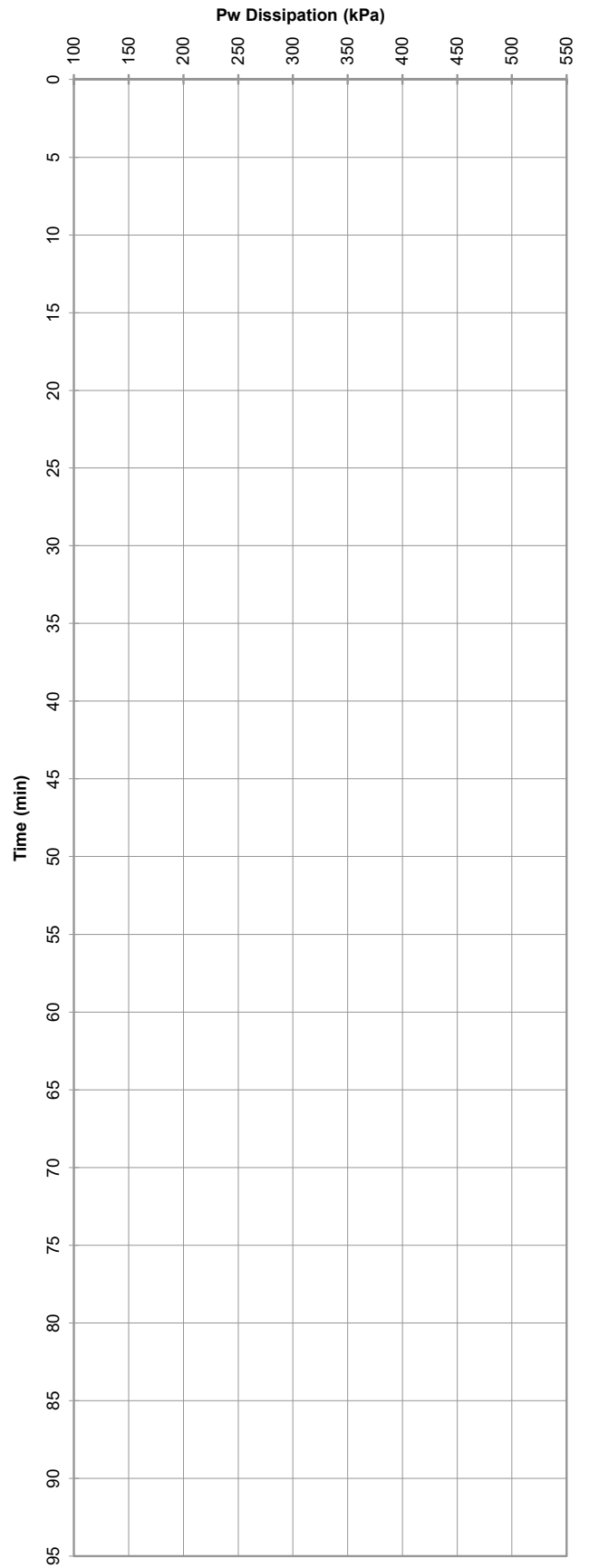
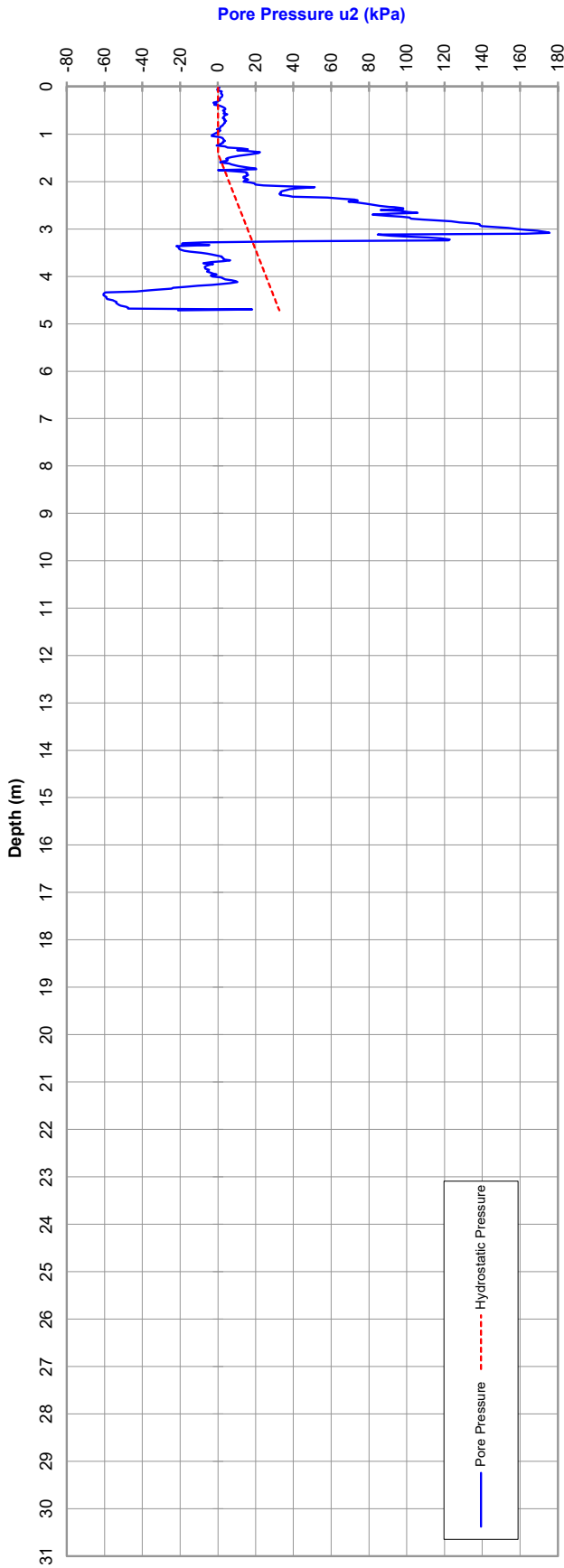
ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance
PROJECT: Causeway Pedestrian and Cyclist Bridge
LOCATION: McCallum Park

Job No.: PS131735
RL (m): 1.52
Co-ords: 6462578mE, 394725mN

**CPCB-
CPTU07B**
24-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

Approx. Water (m): 1.4

File: WS0058G.txt

Rig type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

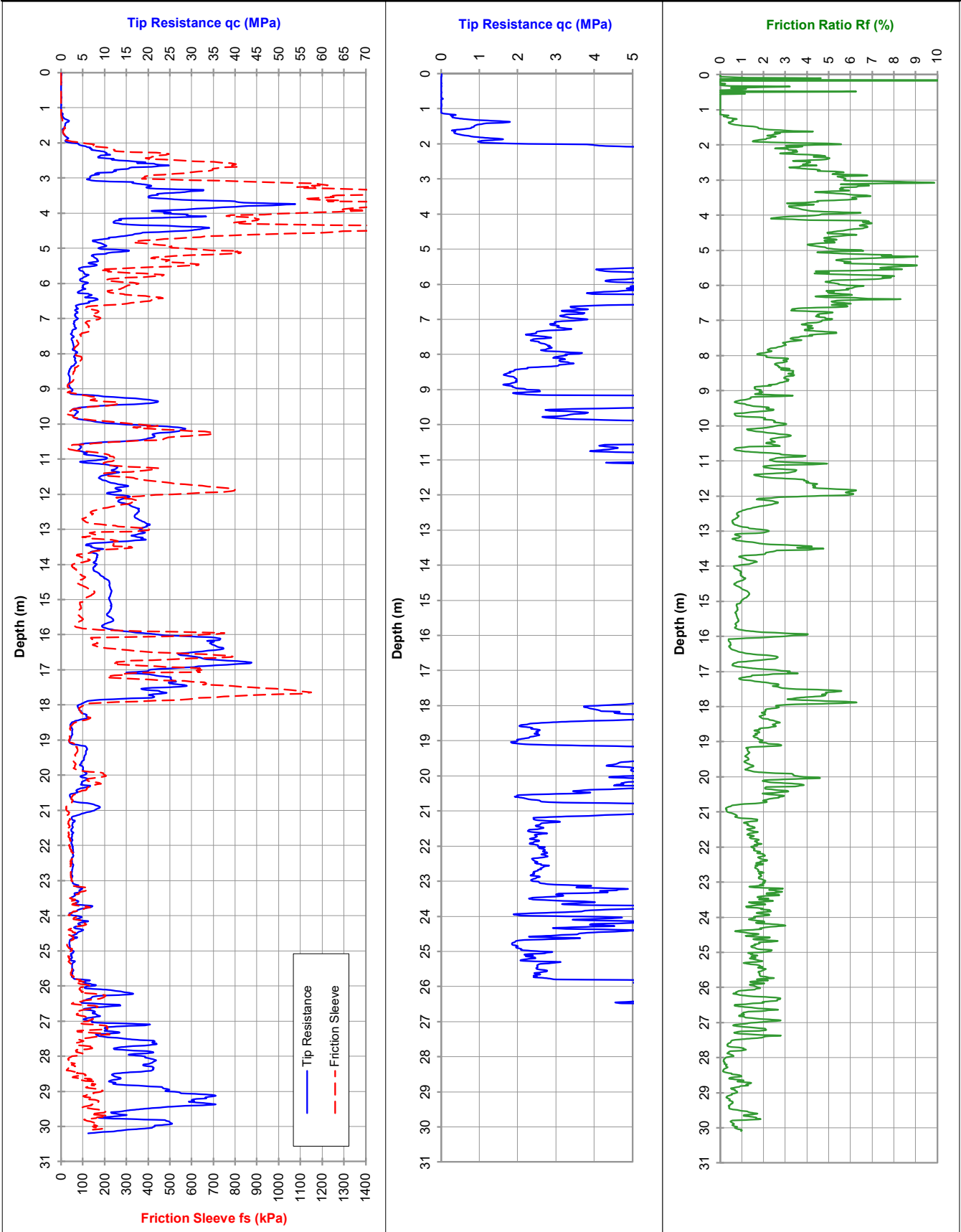
CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: McCallum Park

Job No.: PS131735
 RL (m): 1.64
 Co-ords: 6462533mE, 394831mN

Probe I.D

**CPCB-
CPTU08**

23-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.4

Hand Auger to (m): 1.5

Refusal:

Cone I.D.: EC20

File: WS0054G

Rig Type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

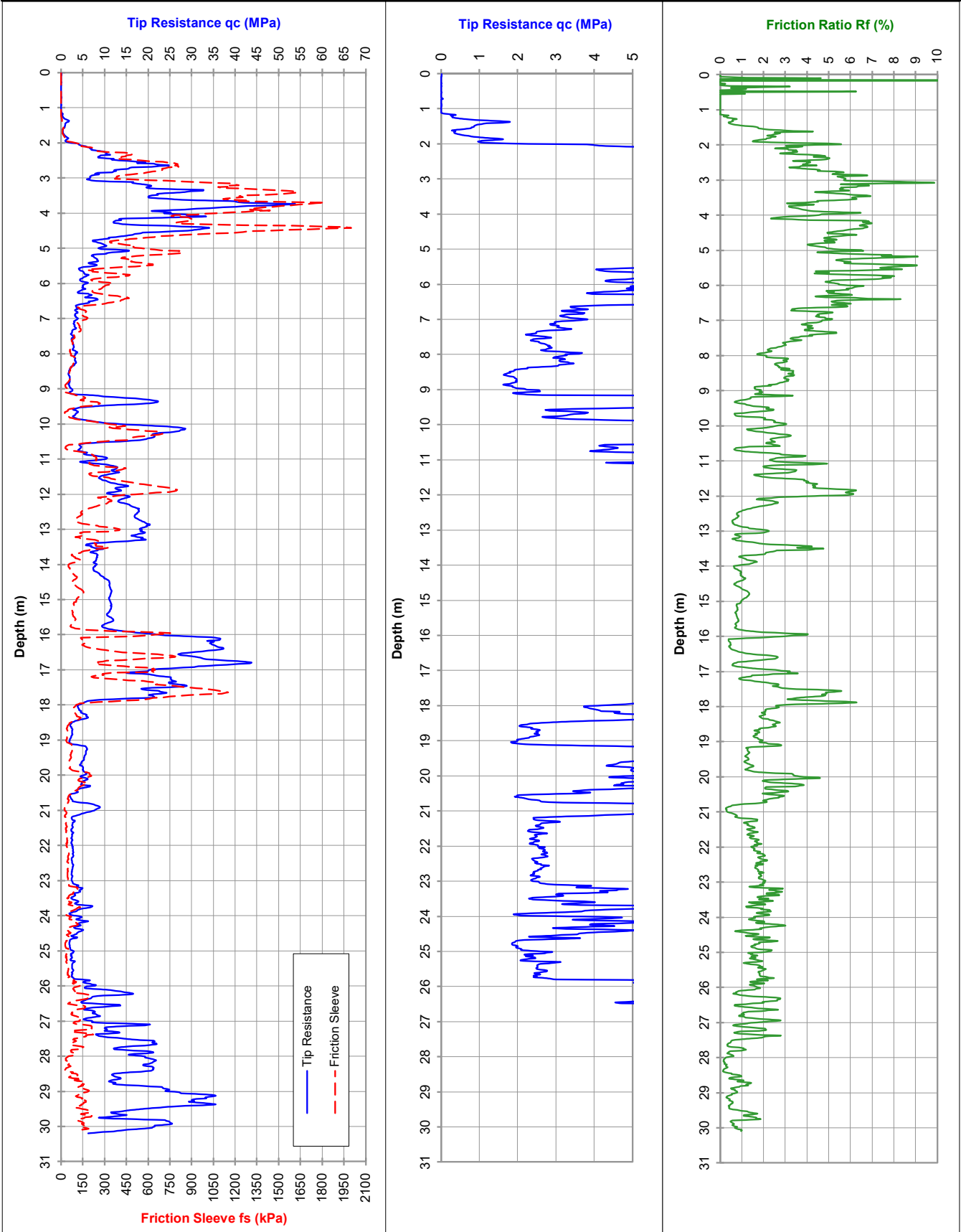
CLIENT: Causeway Link Alliance
 PROJECT: Causeway Pedestrian and Cyclist Bridge
 LOCATION: McCallum Park

Job No.: PS131735
 RL (m): 1.64
 Co-ords: 6462533mE, 394831mN

Probe I.D

**CPCB-
CPTU08**

23-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.4

Hand Auger to (m): 1.5

Refusal:

Cone I.D.: EC20

File: WS0054G

Rig Type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

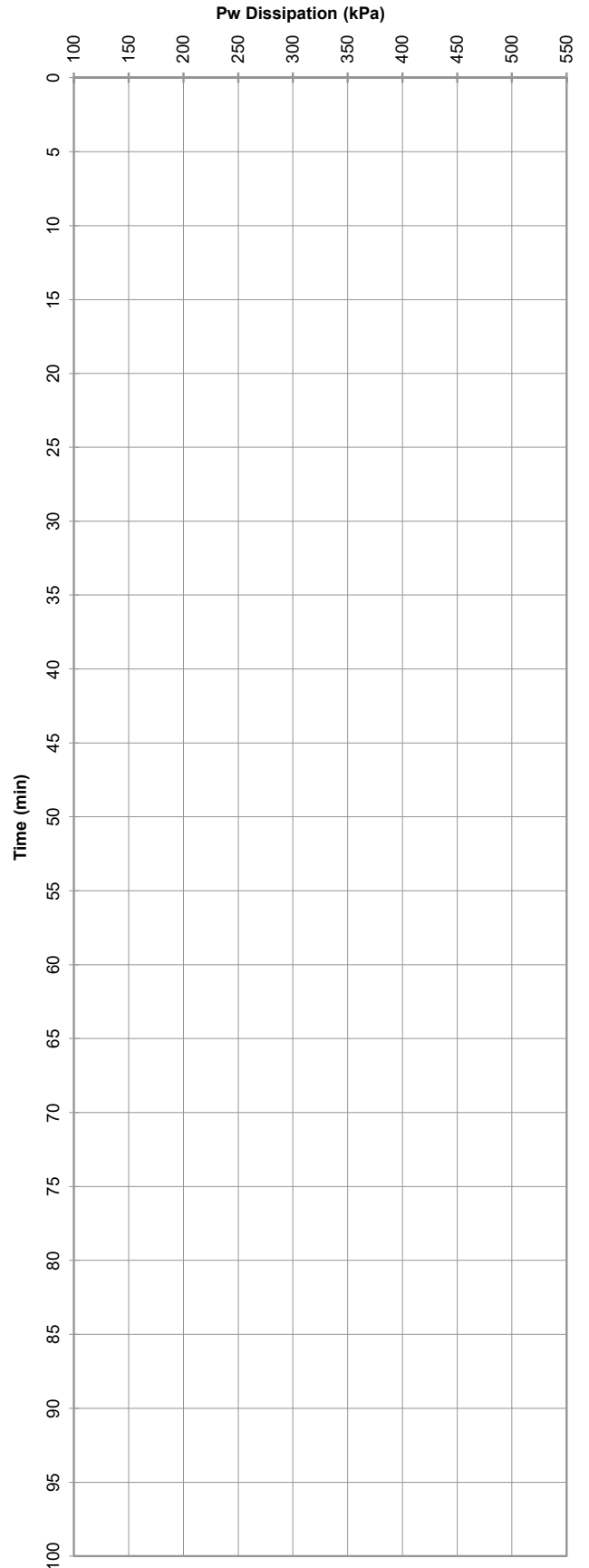
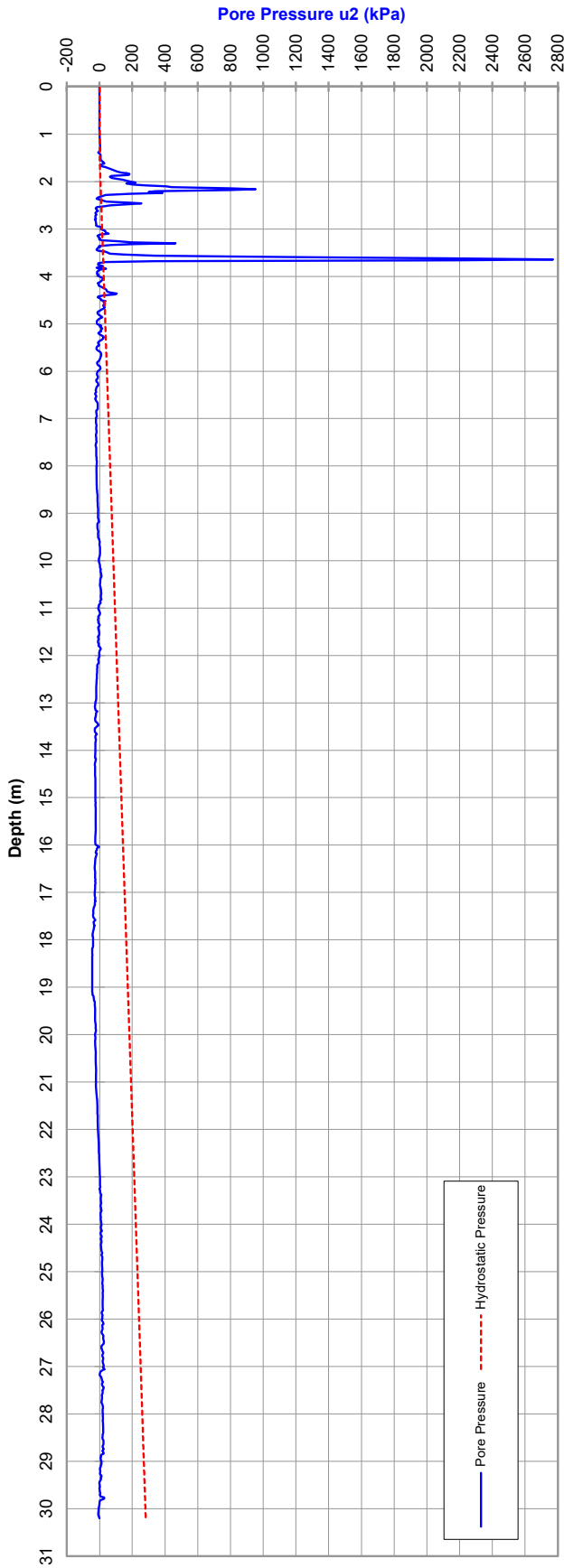
RL (m): 1.52

LOCATION: McCallum Park

Co-ords: 6462578mE, 394725mN

**CPCB-
CPTU08**

23-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

Approx. Water (m): 1.4

File: WS0054G.txt

Rig type: 22t truck (Merc)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

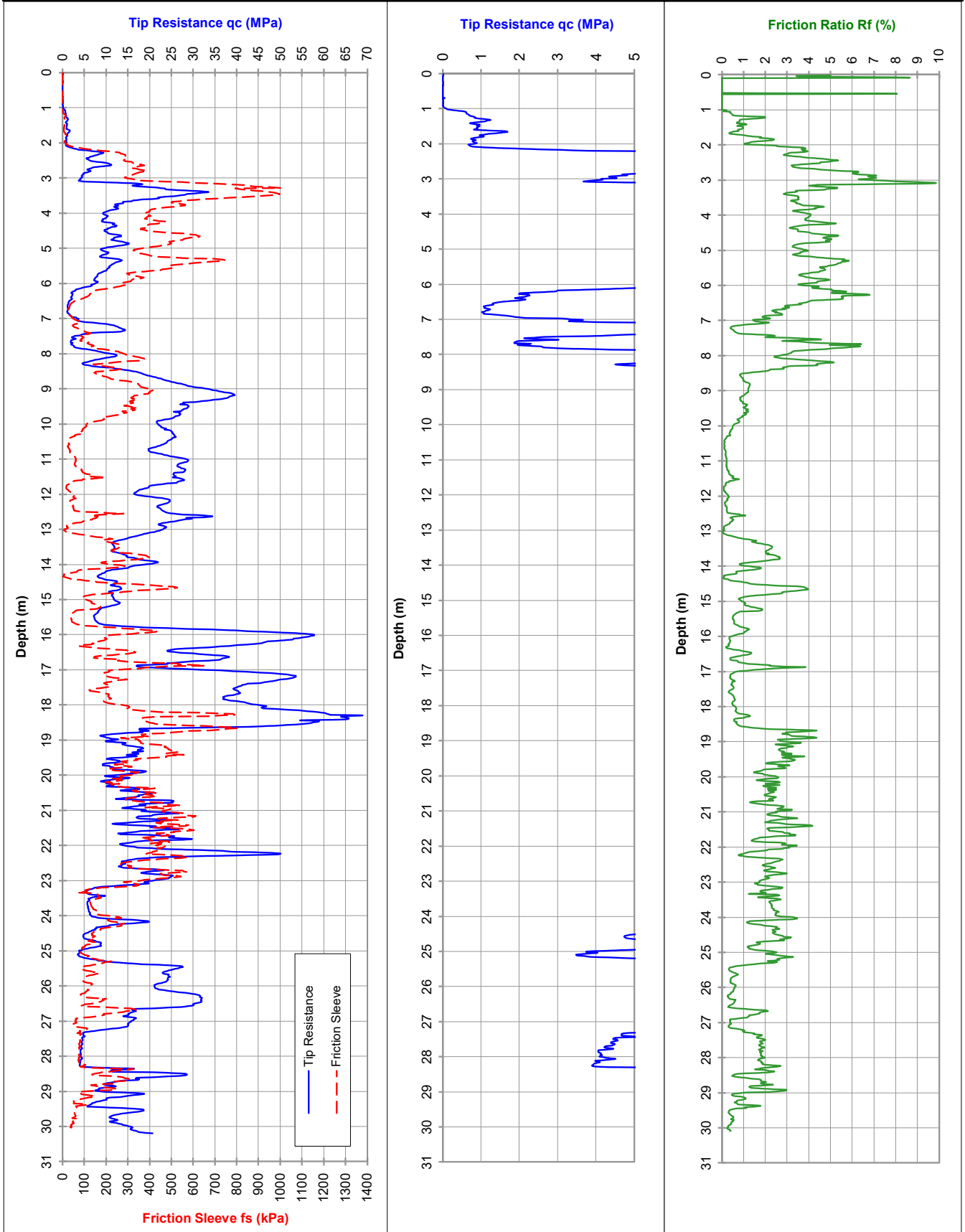
RL (m): 1.65

LOCATION: McCallum Park

Co-ords: 6462561mE, 394859mN

**CPCB-
CPTU09**

23-Jun-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTF 2001 for friction reducer

Approx. water (m): 1.5

Hand Auger to (m): 1.5

Refusal:

Cone I.D.: EC20

File: WS0053G

Rig Type: 22t truck (Merc)

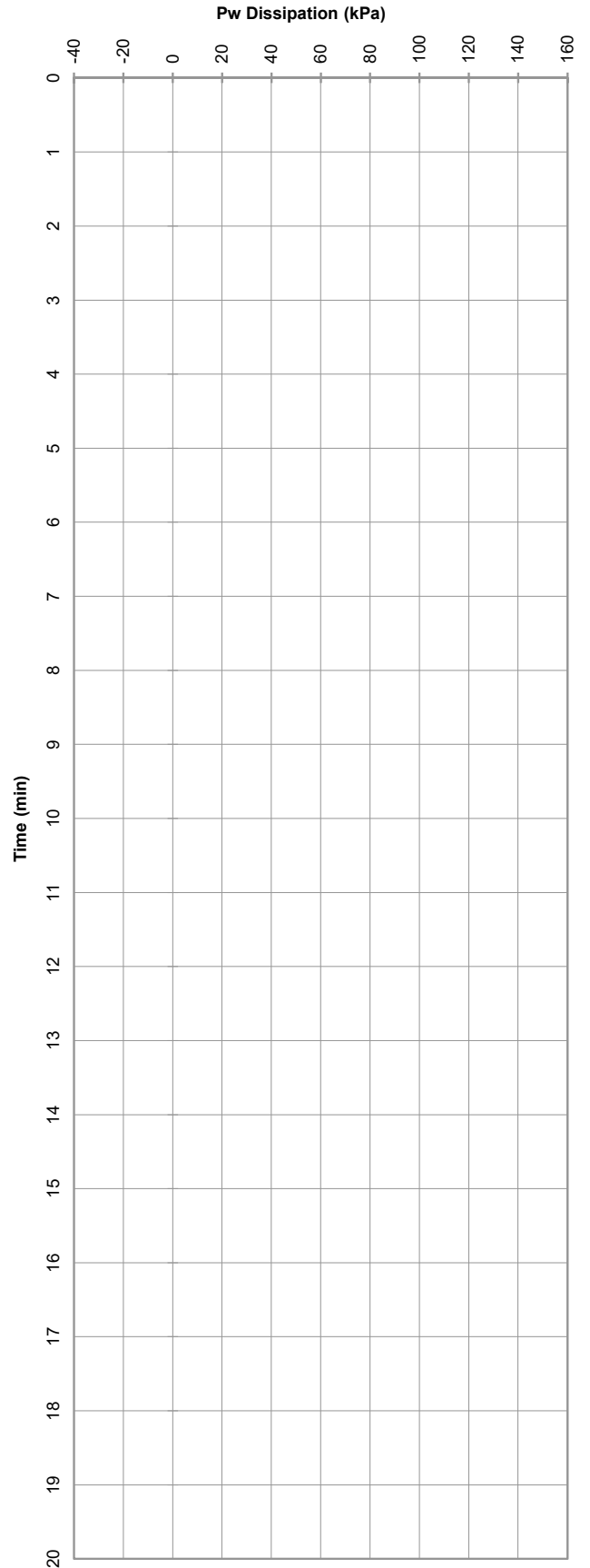
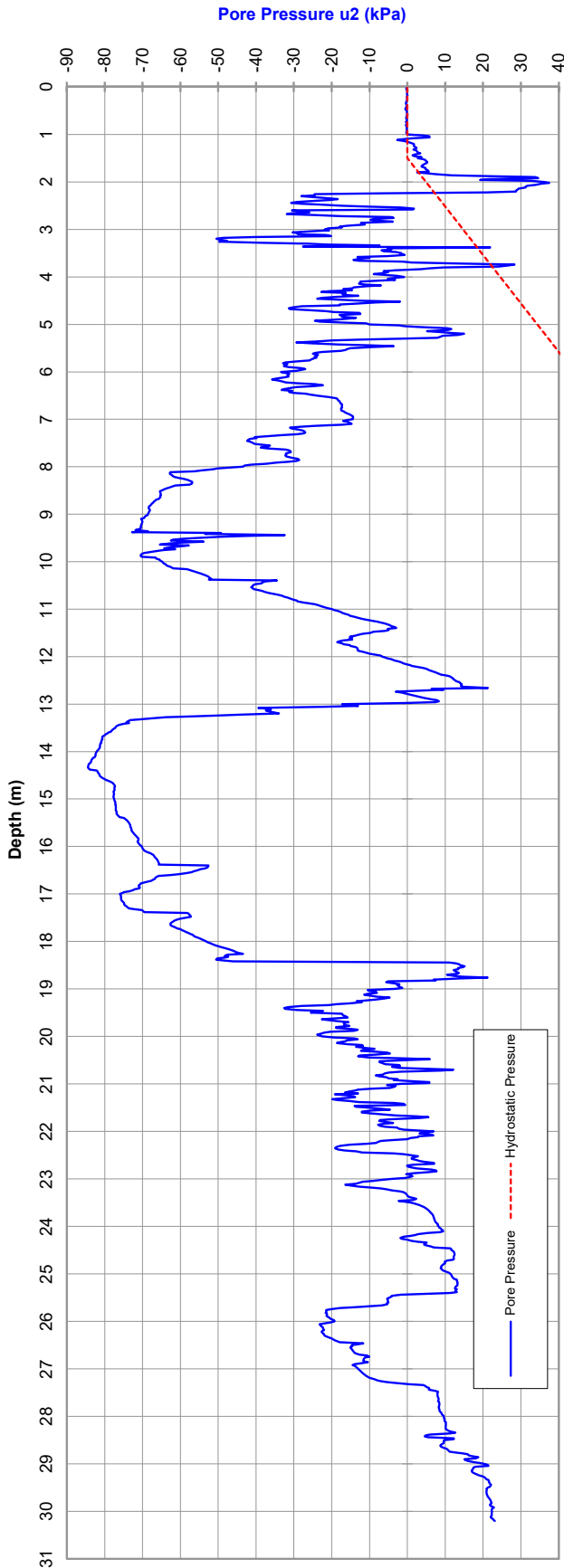
ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance
PROJECT: Causeway Pedestrian and Cyclist Bridge
LOCATION: Heirisson Island

Job No.: PS131735
RL (m): 1.65
Co-ords: 6462561mE, 394859mN

**CPCB-
CPTU09**
23-Jun-22



ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

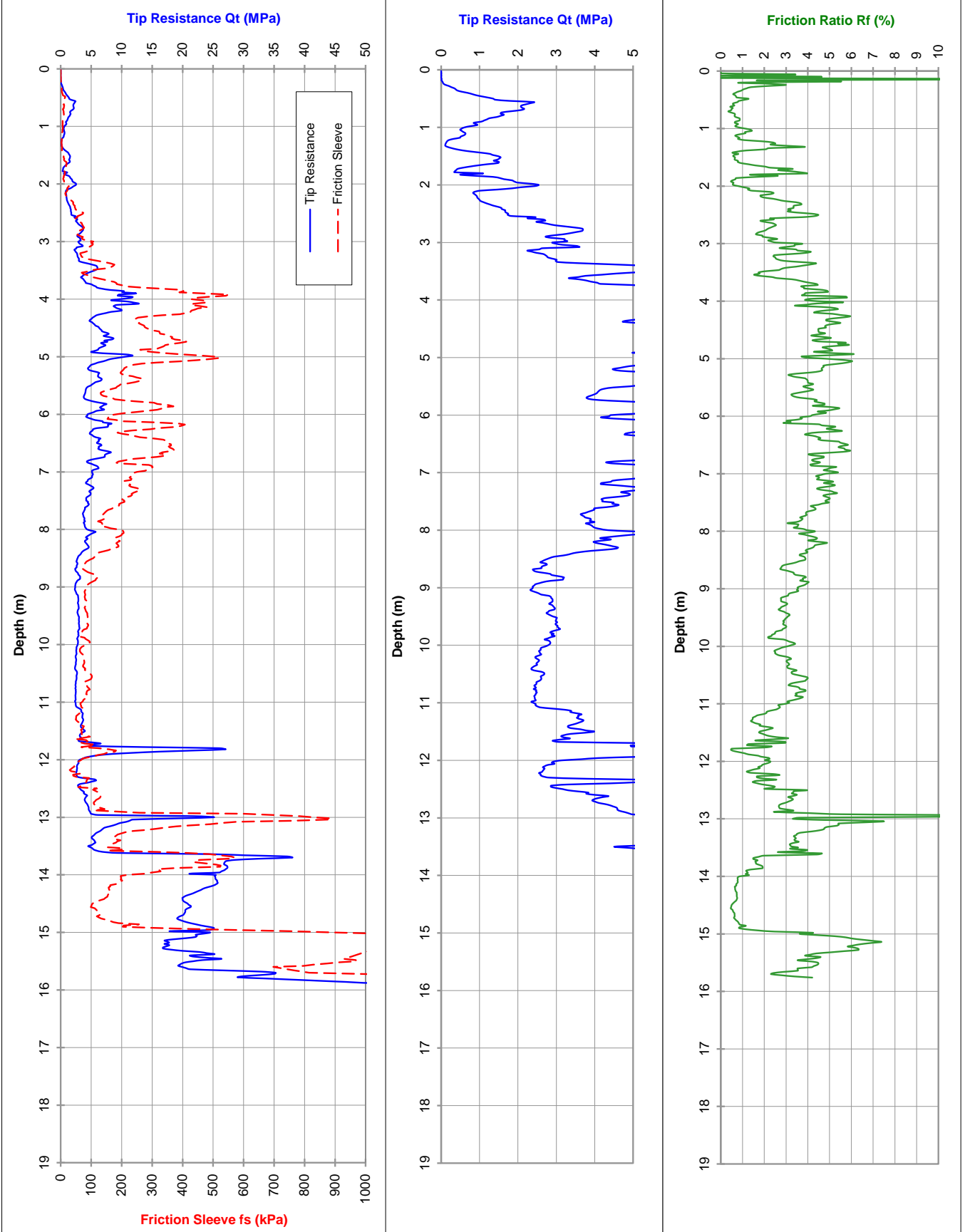
RL (m): 1.4 (mAHD)

CPTU 10

LOCATION: McCallum Park

Co-ords: 394809mE, 6462573mN

11-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 1.4

Dummy probe to (m):

Refusal: 75 MPa + Inclination

Cone I.D.: EC28

File: WS0071TT

Rig Type: 22t truck (Track-Truck)

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CLIENT: Causeway Link Alliance

Job No.: PS131735

PROJECT: Causeway Pedestrian and Cyclist Bridge

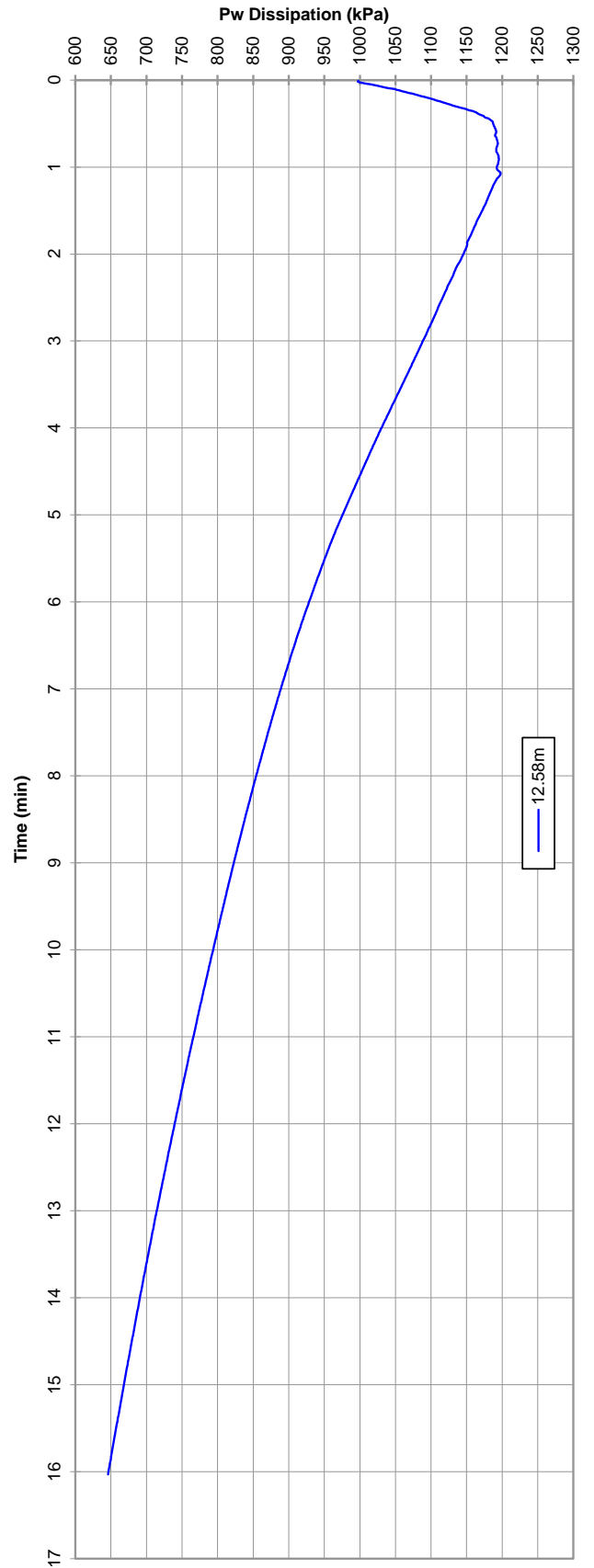
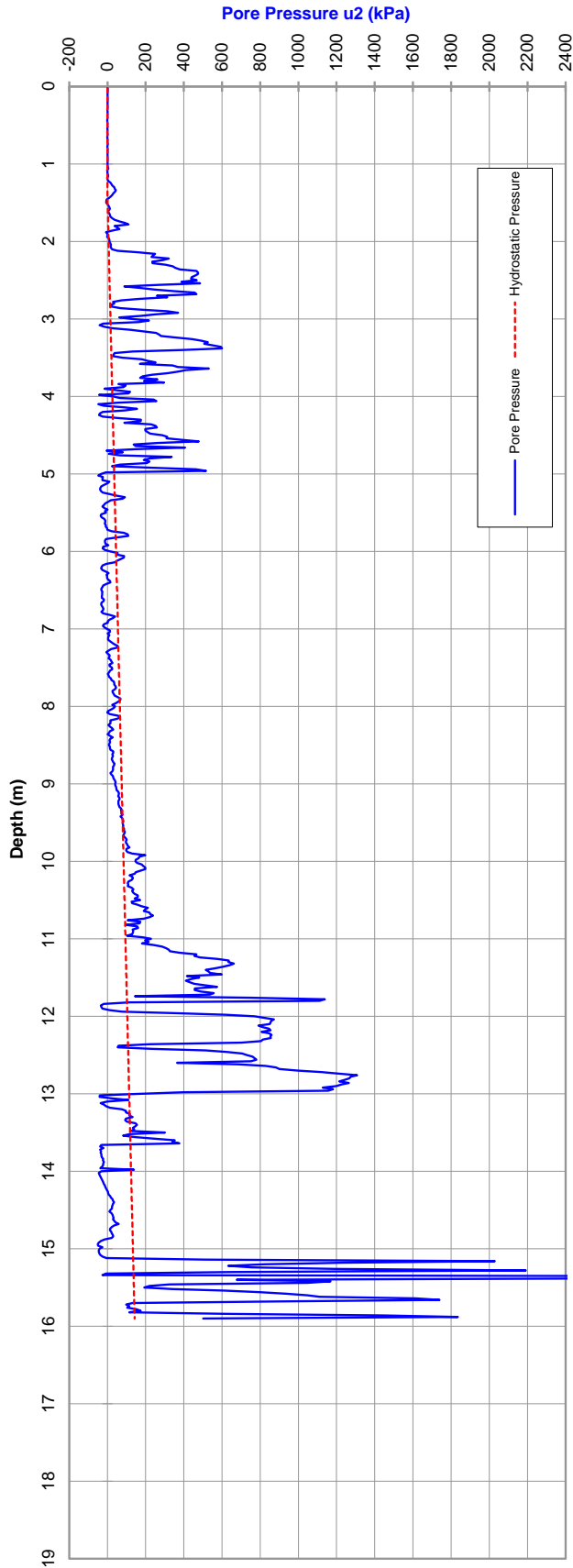
RL (m): 1.4 (mAHD)

LOCATION: McCallum Park

Co-ords: 394809mE, 6462573mN

CPTU 10

11-Jul-22



Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

Approx. Water (m): 1.4








File: WS0071TT.txt

Rig type: 22t truck (Track-Truck)

APPENDIX D: HAND AUGER LOGS

DRAFT

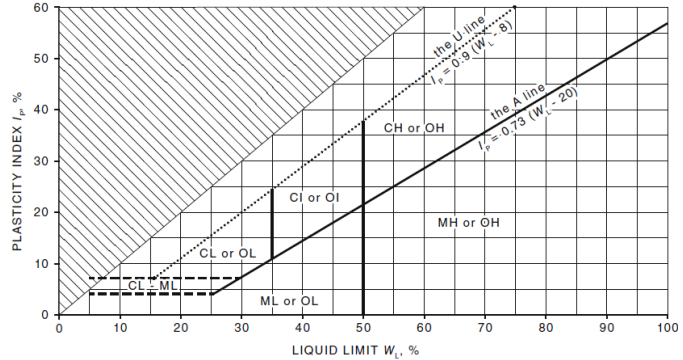
SYMBOLS

	FILL		CLAY (CL, CI or CH)
	GRAVEL (GW, GP, GM or GC)		ORGANIC SOILS (OL, OH or Pt)
	SAND (SW, SP, SM or SC)		COBBLES or BOULDERS
	SILT (ML or MH)		

Combinations of these basic symbols may be used to indicate mixed materials such as sandy clay.

CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil and Rock is classified and described in Reports of Boreholes and Test Pits using the preferred method given in AS1726-2017. The material properties are assessed in the field by visual/tactile methods.

Particle Size			Plasticity Properties
Soil Group	Sub Division	Particle Size	
BOULDERS		> 200 mm	
COBBLES		63 to 200 mm	
GRAVEL	Coarse	19 to 63 mm	
	Medium	6.7 to 19 mm	
	Fine	2.36 to 6.7 mm	
SAND	Coarse	0.6 to 2.36 mm	
	Medium	0.21 to 0.6 mm	
	Fine	0.075 to 0.21 mm	
SILT		0.002 to 0.075 mm	
CLAY		< 0.002 mm	

MOISTURE CONDITION

Symbol	Term	Description
D	Dry	Sands and gravels are free flowing. Clays and silts may be brittle or friable and powdery.
M	Moist	Soils are darker than in dry condition and may feel cool. Sands and gravels tend to cohere.
W	Wet	Soils exude free water. Sand and gravels tend to cohere.

Moisture condition for fine grained soils is described relative to the plastic limit or liquid limit as specified in AS1726-2017.

CONSISTENCY AND DENSITY

Fine Grained Soils			Coarse Grained Soils			
Symbol	Term	Undrained Shear Strength	Symbol	Term	Density Index (%)	SPN "N" *
VS	Very Soft	0 to 12 kPa	VL	Very Loose	Less than 15	0 to 4
S	Soft	12 to 25 kPa	L	Loose	15 to 35	4 to 10
F	Firm	25 to 50 kPa	MD	Medium Dense	35 to 65	10 to 30
St	Stiff	50 to 100 kPa	D	Dense	65 to 85	30 to 50
VSt	Very Stiff	100 to 200 kPa	VD	Very Dense	Above 85	Above 50
H	Hard	Above 200 kPa				
Fr	Friable	-				

In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material.

* SPT correlations are not stated in AS1726-2017, and may be subject to corrections for overburden pressure and equipment type.

CEMENTATION

Weakly Cemented	The soil may be easily disaggregated by hand in air or water.
Moderately Cemented	Effort is required to disaggregate the soil by hand in air or water.

EXPLANATION OF NOTES, ABBREVIATIONS & TERMS USED ON BOREHOLE AND TEST PIT REPORTS

DRILLING/EXCAVATION METHOD





ADH	Hollow auger drilling	EX	Excavator	PQ3	Diamond core - 83 mm
ADT	Auger drilling with tc-bit	HA	Hand auger	PT	Push tube sampling
ADV	Auger drilling with v-bit	HAND	Excavated by hand methods	RAB	Rotary air blast
AIRCORE	Aircore	HMLC	Diamond core - 63 mm	RC	Reverse circulation
AT	Air track	HQ3	Diamond core - 61 mm	RD	Rotary Drilling
BH	Backhoe bucket	JET	Jetting	RT	Rock roller
CT	Cable tool rig	MZ	Mazier tube sampling	SONIC	Sonic drilling
DTC	Diatube coring	NDD	Non-destructive digging	SPT	Standard penetration testing
EE	Existing excavation	NMLC	Diamond core - 52 mm	U	Undisturbed tube sampling
EPT	Extruded push tube	NQ3	Diamond core - 45 mm	WB	Washbore drilling

PENETRATION/EXCAVATION RESISTANCE

L	Low resistance. Rapid penetration possible with little effort from the equipment used.
M	Medium resistance. Excavation/possible at an acceptable rate with moderate effort from the equipment used.
H	High resistance to penetration/excavation. Further penetration is possible at a slow rate and requires significant effort from the equipment.
R	Refusal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine.

These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator.

WATER

	Water level at date shown		Partial water loss
	Water inflow		Complete water loss
GROUNDWATER 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.		
GROUNDWATER 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.		

SAMPLING AND TESTING

SPT	Standard Penetration Test to AS1289.6.3.1-2004
4,7,11 N=18	4,7,11 = Blows per 150mm. N = Blows per 300mm penetration following 150mm seating
30/80 mm	Where practical refusal occurs, the blows and penetration for that interval are reported
RW	Penetration occurred under the rod weight only
HW	Penetration occurred under the hammer and rod weight only
HB	Hammer double bouncing on anvil
DS	Disturbed sample
BDS	Bulk disturbed sample
G	Gas Sample
W	Water Sample
FP	Field permeability test over section noted
FV	Field vane shear test expressed as uncorrected shear strength (sv = peak value, sr = residual value)
PID	Photoionisation Detector reading in ppm
PM	Pressuremeter test over section noted
PP	Pocket penetrometer test expressed as instrument reading in kPa
U63	Thin walled tube sample - number indicates nominal sample diameter in millimetres
WPT	Water pressure test
DCP	Dynamic cone penetration test
CPT	Cone penetration test
CPTu	Cone penetration test with pore pressure (u) measurement

RANKING OF VISUALLY OBSERVABLE CONTAMINATION AND ODOUR (for specific soil contamination assessment projects)

R = 0	No visible evidence of contamination	R = A	No non-natural odours identified
R = 1	Slight evidence of visible contamination	R = B	Slight non-natural odours identified
R = 2	Visible contamination	R = C	Moderate non-natural odours identified
R = 3	Significant visible contamination	R = D	Strong non-natural odours identified

ROCK CORE RECOVERY

TCR = Total Core Recovery (%)	RQD = Rock Quality Designation (%)	SCR = Solid Core Recovery (%)	F = Fracture Frequency
$= \frac{\text{Length of core recovered}}{\text{Length of core run}} \times 100$	$= \frac{\sum \text{Axial lengths of core} > 100 \text{ mm}}{\text{Length of core run}} \times 100$	$= \frac{\sum \text{Length of cylindrical core recovered}}{\text{Length of core run}} \times 100$	$= \frac{\text{No. of defects}}{\text{Length of zone (m)}}$

TERMS FOR ROCK MATERIAL STRENGTH & WEATHERING AND ABBREVIATIONS FOR DEFECT DESCRIPTIONS

STRENGTH

Symbol	Term	UCS (MPa)	Field Guide
VL	Very Low	0.6 to 2	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 30 mm can be broken by finger pressure.
L	Low	2 to 6	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
M	Medium	6 to 20	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
H	High	20 to 60	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken with pick with a single firm blow; rock rings under hammer.
VH	Very High	60 to 200	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
EH	Extremely High	>200	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Material with strength less than 'Very Low' shall be described using soil characteristics. The presence of an original rock structure, fabric or texture should be noted, if relevant.

ROCK MATERIAL WEATHERING

Symbol	Term	Field Guide	
RS	Residual Soil	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.	
XW	Extremely Weathered	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.	
DW	HW	Highly Weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
	MW	Moderately Weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable, but shows little or no change of strength from fresh rock.
SW	Slightly Weathered	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.	
FR	Fresh	Rock shows no sign of decomposition of individual minerals or colour changes.	

ABBREVIATIONS FOR DEFECT TYPES AND DESCRIPTIONS

Defect Type		Coating or Infilling		Roughness	
P	Parting	Cn	Clean	VRo	Very Rough
X	Foliation	Sn	Stain	Ro	Rough
L	Cleavage	Ve	Veneer	Sm	Smooth
C	Contact	Ct	Coating	Po	Polished
J	Joint	In	Infill	Sl	Slickensided
SSu	Sheared Surface	Planarity		Vertical Boreholes – The dip (inclination from horizontal) of the defect is given.	
SS	Sheared Seam				
SZ	Sheared Zone	PI	Planar	Inclined Boreholes – The inclination is measured as the acute angle between the core axis and the vertical direction.	
CS	Crushed Seam	Cv	Curved		
IS	Infilled Seam	Un	Undulating		
EWS	Extremely Weathered Seam	St	Stepped		
V	Vein	Ir	Irregular		



GOLDER REPORT OF HAND AUGERED BOREHOLE: CPCB-HACPT01

SHEET: 1 OF 1

CLIENT: Causeway Link Alliance

COORDS: 304159.0 m E 6463041.0 m N MGA94 50

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 2.15 m DATUM: AHD

LOCATION: Point Fraser

INCLINATION: -90°

LOGGED: EA

DATE: 29/6/22

JOB NO: PS131735

HOLE DEPTH: 2.00 m

CHECKED: IB

DATE: 11/8/22

Drilling				Sampling			Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	2.15			SP	TOPSOIL: SAND fine to coarse grained, dark brown, with rootlets		L		
			0.10	2.05			GP	GRAVEL medium grained, sub-angular to angular, grey				Geohex and geotextile at 0.1m
			0.30	1.85			GP	Sandy GRAVEL fine to coarse grained, sub-rounded to sub-angular, pale yellow, fine to coarse grained sand, trace limestone cobbles		MD - D		
			0.5	1.65			SC	SAND fine to coarse grained, brown orange		M		Geotextile at 0.5m
			1.5	0.65			CL	Sandy CLAY low plasticity, black, fine to coarse grained sand				
			2.0					END OF HAND AUGER @ 2.00 m TARGET DEPTH GROUNDWATER NOT ENCOUNTERED BACKFILLED		W ~ PL	St	

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GAP gINT FN. F01a
RL3



GOLDER REPORT OF HAND AUGERED BOREHOLE: CPCB-HACPT02

SHEET: 1 OF 1

CLIENT: Causeway Link Alliance

COORDS: 394165.0 m E 6463020.0 m N MGA94 50

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 2.03 m DATUM: AHD

LOCATION: Point Fraser

INCLINATION: -90°

LOGGED: EA

DATE: 29/6/22

JOB NO: PS131735

HOLE DEPTH: 2.00 m

CHECKED: IB

DATE: 11/8/22

Drilling			Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	2.03			SP	TOPSOIL: SAND fine to coarse grained, dark brown, with rootlets		L		
			0.10	1.93			GP	GRAVEL medium grained, sub-angular to angular, grey				Geohex and geotextile at 0.1m
			0.30	1.73			GP	Sandy GRAVEL fine to coarse grained, sub-rounded to sub-angular, pale yellow, fine to coarse grained sand, trace limestone cobbles		MD - D		
			0.50	1.53			SP	SAND fine to coarse grained, brown orange and dark brown to black		M		Geotextile at 0.5m
			1.40	0.63			CL	Sandy CLAY low plasticity, black, fine to coarse grained sand		MD		
			2.0					END OF HAND AUGER @ 2.00 m TARGET DEPTH GROUNDWATER NOT ENCOUNTERED BACKFILLED		w ~ PL	St	

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GAP gINT FN. F01a
RL3



GOLDER REPORT OF HAND AUGERED BOREHOLE: CPCB-HACPT03

SHEET: 1 OF 1

CLIENT: Causeway Link Alliance

COORDS: 394214.0 m E 6462986.0 m N MGA94 50

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.67 m DATUM: AHD

LOCATION: Point Fraser

INCLINATION: -90°

LOGGED: EA

DATE: 29/6/22

JOB NO: PS131735

HOLE DEPTH: 1.50 m

CHECKED: IB

DATE: 11/8/22

Drilling			Sampling			Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	1.67			SP	TOPSOIL: SAND fine to coarse grained, dark brown, with rootlets				
			0.25	1.42			SP	FILL: SAND fine to coarse grained, brown orange		M		
			0.5									
			0.60	1.07			SP	SAND fine to coarse grained, dark brown to black, with fines				
			1.0							M - W		
			1.5	0.17				END OF HAND AUGER @ 1.50 m TARGET DEPTH GROUNDWATER ENCOUNTERED @ 1.50 m DEPTH BACKFILLED				
			2.0									

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE GI (BACKUP) GPJ <-DrawingFile>> 11/08/2022 09:45 10.02.00.04 Datgel Tools

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GAP gINT FN. F01a
RL3



GOLDER REPORT OF HAND AUGERED BOREHOLE: CPCB-HACPT04

SHEET: 1 OF 1

CLIENT: Causeway Link Alliance

COORDS: 394275.0 m E 6462871.0 m N MGA94 50

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.74 m DATUM: AHD

LOCATION: Heirisson Island

INCLINATION: -90°

LOGGED: EA

DATE: 24/6/22

JOB NO: PS131735

HOLE DEPTH: 1.20 m

CHECKED: IB

DATE: 11/8/22

Drilling				Sampling			Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA		GWNE	0.0	1.74			SP	TOPSOIL: SAND fine to coarse grained, brown				
			0.20	1.54			SP	FILL: Gravelly SAND fine to coarse grained, grey				
			0.50	1.24			SC	FILL: Clayey SAND fine to coarse grained, brown				
			0.54					END OF HAND AUGER @ 1.20 m TARGET DEPTH GROUNDWATER NOT ENCOUNTERED BACKFILLED				
			1.5									
			2.0									

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GAP gINT FN. F01a
RL3



GOLDER REPORT OF HAND AUGERED BOREHOLE: CPCB-HACPT05

SHEET: 1 OF 1

CLIENT: Causeway Link Alliance

COORDS: 394554.0 m E 6462744.0 m N MGA94 50

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.03 m DATUM: AHD

LOCATION: Heirisson Island

INCLINATION: -90°

LOGGED: EA

DATE: 24/6/22

JOB NO: PS131735

HOLE DEPTH: 1.50 m

CHECKED: IB

DATE: 11/8/22

Drilling				Sampling			Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	1.03			SP	TOPSOIL: SAND fine to coarse grained, brown, with rootlets				
			0.20	0.83			SP	FILL: SAND fine to coarse grained, grey, with shell fragments				
			0.5									
			1.0									
			1.5	-0.47				END OF HAND AUGER @ 1.50 m TARGET DEPTH GROUNDWATER ENCOUNTERED @ 0.80 m DEPTH BACKFILLED				
			2.0									

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GAP gINT FN. F01a
RL3



GOLDER REPORT OF HAND AUGERED BOREHOLE: CPCB-HACPT06

SHEET: 1 OF 1

CLIENT: Causeway Link Alliance

COORDS: 394725.0 m E 6462576.0 m N MGA94 50

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.40 m DATUM: AHD

LOCATION: McCallum Park

INCLINATION: -90°

LOGGED: EA

DATE: 23/6/22

JOB NO: PS131735

HOLE DEPTH: 1.50 m

CHECKED: IB

DATE: 11/8/22

Drilling				Sampling			Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	1.40			SP	TOPSOIL: SAND fine to coarse grained, brown, with rootlets				
			0.20	1.20			SP	FILL: SAND fine to coarse grained, pale brown mottled grey, with shell fragments				
			0.5									
			1.0									
			1.5	-0.10				END OF HAND AUGER @ 1.50 m TARGET DEPTH GROUNDWATER ENCOUNTERED @ 1.10 m DEPTH BACKFILLED				
			2.0									

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G1 (BACKUP) GPJ <-DrawingFile>> 11/08/2022 09:45 10.02.00.04 Datgel Tools

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GAP gINT FN. F01a RL3



GOLDER REPORT OF HAND AUGERED BOREHOLE: CPCB-HACPT11

SHEET: 1 OF 1

CLIENT: Causeway Link Alliance

COORDS: 394740.0 m E 6462566.0 m N MGA94 50

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.60 m DATUM: AHD

LOCATION: McCallum Park

INCLINATION: -90°

LOGGED: EA

DATE: 5/7/22

JOB NO: PS131735

HOLE DEPTH: 1.20 m

CHECKED: IB

DATE: 11/8/22

Drilling				Sampling		Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA			0.0	1.60			SP	TOPSOIL: SAND fine to coarse grained, dark brown, with rootlets				
			0.10	1.50			SP	FILL: SAND fine to coarse grained, brown orange		M		
			0.40	1.20			SP	SAND fine to coarse grained, pale brown grey, with shell fragments		M-W		
			0.40					END OF HAND AUGER @ 1.20 m TARGET DEPTH GROUNDWATER ENCOUNTERED @ 1.05 m DEPTH BACKFILLED				

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GAP gINT FN. F01a
RL3



GOLDER REPORT OF HAND AUGERED BOREHOLE: CPCB-HACPT12

SHEET: 1 OF 1

CLIENT: Causeway Link Alliance

COORDS: 394739.0 m E 6462576.0 m N MGA94 50

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.49 m DATUM: AHD

LOCATION: McCallum Park

INCLINATION: -90°

LOGGED: EA

DATE: 5/7/22

JOB NO: PS131735

HOLE DEPTH: 1.00 m

CHECKED: IB

DATE: 11/8/22

Drilling			Sampling			Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA			0.0	1.49			SP	TOPSOIL: SAND fine to coarse grained, dark brown, with rootlets				
			0.10	1.39			SP	FILL: SAND fine to coarse grained, brown orange				
			0.40	1.09			SP	SAND fine to coarse grained, pale brown grey, with shell fragments			M	
			0.80	0.69			SC	Clayey SAND fine to coarse grained, brown grey, low to medium plasticity clay, trace shell fragments			M - W	
			1.0	0.49					END OF HAND AUGER @ 1.00 m TARGET DEPTH GROUNDWATER ENCOUNTERED @ 1.00 m DEPTH BACKFILLED			

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GAP gINT FN. F01a
RL3



G O L D E R REPORT OF HAND AUGERED BOREHOLE: CPCB-HACPTU07

SHEET: 1 OF 1

CLIENT: Causeway Link Alliance

COORDS: 394817.0 m E 6462568.0 m N MGA94 50

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.52 m DATUM: AHD

LOCATION: McCallum Park

INCLINATION: -90°

LOGGED: EA

DATE: 23/6/22

JOB NO: PS131735

HOLE DEPTH: 1.50 m

CHECKED: IB

DATE: 11/8/22

Drilling				Sampling			Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	1.52			SP	TOPSOIL: SAND fine to coarse grained, brown, with rootlets				
			0.20	1.32			SP	FILL: SAND fine to coarse grained, dark brown to black, with pieces of brick, metal, ceramics and glass				
			0.5									
			1.0									
			1.30	0.22			SP	SAND fine to coarse grained, grey				
			1.5	0.02				END OF HAND AUGER @ 1.50 m TARGET DEPTH GROUNDWATER ENCOUNTERED @ 1.50 m DEPTH BACKFILLED				
			2.0									

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G (BACKUP) GPJ <-DrawingFile>> 11/08/2022 09:45 10.02.00.04 Datgel Tools

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GAP gINT FN. F01a RL3



G O L D E R REPORT OF HAND AUGERED BOREHOLE: CPCB-HACPTU08

SHEET: 1 OF 1

CLIENT: Causeway Link Alliance

COORDS: 394831.0 m E 6462566.0 m N MGA94 50

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.64 m DATUM: AHD

LOCATION: McCallum Park

INCLINATION: -90°

LOGGED: EA

DATE: 23/6/22

JOB NO: PS131735

HOLE DEPTH: 1.50 m

CHECKED: IB

DATE: 11/8/22

Drilling				Sampling			Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	1.64			SP	TOPSOIL: SAND fine to coarse grained, brown, with rootlets				
			0.20	1.44			SP	FILL: SAND fine to coarse grained, dark brown to black, with pieces of brick, metal, ceramics and glass				
			0.5									
			1.0									
			1.30	0.34			SP	SAND fine to coarse grained, black				
			1.5	0.14				END OF HAND AUGER @ 1.50 m TARGET DEPTH GROUNDWATER ENCOUNTERED @ 1.50 m DEPTH BACKFILLED				
			2.0									

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G (BACKUP) GPJ <-DrawingFile>> 11/08/2022 09:45 10.02.00.04 Datgel Tools

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GAP gINT FN. F01a RL3



G O L D E R REPORT OF HAND AUGERED BOREHOLE: CPCB-HACPTU09

SHEET: 1 OF 1

CLIENT: Causeway Link Alliance

COORDS: 394859.0 m E 6462561.0 m N MGA94 50

PROJECT: Causeway Pedestrian and Cyclist Bridge

SURFACE RL: 1.65 m DATUM: AHD

LOCATION: McCallum Park

INCLINATION: -90°

LOGGED: EA

DATE: 23/6/22

JOB NO: PS131735

HOLE DEPTH: 1.50 m

CHECKED: IB

DATE: 11/8/22

Drilling				Sampling			Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	1.65			SP	TOPSOIL: SAND fine to coarse grained, brown, with rootlets				
			0.20	1.45			SP	FILL: SAND fine to coarse grained, dark brown to black, with pieces of brick, metal, ceramics and glass				
			0.5									
			1.0									
			1.30	0.35			SP	SAND fine to coarse grained, grey				
			1.5	0.15				END OF HAND AUGER @ 1.50 m TARGET DEPTH GROUNDWATER ENCOUNTERED @ 1.50 m DEPTH BACKFILLED				
			2.0									

GAP 10.0.7 LIB LOGO.GLB Log GAP NON-CORED FULL PAGE ADDITIONAL CAUSEWAY BRIDGE G (BACKUP) GPJ <-DrawingFile>> 11/08/2022 09:45 10.02.00.04 Datgel Tools

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GAP gINT FN. F01a RL3

APPENDIX E: INFILTRATION TESTING

DRAFT

APPENDIX F: LABORATORY TEST REPORTS

DRAFT

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080114 - 22080114	Lab report ref.:	LPER_22083597	Golder Associates Pty Ltd	
Client:	Causeway Link Alliance	Project reference:				PERTH GEOTECHNICAL LABORATORY	
Client address:		Location:	Perth, WA			84 Guthrie Street, Osborne Park, Western Australia 6017	
Project ID:	PS131735	Project name:	Causeway Footbridge Swan River				

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH01	29.80		Test type:	A										<i>Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method</i>		
	30.00		**Compliant test:	Yes												
Lab sample ID	LPER2022080114		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.94										0.94		
	Method:	-	Defect orientation	70°										-	-	-
Moisture content			Is [MPa]	0.12										0.12		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.16										0.16		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
														Client ref.:		

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH01	29.80		Test type:	D										<i>Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method</i>		
	30.00		**Compliant test:	Yes												
Lab sample ID	LPER2022080114		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.73											0.73	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.12											0.12	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.15											0.15	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
														Client ref.:		

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080114 - 22080114_Rep-22083597	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
	THIS DOCUMENT SHALL ONLY BE REPRODUCED IN FULL	Date reported:	11/08/2022		Paul Kent - Laboratory Manager

Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080116 - 22080116	Lab report ref.:	LPER_22083598	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH01	31.00		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	31.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080116		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	1.4										1.4		
	Method:	-	Defect orientation	180°										-	-	-
Moisture content			Is [MPa]	0.17										0.17		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.22										0.22		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			
CPCB-BH01	31.00		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	31.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080116		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	1.1											1.1	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.19											0.19	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.23											0.23	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080116 - 22080116_Rep-22083598	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080117 - 22080117	Lab report ref.:	LPER_22083599	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH01	32.20		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	32.40		**Compliant test:	Yes												
Lab sample ID	LPER2022080117		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.85										0.85		
	Method:	-	Defect orientation	180°										-	-	-
Moisture content			Is [MPa]	0.12										0.12		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.15										0.15		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			
Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH01	32.20		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	32.40		**Compliant test:	Yes												
Lab sample ID	LPER2022080117		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.81											0.81	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.13											0.13	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.16											0.16	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080117 - 22080117_Rep-22083599	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
	THIS DOCUMENT SHALL ONLY BE REPRODUCED IN FULL	Date reported:	11/08/2022		Paul Kent - Laboratory Manager

Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080119 - 22080119	Lab report ref.:	LPER_22083600	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH01	33.80		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	34.00		**Compliant test:	Yes												
Lab sample ID	LPER2022080119		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	1.2										1.2		
	Method:	-	Defect orientation	70°										-	-	-
Moisture content			Is [MPa]	0.17										0.17		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.21										0.21		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
														Client ref.:		

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH01	33.80		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	34.00		**Compliant test:	Yes												
Lab sample ID	LPER2022080119		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.88											0.88	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.17											0.17	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.2											0.2	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
														Client ref.:		

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080119 - 22080119_Rep-22083600	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080121 - 22080121	Lab report ref.:	LPER_22083601	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH01	36.00		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	36.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080121		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	1.3										1.3		
	Method:	-	Defect orientation	80°										-	-	-
Moisture content			Is [MPa]	0.24										0.24		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.29										0.29		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
														Client ref.:		
CPCB-BH01	36.00		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	36.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080121		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	1.3											1.3	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.31											0.31	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.35											0.35	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
														Client ref.:		

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080121 - 22080121_Rep-22083601	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080122 - 22080122	Lab report ref.:	LPER_22083602	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH01	38.00		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	38.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080122		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.82										0.82		
	Method:	-	Defect orientation	180°										-	-	-
Moisture content			Is [MPa]	0.11										0.11		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.14										0.14		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			
CPCB-BH01	38.00		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	38.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080122		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.48											0.48	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.076											0.076	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.094											0.094	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080122 - 22080122_Rep-22083602	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080123 - 22080123	Lab report ref.:	LPER_22083603	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH02	29.80		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	30.00		**Compliant test:	Yes												
Lab sample ID	LPER2022080123		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.67										0.67		
	Method:	-	Defect orientation	60°										-	-	-
Moisture content			Is [MPa]	0.087										0.087		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.11										0.11		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
														Client ref.:		
CPCB-BH02	29.80		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	30.00		**Compliant test:	Yes												
Lab sample ID	LPER2022080123		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.82											0.82	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.14											0.14	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.17											0.17	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
														Client ref.:		

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080123 - 22080123_Rep-22083603	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080125 - 22080125	Lab report ref.:	LPER_22083604	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH02	32.40		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	32.60		**Compliant test:	Yes												
Lab sample ID	LPER2022080125		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	1.4										1.4		
	Method:	-	Defect orientation	180°										-	-	-
Moisture content			Is [MPa]	0.21										0.21		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.26										0.26		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			
CPCB-BH02	32.40		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	32.60		**Compliant test:	Yes												
Lab sample ID	LPER2022080125		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	1.5											1.5	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.27											0.27	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.32											0.32	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080125 - 22080125_Rep-22083604	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080127 - 22080127	Lab report ref.:	LPER_22083605	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH02	34.00		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	34.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080127		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.46										0.46		
	Method:	-	Defect orientation	60°										-	-	-
Moisture content			Is [MPa]	0.078										0.078		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.095										0.095		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			
CPCB-BH02	34.00		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	34.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080127		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.45											0.45	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.097											0.097	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.11											0.11	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080127 - 22080127_Rep-22083605	Specimens prepared by:	sw	Approved signatory:
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22	
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent	
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080128 - 22080128	Lab report ref.:	LPER_22083606	Golder Associates Pty Ltd	
Client:	Causeway Link Alliance	Project reference:				PERTH GEOTECHNICAL LABORATORY	
Client address:		Location:	Perth, WA			84 Guthrie Street, Osborne Park, Western Australia 6017	
Project ID:	PS131735	Project name:	Causeway Footbridge Swan River				

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH02	35.80		Test type:	A										<i>Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method</i>		
	6.00		**Compliant test:	Yes												
Lab sample ID	LPER2022080128		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.63										0.63		
	Method:	-	Defect orientation	180°										-	-	-
Moisture content			Is [MPa]	0.096										0.096		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.12										0.12		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE							History:	Test performed on samples submitted to the laboratory.				
														Client ref.:		
Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH02	35.80		Test type:	D										<i>Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method</i>		
	6.00		**Compliant test:	Yes												
Lab sample ID	LPER2022080128		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.4											0.4	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.07											0.07	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.085											0.085	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE							History:	Test performed on samples submitted to the laboratory.				
														Client ref.:		

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080128 - 22080128_Rep-22083606	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth Accredited for compliance with ISO/IEC 17025 - Testing	Tests performed by:	sw 03/08/22		Paul Kent - Laboratory Manager
	THIS DOCUMENT SHALL ONLY BE REPRODUCED IN FULL	Results reviewed by:	PKent		
		Date reported:	11/08/2022		

Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080129 - 22080129	Lab report ref.:	LPER_22083607	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH03	29.20		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	29.40		**Compliant test:	Yes												
Lab sample ID	LPER2022080129		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	1.5										1.5		
	Method:	-	Defect orientation	180°										-	-	-
Moisture content			Is [MPa]	0.23										0.23		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.28										0.28		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
														Client ref.:		

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH03	29.20		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	29.40		**Compliant test:	Yes												
Lab sample ID	LPER2022080129		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	1.5											1.5	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.24											0.24	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.29											0.29	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
														Client ref.:		

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080129 - 22080129_Rep-22083607	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
	THIS DOCUMENT SHALL ONLY BE REPRODUCED IN FULL	Date reported:	11/08/2022		Paul Kent - Laboratory Manager

Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080131 - 22080131	Lab report ref.:	LPER_22083608	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH03	31.50		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	31.70		**Compliant test:	Yes												
Lab sample ID	LPER2022080131		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	1.4										1.4		
	Method:	-	Defect orientation	180°										-	-	-
Moisture content			Is [MPa]	0.23										0.23		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.28										0.28		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
														Client ref.:		
CPCB-BH03	31.50		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	31.70		**Compliant test:	Yes												
Lab sample ID	LPER2022080131		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	1.1											1.1	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.2											0.2	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.24											0.24	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
														Client ref.:		

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080131 - 22080131_Rep-22083608	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
	THIS DOCUMENT SHALL ONLY BE REPRODUCED IN FULL	Date reported:	11/08/2022		Paul Kent - Laboratory Manager

Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080132 - 22080132	Lab report ref.:	LPER_22083609	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH03	32.00		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	32.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080132		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.29										0.29		
	Method:	-	Defect orientation	180°										-	-	-
Moisture content			Is [MPa]	0.054										0.054		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.064										0.064		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			
CPCB-BH03	32.00		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	32.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080132		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.29											0.29	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.05											0.05	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.061											0.061	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080132 - 22080132_Rep-22083609	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080134 - 22080134	Lab report ref.:	LPER_22083610	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH03	35.00		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	35.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080134		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.75										0.75		
	Method:	-	Defect orientation	180°										-	-	-
Moisture content			Is [MPa]	0.12										0.12		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.15										0.15		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH03	35.00		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	35.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080134		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.75											0.75	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.18											0.18	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.2											0.2	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080134 - 22080134_Rep-22083610	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
	THIS DOCUMENT SHALL ONLY BE REPRODUCED IN FULL	Date reported:	11/08/2022		Paul Kent - Laboratory Manager

Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080136 - 22080136	Lab report ref.:	LPER_22083611	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH03	37.00		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	37.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080136		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.79										0.79		
	Method:	-	Defect orientation	180°										-	-	-
Moisture content			Is [MPa]	0.13										0.13		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.16										0.16		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			
CPCB-BH03	37.00		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	37.20		**Compliant test:	Yes												
Lab sample ID	LPER2022080136		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.49											0.49	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.089											0.089	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.11											0.11	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080136 - 22080136_Rep-22083611	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
	THIS DOCUMENT SHALL ONLY BE REPRODUCED IN FULL	Date reported:	11/08/2022		Paul Kent - Laboratory Manager

Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Rocks testing - Determination of point load strength index

Including tests on; Axial (A), Diametral (D) or irregular Lump (L) specimens

TEST REPORT - SUMMARY OF ANALYSIS



AS 4133.4.1-2007

Test request ID:	TRP22-0095	Lab sample IDs:	22080137 - 22080137	Lab report ref.:	LPER_22083612	Golder Associates Pty Ltd PERTH GEOTECHNICAL LABORATORY 84 Guthrie Street, Osborne Park, Western Australia 6017	
Client:	Causeway Link Alliance	Project reference:		Location:	Perth, WA		
Client address:		Project name:	Causeway Footbridge Swan River				
Project ID:	PS131735						

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH03	38.80		Test type:	A										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	39.00		**Compliant test:	Yes												
Lab sample ID	LPER2022080137		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.86										0.86		
	Method:	-	Defect orientation	180°										-	-	-
Moisture content			Is [MPa]	0.12										0.12		
Moisture content type:			Is ₍₅₀₎ [MPa]	0.15										0.15		
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			

Exploratory hole reference	Sample depth (m)	Specimen reference	Sub-specimen:	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	Location test conducted:	Laboratory	
CPCB-BH03	38.80		Test type:	D										Mean values: Calculation excludes specimens which are not compliant with the tolerances specified in the test method		
	39.00		**Compliant test:	Yes												
Lab sample ID	LPER2022080137		Failure mode	M										Axial	Diametral	Irregular
Sampling	By	Date:	Failure load [kN]	0.53											0.53	
	Method:	-	Defect orientation	90°										-	-	-
Moisture content			Is [MPa]	0.095											0.095	
Moisture content type:			Is ₍₅₀₎ [MPa]	0.11											0.11	
Density (t/m ³)	As received	Dry	Lithological description	SANDSTONE								History:	Test performed on samples submitted to the laboratory.			
													Client ref.:			

Definitions: Test types: A = Axial, D = Diametral, L = Lump / Irregular n/a = Not applicable, ND = Not determined ** A non compliant test = platen gap at failure being outside of the tolerance of the method
 Failure modes: B = Along bedding plane, M = Through rock matrix, J = Along joint, W = Along a plane of weakness, DF = Didn't Fail

Cert. ref.:	PS131735_TRP22-0095_PtLd_22080137 - 22080137_Rep-22083612	Specimens prepared by:	sw	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth	Tests performed by:	sw 03/08/22		
	Accredited for compliance with ISO/IEC 17025 - Testing	Results reviewed by:	PKent		
	THIS DOCUMENT SHALL ONLY BE REPRODUCED IN FULL	Date reported:	11/08/2022		Paul Kent - Laboratory Manager

Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Soils testing - Particle size distribution & consistency limits test report

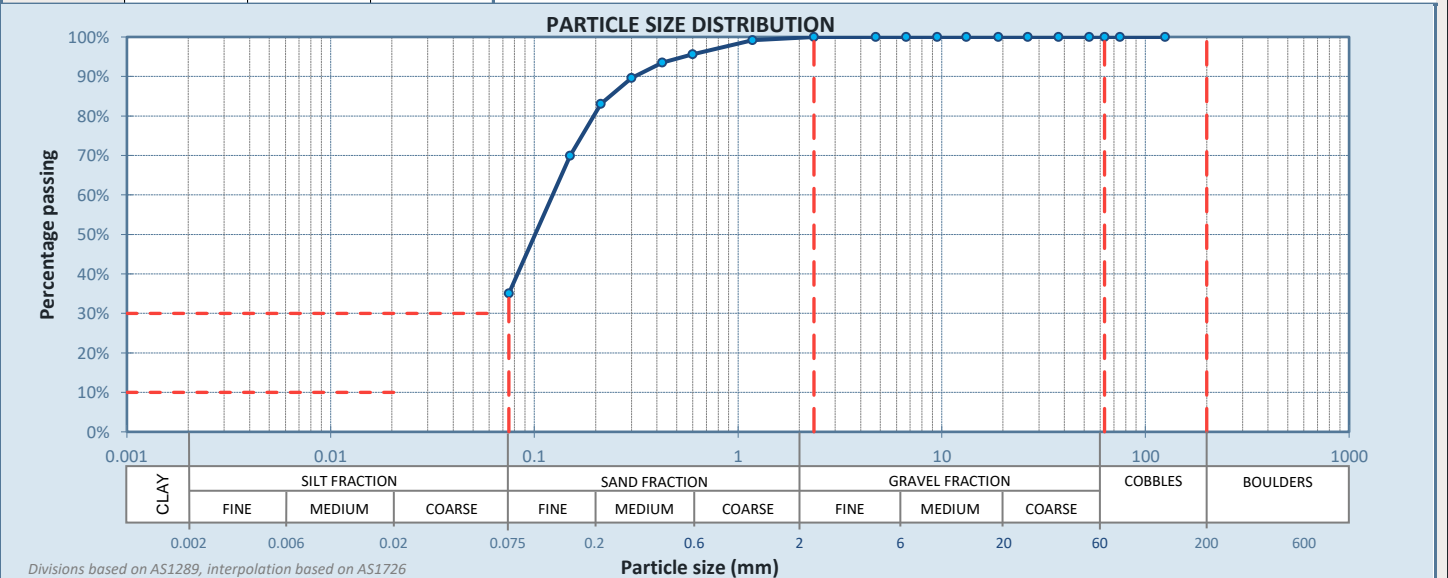


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0095	Specimen ID:	LPER202208010	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735	Exploratory Hole		Sample depth (m): 6.50 - 6.95
Project name:	Causeway Footbridge Swan River	CPCB-BH01		Client sample ref:
Project reference:		Loc. ref.:		Perth, WA

Specimen description:				Sampling: Tested as received						
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(CH/MH) Sandy CLAY/SILT, high plasticity, dark grey, fine to coarse grained sand.						
Sieve Size	Passing	LB S	UB S	Easting (m)	Northing (m)	Level (m)				
125 mm	100%			Method: AS 1289.2.1.1 AS 1289.3.1.2 AS 1289.3.2.1 AS 1289.3.3.1 AS 1289.3.4.1						
75 mm	100%			Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking	
63 mm	100%			Result:	65.0% As Rcvd.	62%	31%	31%	9.5%	None
53 mm	100%			LB S:					-	
37.5 mm	100%			UB S:					-	
26.5 mm	100%			Att. preparation method:	Dry sieved		LSM length (mm):	125		
19 mm	100%			Specimen history/notes:	Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory					
13.2 mm	100%			Definitions:	LB S = Lower bound specification LSM = Linear shrinkage mould UB S = Upper bound specification		N/A = Not applicable ND = Not determined; SIB = Slip in bowl NO = Not obtainable; NP = Non plastic			
9.5 mm	100%			GRADING SUMMARY						
6.7 mm	100%			Fines (<75 µm)	Sand* (>75 µm - <2.36 mm)	Gravel* (>2.36 mm - <63 mm)	Cobbles* (>63mm - <200 mm)			
4.75 mm	100%			35.1%	64.9%	0.0%	0.0%			
2.36 mm	100%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2						
1.18 mm	99%									
600 µm	96%									
425 µm	93%									
300 µm	90%									
212 µm	83%									
150 µm	70%									
75 µm	35%									



Testing by: DP Dates: 09/08/22 - 10/08/22 Results reviewed by: PKent Date reported: 11/08/2022

Cert. ref.:	PS131735_CPCB-BH01_TRP22-0095_PSD_2208010_Rep22083588	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth Accredited for compliance with ISO/IEC 17025 - Testing		Paul Kent - Laboratory Manager
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Soils testing - Particle size distribution & consistency limits test report

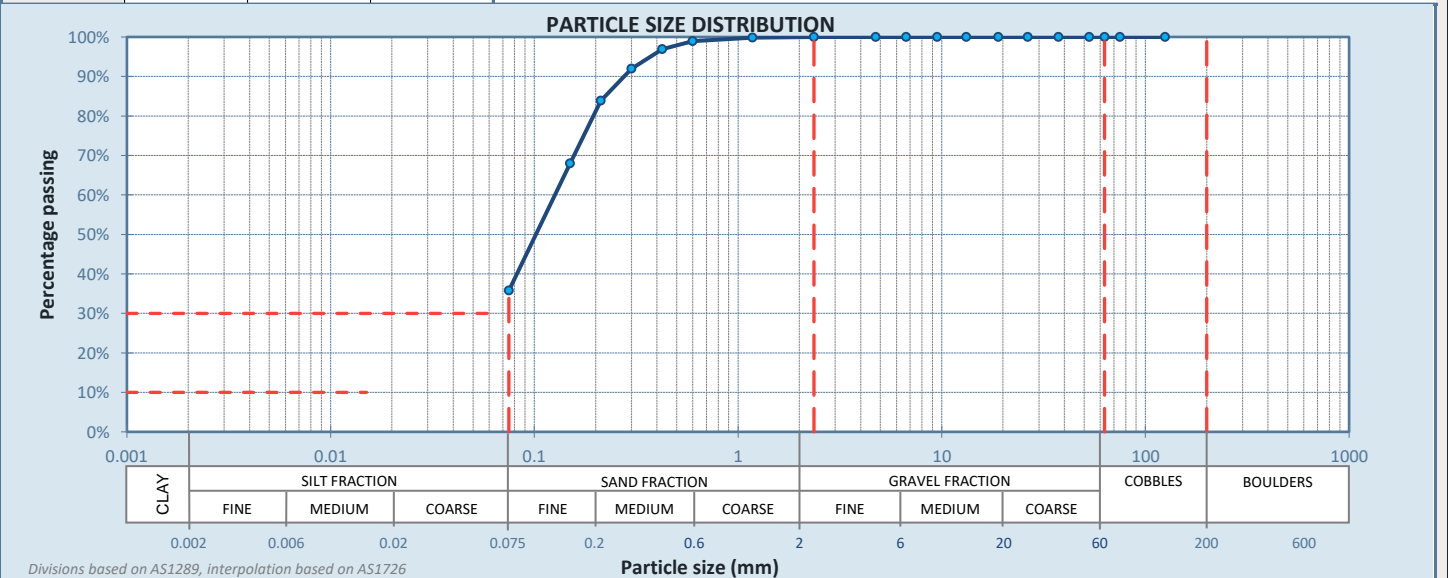


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0095	Specimen ID:	LPER202208014	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735		Exploratory Hole	Sample depth (m): 17.00 - 17.45
Project name:	Causeway Footbridge Swan River		CPCB-BH01	Client sample ref:
Project reference:			Loc. ref.:	Perth, WA

Specimen description:				Sampling: Tested as received											
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				Easting (m)		Northing (m)		Level (m)							
Sieve Size	Passing	LB S	UB S	Sandy SILT, non-plastic fines, greyish brown, fine to medium grained sand.											
125 mm	100%			Method:		AS 1289.2.1.1		AS 1289.3.1.2		AS 1289.3.2.1		AS 1289.3.3.1		AS 1289.3.4.1	
75 mm	100%			Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking						
63 mm	100%														
53 mm	100%			Result:	23.3% As Rcvd.	SIB	NP	ND							
37.5 mm	100%														
26.5 mm	100%			LB S:											
19 mm	100%			UB S:											
13.2 mm	100%			Att. preparation method:		Dry sieved		LSM length (mm):							
9.5 mm	100%			Specimen history/notes:	Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK										
6.7 mm	100%				Preparation of specimen and testing performed on sample supplied to the laboratory										
4.75 mm	100%			Definitions:	LB S = Lower bound specification			N/A = Not applicable							
2.36 mm	100%				LSM = Linear shrinkage mould			ND = Not determined; SIB = Slip in bowl							
1.18 mm	100%			UB S = Upper bound specification			NO = Not obtainable; NP = Non plastic								
600 µm	99%			GRADING SUMMARY											
425 µm	97%			Fines (<75 µm)		Sand* (>75 µm - <2.36 mm)		Gravel* (>2.36 mm - <63 mm)		Cobbles* (>63mm - <200 mm)					
300 µm	92%			35.8%		64.2%		0.0%		0.0%					
212 µm	84%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2											
150 µm	68%														
75 µm	36%														



Testing by: DP Dates: 09/08/22 - 09/08/22 Results reviewed by: PKent Date reported: 11/08/2022

Cert. ref.:	PS131735_CPCB-BH01_TRP22-0095_PSD_2208014_Rep22083589	Approved signatory:
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Soils testing - Particle size distribution & consistency limits test report

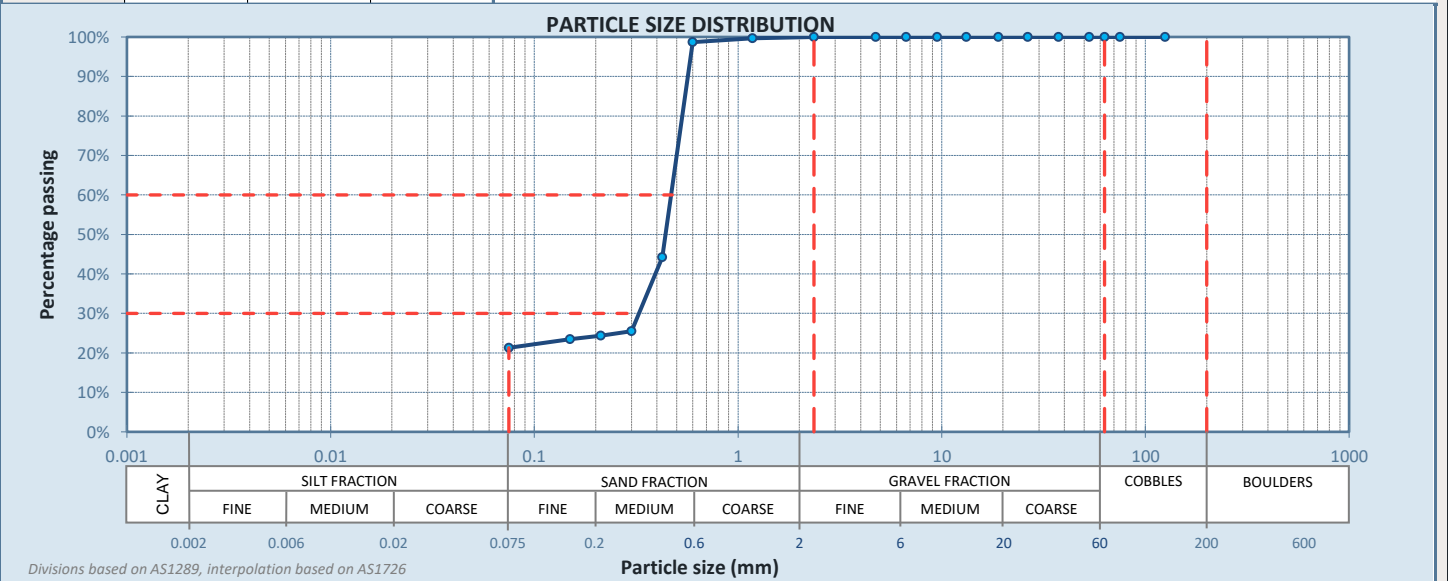


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0095	Specimen ID:	LPER202208015	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735		Exploratory Hole	Sample depth (m): 26.50 -
Project name:	Causeway Footbridge Swan River		CPCB-BH01	Client sample ref:
Project reference:		Loc. ref.:		Perth, WA

Specimen description:				Sampling: Tested as received						
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(SC) Clayey SAND, fine to medium grained, brownish grey, high plasticity.		Easting (m)	Northing (m)	Level (m)		
Sieve Size	Passing	LB S	UB S	Method:	AS 1289.2.1.1	AS 1289.3.1.2	AS 1289.3.2.1	AS 1289.3.3.1	AS 1289.3.4.1	
125 mm	100%			Moisture content	33.8% As Rcvd.	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking
75 mm	100%									
63 mm	100%			LB S:	-	-	-	-	-	
53 mm	100%									UB S:
37.5 mm	100%			Att. preparation method:		Dry sieved		LSM length (mm):		
26.5 mm	100%			Specimen history/notes:	Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory					
19 mm	100%				Definitions:	LB S = Lower bound specification			N/A = Not applicable	
13.2 mm	100%			LSM = Linear shrinkage mould		ND = Not determined; SIB = Slip in bowl				
9.5 mm	100%			UB S = Upper bound specification		NO = Not obtainable; NP = Non plastic				
6.7 mm	100%			GRADING SUMMARY						
4.75 mm	100%			Fines	Sand*	Gravel*	Cobbles*			
2.36 mm	100%			(<75 µm)	(>75 µm - <2.36 mm)	(>2.36 mm - <63 mm)	(>63mm - <200 mm)			
1.18 mm	100%			21.3%	78.7%	0.0%	0.0%			
600 µm	99%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2						
425 µm	44%									
300 µm	26%									
212 µm	24%									
150 µm	23%									
75 µm	21%									



Testing by: **DP** Dates: **12/08/22 - 13/08/22** Results reviewed by: **PKent** Date reported: **15/08/2022**

Cert. ref.:	PS131735_CPCB-BH01_TRP22-0095_PSD_2208015_Rep22083734	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth Accredited for compliance with ISO/IEC 17025 - Testing		
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Soils testing - Particle size distribution & consistency limits test report

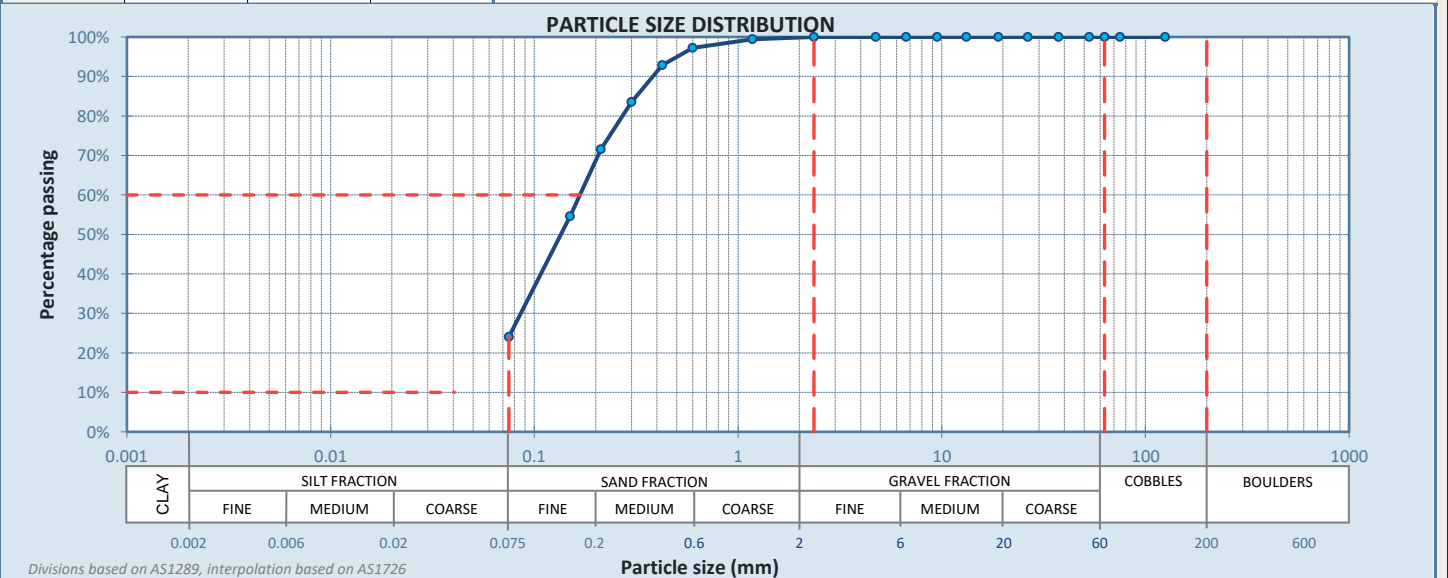


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0095	Specimen ID:	LPER202208016	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735	Exploratory Hole		Sample depth (m): 14.00 - 14.45
Project name:	Causeway Footbridge Swan River	CPCB-BH02		Client sample ref:
Project reference:		Loc. ref.:		Perth, WA

Specimen description:				Sampling: Tested as received					
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(SM) Silty SAND, fine to medium grained, dark grey, non-plastic fines.					
Sieve Size	Passing	LB S	UB S	Easting (m)	Northing (m)	Level (m)			
125 mm	100%			Method: AS 1289.2.1.1 AS 1289.3.1.2 AS 1289.3.2.1 AS 1289.3.3.1 AS 1289.3.4.1					
75 mm	100%			Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking
63 mm	100%			Result:	27.5% As Rcvd.	SIB	NP	ND	
53 mm	100%			LB S:					-
37.5 mm	100%			UB S:					-
26.5 mm	100%			Att. preparation method:		Dry sieved		LSM length (mm):	
19 mm	100%			Specimen history/notes: Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory					
13.2 mm	100%			Definitions:		LB S = Lower bound specification N/A = Not applicable LSM = Linear shrinkage mould ND = Not determined; SIB = Slip in bowl UB S = Upper bound specification NO = Not obtainable; NP = Non plastic			
9.5 mm	100%			GRADING SUMMARY					
6.7 mm	100%			Fines (<75 µm)	Sand* (>75 µm - <2.36 mm)	Gravel* (>2.36 mm - <63 mm)	Cobbles* (>63mm - <200 mm)		
4.75 mm	100%			24.1%	75.9%	0.0%	0.0%		
2.36 mm	100%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2					
1.18 mm	99%								
600 µm	97%								
425 µm	93%								
300 µm	84%								
212 µm	72%								
150 µm	55%								
75 µm	24%								



Testing by: dp Dates: 09/08/22 - 09/08/22 Results reviewed by: SWai Date reported: 11/08/2022

Cert. ref.:	PS131735_CPCB-BH02_TRP22-0095_PSD_2208016_Rep22083590	Approved signatory:
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Soils testing - Particle size distribution & consistency limits test report

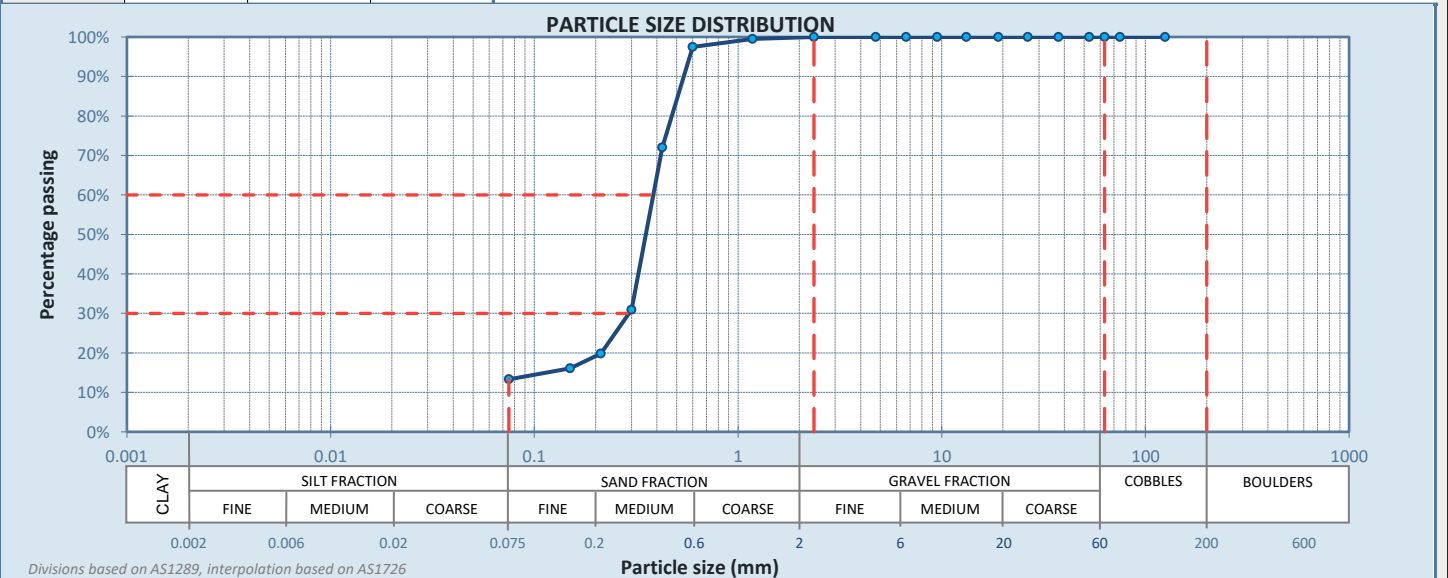


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0095	Specimen ID:	LPER202208017	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735		Exploratory Hole	Sample depth (m): 21.50 - 21.95
Project name:	Causeway Footbridge Swan River		CPCB-BH02	Client sample ref:
Project reference:		Loc. ref.:		Perth, WA

Specimen description:				Sampling: Tested as received							
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(SM) Silty SAND, fine to medium grained, yellowish brown, non-plastic fines.		Easting (m)	Northing (m)	Level (m)			
Sieve Size	Passing	LB S	UB S	Method:	AS 1289.2.1.1	AS 1289.3.1.2	AS 1289.3.2.1	AS 1289.3.3.1	AS 1289.3.4.1		
125 mm	100%			Moisture content	27.4% As Rcvd.	1 point Liquid limit SIB	Plastic limit NP	Plasticity index ND	Linear shrinkage	Curling/ Crumbling/ Cracking	
75 mm	100%										
63 mm	100%			Result:	27.4% As Rcvd.	SIB	NP	ND			
53 mm	100%										
37.5 mm	100%			LB S:						-	
26.5 mm	100%										
19 mm	100%			UB S:						-	
13.2 mm	100%										
9.5 mm	100%			Att. preparation method:		Dry sieved		LSM length (mm):			
6.7 mm	100%			Specimen history/notes:	Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory						
4.75 mm	100%				Definitions:	LB S = Lower bound specification			N/A = Not applicable		
2.36 mm	100%			GRADING SUMMARY		LSM = Linear shrinkage mould			ND = Not determined; SIB = Slip in bowl		
1.18 mm	100%				Fines (<75 µm)	UB S = Upper bound specification		NO = Not obtainable; NP = Non plastic			
600 µm	97%			Sand* (>75 µm - <2.36 mm)		Gravel* (>2.36 mm - <63 mm)		Cobbles* (>63mm - <200 mm)			
425 µm	72%			13.3%		86.7%		0.0%		0.0%	
300 µm	31%										*Proportions based on guidance in AS1726-2017 Section 6.1.4.2
212 µm	20%										
150 µm	16%										
75 µm	13%										



Testing by: DP Dates: 09/08/22 - 09/08/22 Results reviewed by: SWai Date reported: 11/08/2022

Cert. ref.:	PS131735_CPCB-BH02_TRP22-0095_PSD_2208017_Rep22083591	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth Accredited for compliance with ISO/IEC 17025 - Testing		Paul Kent - Laboratory Manager
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Soils testing - Particle size distribution & consistency limits test report

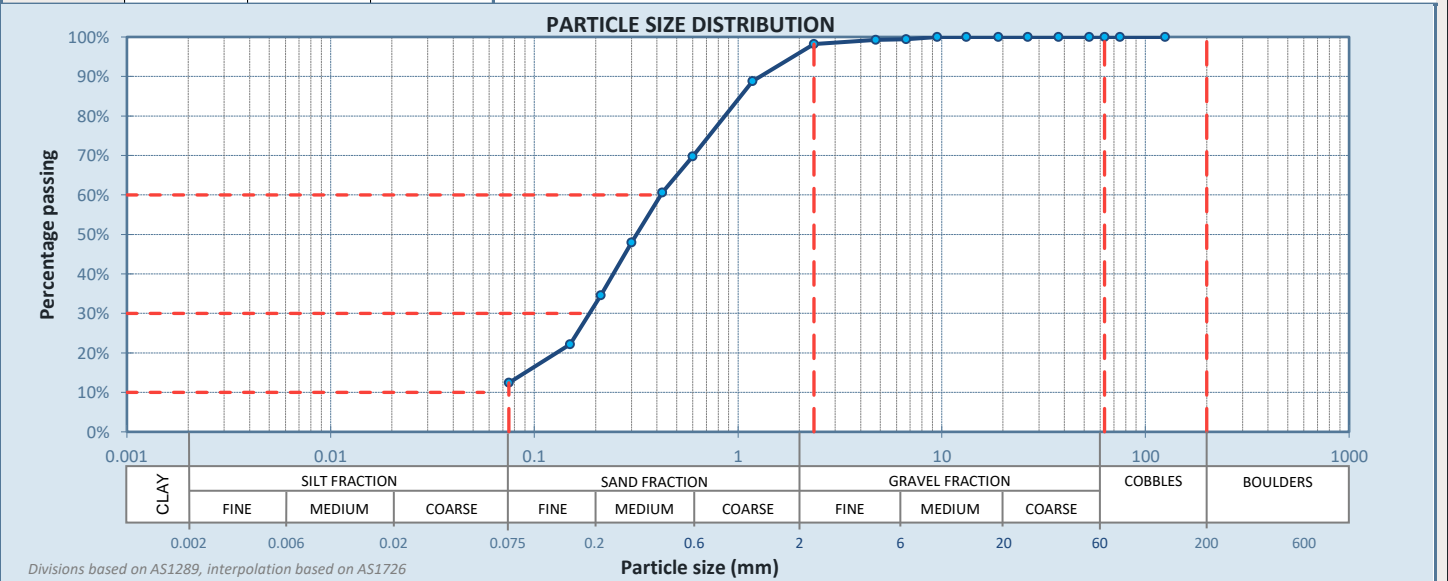


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0095	Specimen ID:	LPER202208018	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735		Exploratory Hole	Sample depth (m): 24.50 - 24.95
Project name:	Causeway Footbridge Swan River		CPCB-BH02	Client sample ref:
Project reference:			Loc. ref.:	Perth, WA

Specimen description:				Sampling: Tested as received			
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(SM) Silty SAND, fine to coarse grained, brownish grey, non-plastic fines.			
Sieve Size	Passing	LB S	UB S	Easting (m)	Northing (m)	Level (m)	
125 mm	100%			Method: AS 1289.2.1.1 AS 1289.3.1.2 AS 1289.3.2.1 AS 1289.3.3.1 AS 1289.3.4.1			
75 mm	100%			Moisture content	1 point Liquid limit	Plastic limit	Plasticity index
63 mm	100%			Result: 24.6%	SIB	NP	ND
53 mm	100%			LB S:			-
37.5 mm	100%			UB S:			-
26.5 mm	100%			Att. preparation method: Dry sieved		LSM length (mm):	
19 mm	100%			Specimen history/notes: Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory			
13.2 mm	100%			Definitions: LB S = Lower bound specification N/A = Not applicable LSM = Linear shrinkage mould ND = Not determined; SIB = Slip in bowl UB S = Upper bound specification NO = Not obtainable; NP = Non plastic			
9.5 mm	100%			GRADING SUMMARY			
6.7 mm	99%			Fines (<75 µm)	Sand* (>75 µm - <2.36 mm)	Gravel* (>2.36 mm - <63 mm)	Cobbles* (>63mm - <200 mm)
4.75 mm	99%			12.4%	85.8%	1.8%	0.0%
2.36 mm	98%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2			
1.18 mm	89%						
600 µm	70%						
425 µm	61%						
300 µm	48%						
212 µm	35%						
150 µm	22%						
75 µm	12%						



Testing by: JO Dates: 09/08/22 - 09/08/22 Results reviewed by: SWai Date reported: 11/08/2022

Cert. ref.:	PS131735_CPCB-BH02_TRP22-0095_PSD_2208018_Rep22083592	Approved signatory:
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Soils testing - Particle size distribution & consistency limits test report

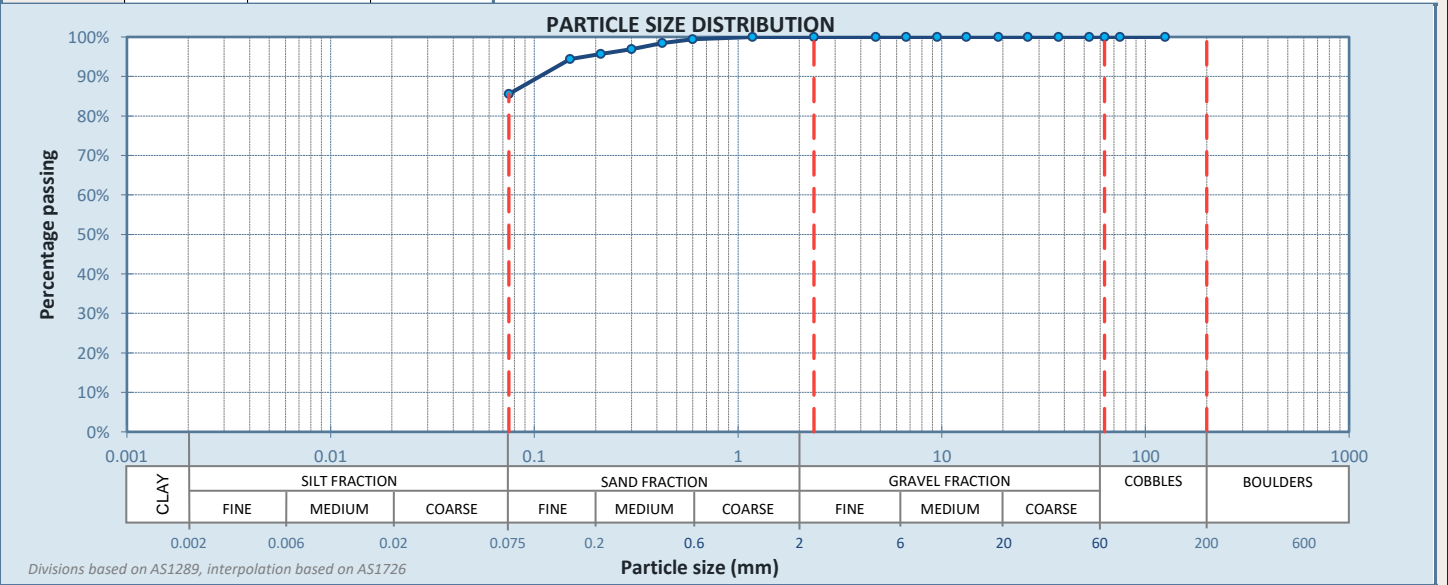


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0095	Specimen ID:	LPER202208019	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735	Exploratory Hole		Sample depth (m): 3.50 - 3.95
Project name:	Causeway Footbridge Swan River	CPCB-BH03		Client sample ref:
Project reference:		Loc. ref.:		Perth, WA

Specimen description:				Sampling: Tested as received						
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(CH) CLAY, high plasticity, dark grey, trace of fine to medium grained sand.						
Sieve Size	Passing	LB S	UB S	Easting (m)	Northing (m)	Level (m)				
125 mm	100%			Method: AS 1289.2.1.1 AS 1289.3.1.2 AS 1289.3.2.1 AS 1289.3.3.1 AS 1289.3.4.1						
75 mm	100%			Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking	
63 mm	100%			Result:	84.0% As Rcvd.	65%	26%	39%	13.0%	None
53 mm	100%			LB S:					-	
37.5 mm	100%			UB S:					-	
26.5 mm	100%			Att. preparation method:		Dry sieved		LSM length (mm):		125
19 mm	100%			Specimen history/notes: Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory						
13.2 mm	100%			Definitions: LB S = Lower bound specification N/A = Not applicable LSM = Linear shrinkage mould ND = Not determined; SIB = Slip in bowl UB S = Upper bound specification NO = Not obtainable; NP = Non plastic						
9.5 mm	100%			GRADING SUMMARY						
6.7 mm	100%			Fines	Sand*	Gravel*	Cobbles*			
4.75 mm	100%			(<75 µm)	(>75 µm - <2.36 mm)	(>2.36 mm - <63 mm)	>63mm - <200 mm)			
2.36 mm	100%			85.5%	14.5%	0.0%	0.0%			
1.18 mm	100%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2						
600 µm	99%									
425 µm	98%									
300 µm	97%									
212 µm	96%									
150 µm	94%									
75 µm	86%									



Testing by: DP Dates: 10/08/22 - 10/08/22 Results reviewed by: PKent Date reported: 11/08/2022

Cert. ref.:	PS131735_CPCB-BH03_TRP22-0095_PSD_2208019_Rep22083593	Approved signatory:
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Soils testing - Particle size distribution & consistency limits test report

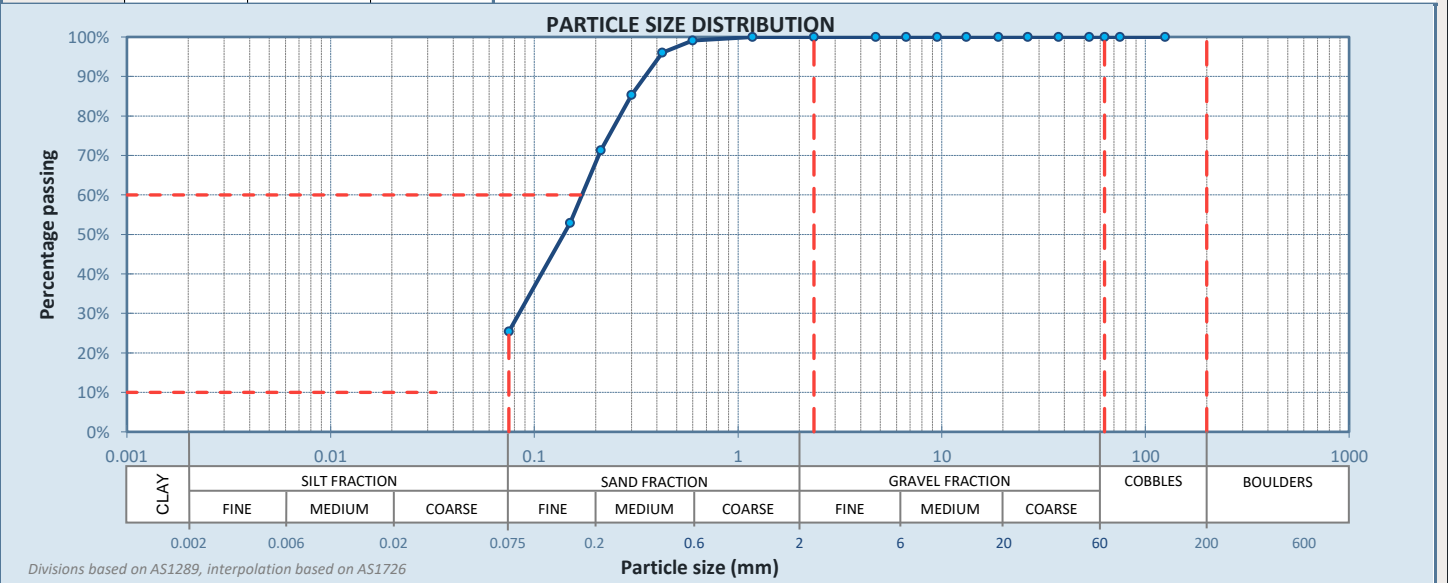


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0095	Specimen ID:	LPER2022080110	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735	Exploratory Hole		Sample depth (m): 12.50 - 12.95
Project name:	Causeway Footbridge Swan River	CPCB-BH03		Client sample ref:
Project reference:		Loc. ref.:		Perth, WA

Specimen description:				Sampling: Tested as received						
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(SM) Silty SAND, fine to medium grained, greyish brown, non-plastic fines.		Easting (m)	Northing (m)	Level (m)		
Sieve Size	Passing	LB S	UB S	Method:	AS 1289.2.1.1	AS 1289.3.1.2	AS 1289.3.2.1	AS 1289.3.3.1	AS 1289.3.4.1	
125 mm	100%			Moisture content	24.0% As Rcvd.	1 point Liquid limit SIB	Plastic limit NP	Plasticity index ND	Linear shrinkage	Curling/ Crumbling/ Cracking
75 mm	100%									
63 mm	100%			Result:	24.0% As Rcvd.	SIB	NP	ND		
53 mm	100%									
37.5 mm	100%			LB S:						-
26.5 mm	100%									
19 mm	100%			UB S:						-
13.2 mm	100%									
9.5 mm	100%			Att. preparation method:		Dry sieved		LSM length (mm):		
6.7 mm	100%			Specimen history/notes:	Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory					
4.75 mm	100%									
2.36 mm	100%			Definitions:	LB S = Lower bound specification			N/A = Not applicable		
1.18 mm	100%									
600 µm	99%			LSM = Linear shrinkage mould			ND = Not determined; SIB = Slip in bowl			
425 µm	96%			UB S = Upper bound specification			NO = Not obtainable; NP = Non plastic			
300 µm	85%			GRADING SUMMARY						
212 µm	71%			Fines (<75 µm)	Sand* (>75 µm - <2.36 mm)	Gravel* (>2.36 mm - <63 mm)	Cobbles* (>63mm - <200 mm)			
150 µm	53%			25.4%	74.6%	0.0%	0.0%			
75 µm	25%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2						



Testing by: DP Dates: 06/08/22 - 09/08/22 Results reviewed by: SWai Date reported: 11/08/2022

Cert. ref.:	PS131735_CPCB-BH03_TRP22-0095_PSD_22080110_Rep22083594	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth Accredited for compliance with ISO/IEC 17025 - Testing		Paul Kent - Laboratory Manager
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Soils testing - Particle size distribution & consistency limits test report

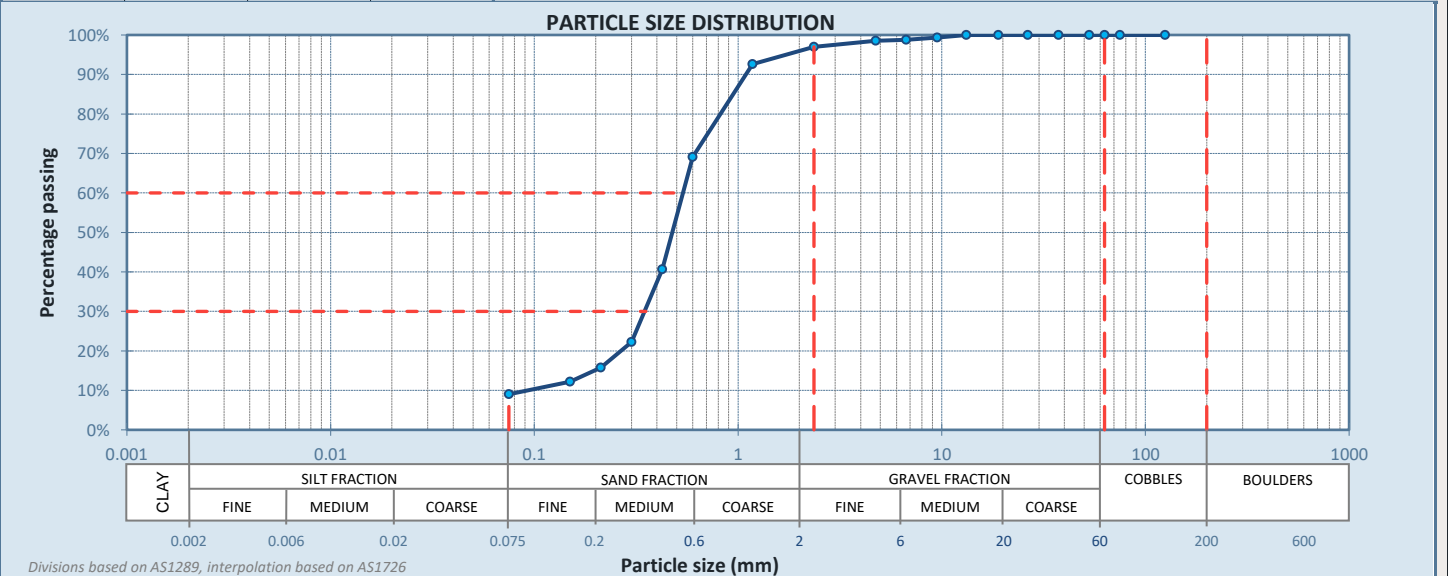


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0095	Specimen ID:	LPER2022080111	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735		Exploratory Hole	Sample depth (m): 23.00 - 23.45
Project name:	Causeway Footbridge Swan River		CPCB-BH03	Client sample ref:
Project reference:			Loc. ref.:	Perth, WA

Specimen description:				Sampling: Tested as received					
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(SP-SM) SAND with silt, fine to coarse grained, greyish yellow, non-plastic fines, trace of fine grained gravel.					
Sieve Size	Passing	LB S	UB S	Easting (m)	Northing (m)	Level (m)			
125 mm	100%			Method: AS 1289.2.1.1 AS 1289.3.1.2 AS 1289.3.2.1 AS 1289.3.3.1 AS 1289.3.4.1					
75 mm	100%			Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking
63 mm	100%								
53 mm	100%			Result:	SIB	NP	ND		
37.5 mm	100%								
26.5 mm	100%			LB S:					-
19 mm	100%			UB S:					-
13.2 mm	100%			Att. preparation method: Dry sieved		LSM length (mm):			
9.5 mm	99%			Specimen history/notes: Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory					
6.7 mm	99%								
4.75 mm	98%			Definitions: LB S = Lower bound specification N/A = Not applicable LSM = Linear shrinkage mould ND = Not determined; SIB = Slip in bowl UB S = Upper bound specification NO = Not obtainable; NP = Non plastic					
2.36 mm	97%								
1.18 mm	93%			GRADING SUMMARY					
600 µm	69%								
425 µm	41%			Fines	Sand*	Gravel*	Cobbles*		
300 µm	22%			(<75 µm)	(>75 µm - <2.36 mm)	(>2.36 mm - <63 mm)	(>63mm - <200 mm)		
212 µm	16%			9.0%	88.0%	3.0%	0.0%		
150 µm	12%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2					
75 µm	9%								



Testing by: DP Dates: 06/08/22 - 09/08/22 Results reviewed by: SWai Date reported: 11/08/2022

Cert. ref.:	PS131735_CPCB-BH03_TRP22-0095_PSD_22080111_Rep22083595	Approved signatory:
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Soils testing - Particle size distribution & consistency limits test report

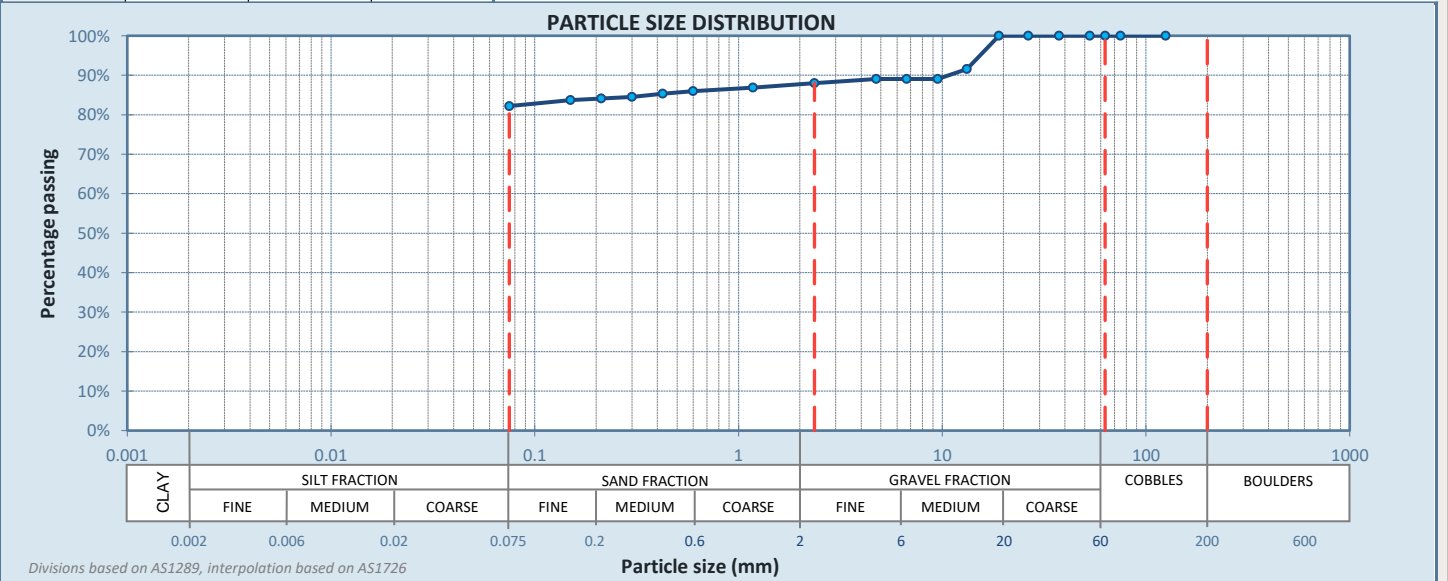


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0093	Specimen ID:	LPER202207197	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735		Exploratory Hole	Sample depth (m): 5.00 - 5.45
Project name:	Causeway Footbridge Swan River		CPCB-BH04	Client sample ref:
Project reference:		Loc. ref.:		Perth, WA

Specimen description:				Sampling: Tested as received							
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(CH) CLAY, high plasticity, dark grey, trace of fine to medium grained sand, trace of gravel/shell fragments.							
Sieve Size	Passing	LB S	UB S	Easting (m)	Northing (m)	Level (m)					
125 mm	100%			Method: AS 1289.2.1.1 AS 1289.3.1.2 AS 1289.3.2.1 AS 1289.3.3.1 AS 1289.3.4.1							
75 mm	100%			Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking		
63 mm	100%										
53 mm	100%			Result:	79%	33%	46%	15.0%	Cracking		
37.5 mm	100%										
26.5 mm	100%			LB S:					-		
19 mm	100%			UB S:					-		
13.2 mm	92%			Att. preparation method: Dry sieved		LSM length (mm):		125			
9.5 mm	89%			Specimen history/notes: Specimen mass does not comply with AS1289.1.1 Clause 5.7 Table 1, insufficient sample provided to laboratory Preparation of specimen and testing performed on sample supplied to the laboratory							
6.7 mm	89%			Definitions: LB S = Lower bound specification N/A = Not applicable LSM = Linear shrinkage mould ND = Not determined; SIB = Slip in bowl UB S = Upper bound specification NO = Not obtainable; NP = Non plastic							
4.75 mm	89%			GRADING SUMMARY							
2.36 mm	88%			Fines (<75 µm)		Sand* (>75 µm - <2.36 mm)		Gravel* (>2.36 mm - <63 mm)		Cobbles* (>63mm - <200 mm)	
1.18 mm	87%			82.2%		5.8%		12.0%		0.0%	
600 µm	86%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2							
425 µm	85%										
300 µm	84%										
212 µm	84%										
150 µm	84%										
75 µm	82%										



Testing by: **DP** Dates: **10/08/22 - 10/08/22** Results reviewed by: **PKent** Date reported: **11/08/2022**

Cert. ref.:	PS131735_CPCB-BH04_TRP22-0093_PSD_2207197_Rep22083617	Approved signatory:
	NATA accreditation number: 1961 - Site:1598 - Perth Accredited for compliance with ISO/IEC 17025 - Testing	
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Soils testing - Particle size distribution & consistency limits test report

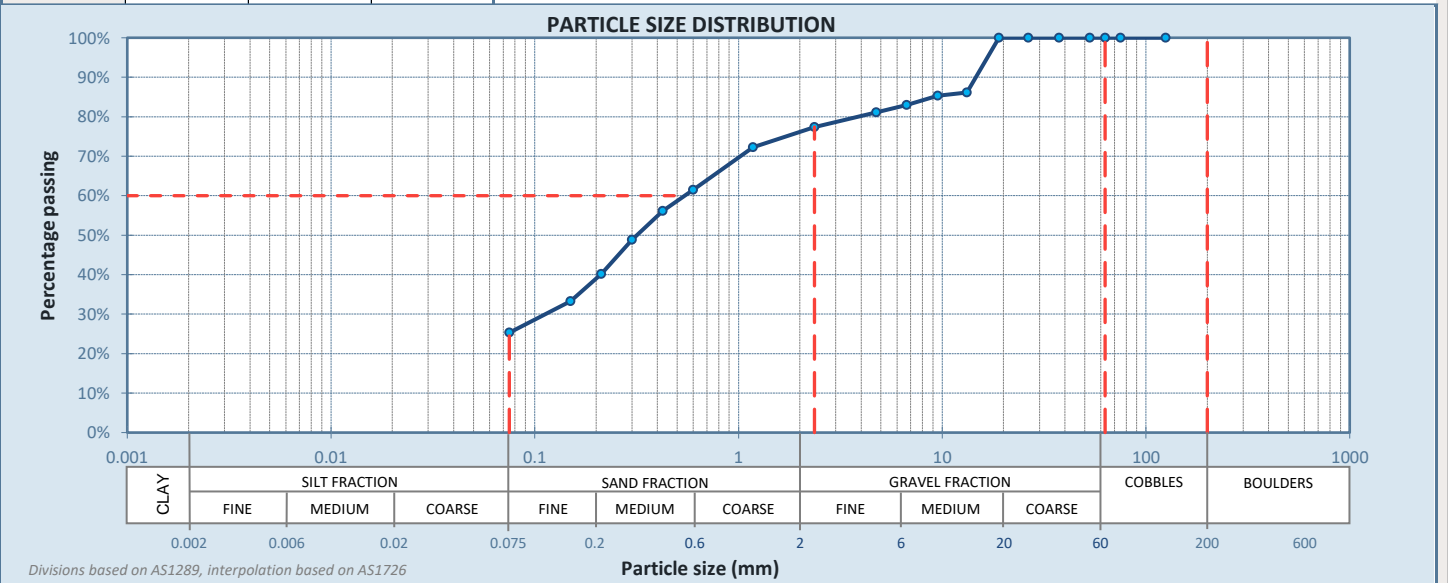


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0093	Specimen ID:	LPER202207198	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735		Exploratory Hole	Sample depth (m): 23.00 - 23.45
Project name:	Causeway Footbridge Swan River		CPCB-BH04	Client sample ref:
Project reference:		Loc. ref.:		Perth, WA

Specimen description:				Sampling: Tested as received						
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				Easting (m)		Northing (m)		Level (m)		
Sieve Size	Passing	LB S	UB S	(SC) Clayey SAND, with gravel, fine to coarse grained, greyish orange, low to medium plasticity, fine to medium grained gravel.						
125 mm	100%			Method:	AS 1289.2.1.1	AS 1289.3.1.2	AS 1289.3.2.1	AS 1289.3.3.1	AS 1289.3.4.1	
75 mm	100%			Moisture content	1 point	Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking
63 mm	100%			Result:	16.3%	35%	13%	22%	6.5%	None
53 mm	100%			LB S:						-
37.5 mm	100%			UB S:						-
26.5 mm	100%			Att. preparation method:	Dry sieved			LSM length (mm):	125	
19 mm	100%			Specimen history/notes:	Specimen mass does not comply with AS1289.1.1 Clause 5.7 Table 1, insufficient sample provided to laboratory Preparation of specimen and testing performed on sample supplied to the laboratory					
13.2 mm	86%			Definitions:	LB S = Lower bound specification LSM = Linear shrinkage mould UB S = Upper bound specification			N/A = Not applicable ND = Not determined; SIB = Slip in bowl NO = Not obtainable; NP = Non plastic		
9.5 mm	85%			GRADING SUMMARY						
6.7 mm	83%			Fines	Sand*		Gravel*		Cobbles*	
4.75 mm	81%			(<75 µm)	(>75 µm - <2.36 mm)		(>2.36 mm - <63 mm)		(>63mm - <200 mm)	
2.36 mm	77%			25.3%	52.1%		22.6%		0.0%	
1.18 mm	72%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2						
600 µm	61%									
425 µm	56%									
300 µm	49%									
212 µm	40%									
150 µm	33%									
75 µm	25%									



Testing by: **DP** Dates: **09/08/22 - 09/08/22** Results reviewed by: **PKent** Date reported: **11/08/2022**

Cert. ref.:	PS131735_CPCB-BH04_TRP22-0093_PSD_2207198_Rep22083618	Approved signatory:	
	NATA accreditation number: 1961 - Site:1598 - Perth Accredited for compliance with ISO/IEC 17025 - Testing		
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

These tests were carried out in accordance with the Australian standards identified in this certificate.
Test results relate only to the specimens tested.

Soils testing - Particle size distribution & consistency limits test report

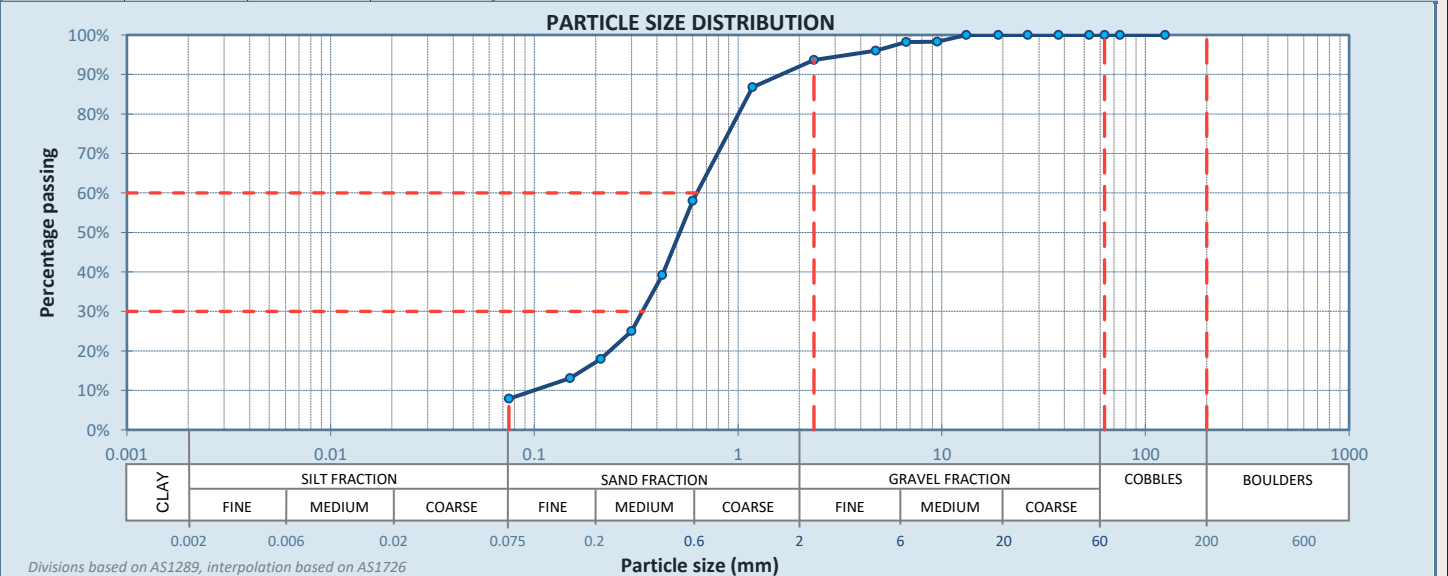


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0095	Specimen ID:	LPER2022080113	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735		Exploratory Hole	Sample depth (m): 17.00 - 17.45
Project name:	Causeway Footbridge Swan River		CPCB-BH05	Client sample ref:
Project reference:			Loc. ref.:	Perth, WA

Specimen description:				Sampling: Tested as received					
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(SP-SM) SAND with silt, fine to coarse grained, pale brown, non-plastic fines, trace of fine to medium gravel.					
Sieve Size	Passing	LB S	UB S	Easting (m)	Northing (m)	Level (m)			
125 mm	100%			Method: AS 1289.2.1.1 AS 1289.3.1.2 AS 1289.3.2.1 AS 1289.3.3.1 AS 1289.3.4.1					
75 mm	100%			Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking
63 mm	100%								
53 mm	100%			Result:	18.6% As Rcvd.	SIB	NP	ND	
37.5 mm	100%								
26.5 mm	100%			LB S:					-
19 mm	100%			UB S:					-
13.2 mm	100%			Att. preparation method:		Dry sieved		LSM length (mm):	
9.5 mm	98%			Specimen history/notes: Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory					
6.7 mm	98%								
4.75 mm	96%			Definitions: LB S = Lower bound specification N/A = Not applicable LSM = Linear shrinkage mould ND = Not determined; SIB = Slip in bowl UB S = Upper bound specification NO = Not obtainable; NP = Non plastic					
2.36 mm	94%								
1.18 mm	87%			GRADING SUMMARY					
600 µm	58%								
425 µm	39%			Fines	Sand*	Gravel*	Cobbles*		
300 µm	25%			(<75 µm)	(>75 µm - <2.36 mm)	(>2.36 mm - <63 mm)	(>63mm - <200 mm)		
212 µm	18%			7.9%	85.8%	6.3%	0.0%		
150 µm	13%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2					
75 µm	8%								



Testing by: DP Dates: 06/08/22 - 08/08/22 Results reviewed by: SWai Date reported: 11/08/2022

Cert. ref.:	PS131735_CPCB-BH05_TRP22-0095_PSD_22080113_Rep22083596	Approved signatory:
	NATA accreditation number: 1961 - Site:1598 - Perth Accredited for compliance with ISO/IEC 17025 - Testing	 Paul Kent - Laboratory Manager
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Soils testing - Particle size distribution & consistency limits test report

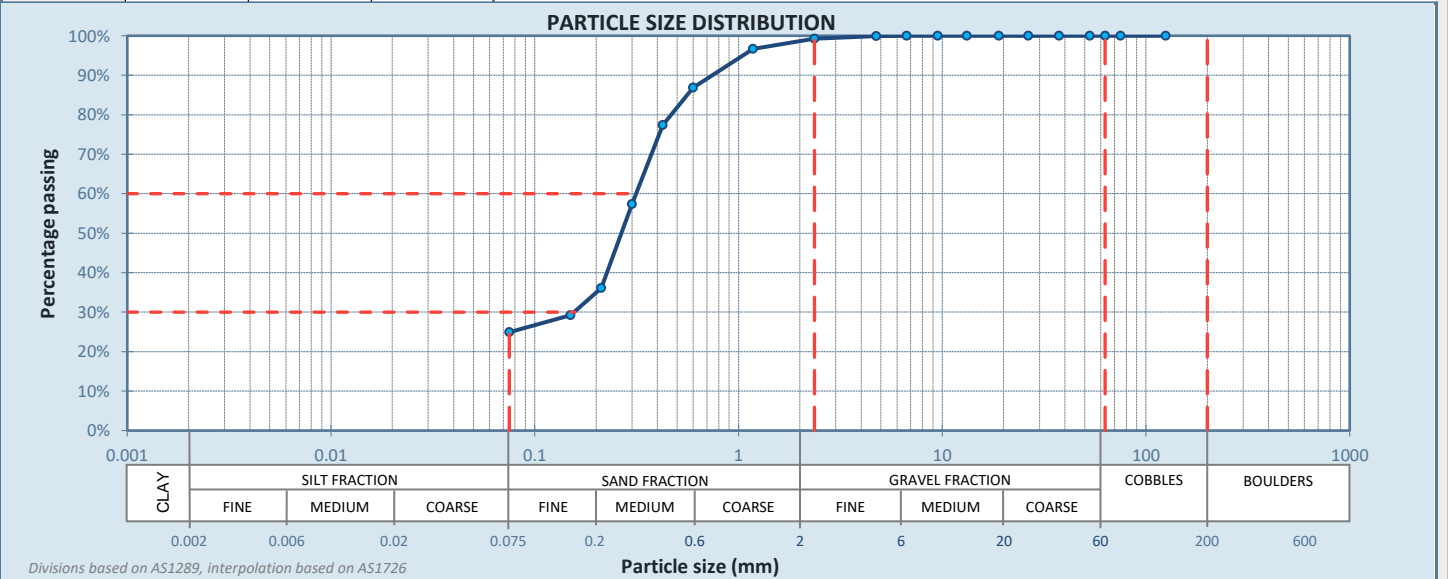


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0093	Specimen ID:	LPER202207196	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735		Exploratory Hole	Sample depth (m): 30.50 - 30.95
Project name:	Causeway Footbridge Swan River		CPCB-BH06	Client sample ref:
Project reference:		Loc. ref.:		Perth, WA

Specimen description:				Sampling: Tested as received			
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(SC) Clayey SAND, fine to coarse grained, dark grey, low plasticity, trace of fine grained gravel.			
Sieve Size	Passing	LB S	UB S	Easting (m)	Northing (m)	Level (m)	
125 mm	100%			Method: AS 1289.2.1.1 AS 1289.3.1.2 AS 1289.3.2.1 AS 1289.3.3.1 AS 1289.3.4.1			
75 mm	100%			Moisture content	1 point Liquid limit	Plastic limit	Plasticity index
63 mm	100%			Result: 29.6% As Rcvd.	24%	13%	11%
53 mm	100%			LB S:			
37.5 mm	100%			UB S:			
26.5 mm	100%			Att. preparation method: Dry sieved		LSM length (mm): 125	
19 mm	100%			Specimen history/notes: Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory			
13.2 mm	100%			Definitions: LB S = Lower bound specification N/A = Not applicable LSM = Linear shrinkage mould ND = Not determined; SIB = Slip in bowl UB S = Upper bound specification NO = Not obtainable; NP = Non plastic			
9.5 mm	100%			GRADING SUMMARY			
6.7 mm	100%			Fines (<75 µm)	Sand* (>75 µm - <2.36 mm)	Gravel* (>2.36 mm - <63 mm)	Cobbles* (>63mm - <200 mm)
4.75 mm	100%			24.9%	74.3%	0.8%	0.0%
2.36 mm	99%			<i>*Proportions based on guidance in AS1726-2017 Section 6.1.4.2</i>			
1.18 mm	97%						
600 µm	87%						
425 µm	77%						
300 µm	57%						
212 µm	36%						
150 µm	29%						
75 µm	25%						



Testing by: **DP** Dates: **09/08/22 - 09/08/22** Results reviewed by: **PKent** Date reported: **11/08/2022**

Cert. ref.:	PS131735_CPCB-BH06_TRP22-0093_PSD_2207196_Rep22083619	Approved signatory:	
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

These tests were carried out in accordance with the Australian standards identified in this certificate. Test results relate only to the specimens tested.

Soils testing - Particle size distribution & consistency limits test report

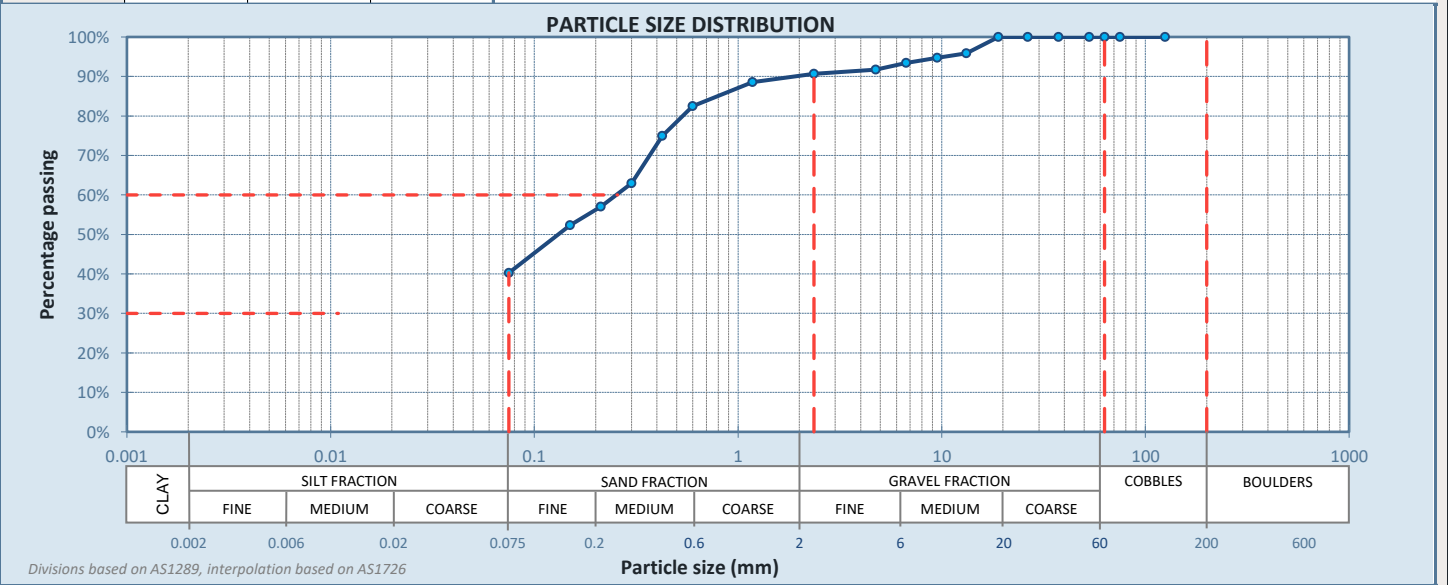


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0093	Specimen ID:	LPER202207191	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735		Exploratory Hole	Sample depth (m): 2.45 -
Project name:	Causeway Footbridge Swan River		CPCB-BH07	Client sample ref:
Project reference:			Loc. ref.:	Perth, WA

Specimen description:				Sampling: Tested as received						
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(CI) Sandy CLAY, medium plasticity, dark grey, fine to coarse grained sand, traces of shell fragments.						
Sieve Size	Passing	LB S	UB S	Easting (m)	Northing (m)	Level (m)				
125 mm	100%			Method: AS 1289.2.1.1 AS 1289.3.1.2 AS 1289.3.2.1 AS 1289.3.3.1 AS 1289.3.4.1						
75 mm	100%			Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking	
63 mm	100%			Result:	64.5% As Rcvd.	47%	24%	23%	9.0%	None
53 mm	100%			LB S:					-	
37.5 mm	100%			UB S:					-	
26.5 mm	100%			Att. preparation method:		Dry sieved		LSM length (mm):		125
19 mm	100%			Specimen history/notes: Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory						
13.2 mm	96%			Definitions: LB S = Lower bound specification N/A = Not applicable LSM = Linear shrinkage mould ND = Not determined; SIB = Slip in bowl UB S = Upper bound specification NO = Not obtainable; NP = Non plastic						
9.5 mm	95%			GRADING SUMMARY						
6.7 mm	93%			Fines (<75 µm)	Sand* (>75 µm - <2.36 mm)	Gravel* (>2.36 mm - <63 mm)	Cobbles* (>63mm - <200 mm)			
4.75 mm	92%			40.3%	50.4%	9.3%	0.0%			
2.36 mm	91%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2						
1.18 mm	89%									
600 µm	82%									
425 µm	75%									
300 µm	63%									
212 µm	57%									
150 µm	52%									
75 µm	40%									



Testing by: DP Dates: 12/08/22 - 13/08/22 Results reviewed by: PKent Date reported: 15/08/2022

Cert. ref.:	PS131735_CPCB-BH07_TRP22-0093_PSD_2207191_Rep22083731	Approved signatory:
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Soils testing - Particle size distribution & consistency limits test report

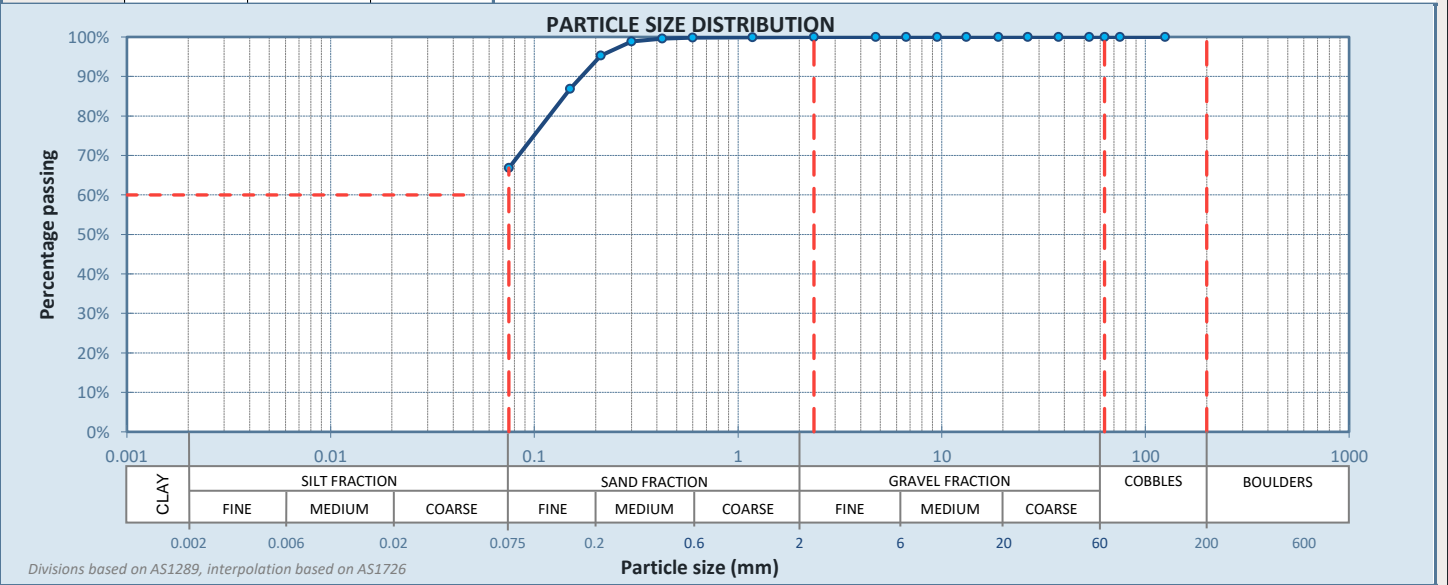


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0093	Specimen ID:	LPER202207192	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735	Exploratory Hole		Sample depth (m): 7.50 -
Project name:	Causeway Footbridge Swan River	CPCB-BH07		Client sample ref:
Project reference:		Loc. ref.:		Perth, WA

Specimen description:				Sampling: Tested as received						
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(CI) Sandy CLAY, medium plasticity, red brown, fine to coarse grained sand.						
Sieve Size	Passing	LB S	UB S	Easting (m)	Northing (m)	Level (m)				
125 mm	100%			Method: AS 1289.2.1.1 AS 1289.3.1.2 AS 1289.3.2.1 AS 1289.3.3.1 AS 1289.3.4.1						
75 mm	100%			Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking	
63 mm	100%			Result:	26.2% As Rcvd.	36%	14%	22%	8.0%	None
53 mm	100%			LB S:					-	
37.5 mm	100%			UB S:					-	
26.5 mm	100%			Att. preparation method:	Dry sieved		LSM length (mm):	125		
19 mm	100%			Specimen history/notes:	Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory					
13.2 mm	100%			Definitions:	LB S = Lower bound specification LSM = Linear shrinkage mould UB S = Upper bound specification		N/A = Not applicable ND = Not determined; SIB = Slip in bowl NO = Not obtainable; NP = Non plastic			
9.5 mm	100%			GRADING SUMMARY						
6.7 mm	100%			Fines (<75 µm)	Sand* (>75 µm - <2.36 mm)	Gravel* (>2.36 mm - <63 mm)	Cobbles* (>63mm - <200 mm)			
4.75 mm	100%			66.8%	33.2%	0.0%	0.0%			
2.36 mm	100%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2						
1.18 mm	100%									
600 µm	100%									
425 µm	100%									
300 µm	99%									
212 µm	95%									
150 µm	87%									
75 µm	67%									



Testing by: DP Dates: 12/08/22 - 13/08/22 Results reviewed by: PKent Date reported: 15/08/2022

Cert. ref.:	PS131735_CPCB-BH07_TRP22-0093_PSD_2207192_Rep22083733	Approved signatory:
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Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Soils testing - Particle size distribution & consistency limits test report

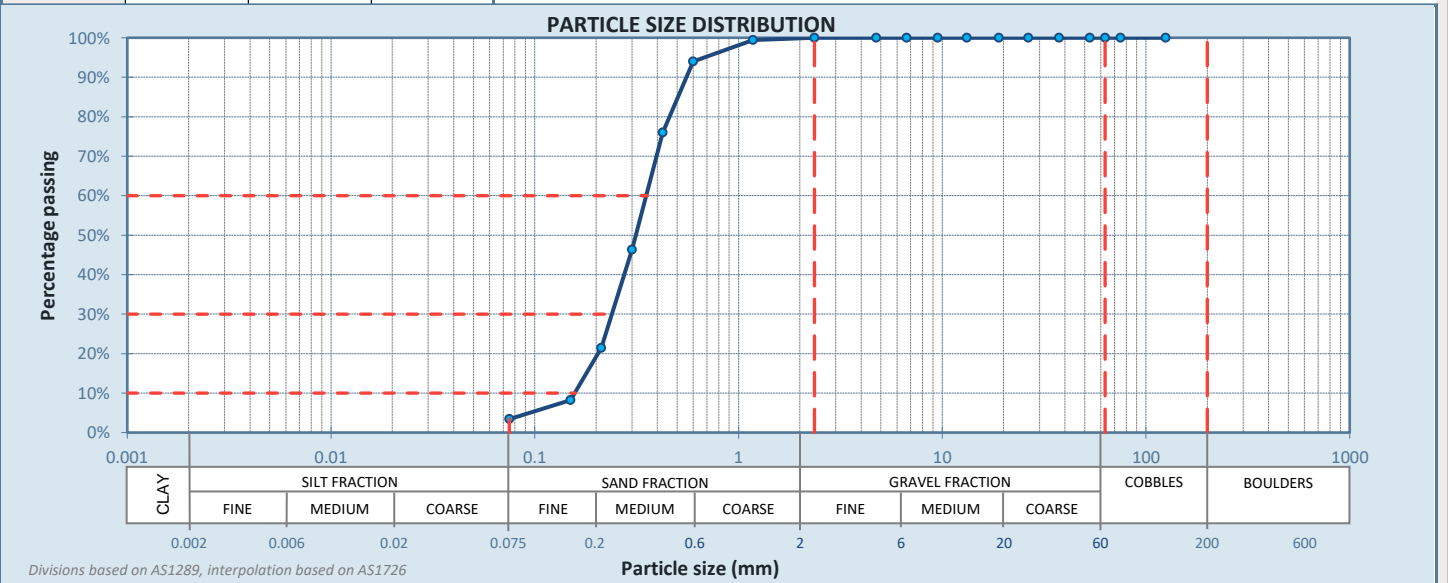


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0093	Specimen ID:	LPER202207193	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735		Exploratory Hole	Sample depth (m): 29.00 - 29.50
Project name:	Causeway Footbridge Swan River		CPCB-BH07	Client sample ref:
Project reference:		Loc. ref.:		Perth, WA

Specimen description:				Sampling: Tested as received						
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				Easting (m)		Northing (m)		Level (m)		
Sieve Size	Passing	LB S	UB S	(SP) SAND, trace of silt, fine to medium grained, grey, non-plastic fines.						
125 mm	100%			Method:	AS 1289.2.1.1	AS 1289.3.1.2	AS 1289.3.2.1	AS 1289.3.3.1	AS 1289.3.4.1	
75 mm	100%			Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking	
63 mm	100%									
53 mm	100%			Result:	22.1% As Rcvd.	SIB	NP	ND		
37.5 mm	100%			LB S:						
26.5 mm	100%			UB S:						
19 mm	100%			Att. preparation method:	Dry sieved		LSM length (mm):			
13.2 mm	100%			Specimen history/notes:	Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory					
9.5 mm	100%				Definitions:	LB S = Lower bound specification		N/A = Not applicable		
6.7 mm	100%			LSM = Linear shrinkage mould		ND = Not determined; SIB = Slip in bowl				
4.75 mm	100%			UB S = Upper bound specification		NO = Not obtainable; NP = Non plastic				
2.36 mm	100%			GRADING SUMMARY						
1.18 mm	99%			Fines (<75 µm)	Sand* (>75 µm - <2.36 mm)	Gravel* (>2.36 mm - <63 mm)	Cobbles* (>63mm - <200 mm)			
600 µm	94%			3.4%	96.6%	0.0%	0.0%			
425 µm	76%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2						
300 µm	46%									
212 µm	21%									
150 µm	8%									
75 µm	3%									



Testing by: **DP** Dates: **03/08/22 - 08/08/22** Results reviewed by: **PKent** Date reported: **11/08/2022**

Cert. ref.:	PS131735_CPCB-BH07_TRP22-0093_PSD_2207193_Rep22083620	Approved signatory:
	NATA accreditation number: 1961 - Site:1598 - Perth Accredited for compliance with ISO/IEC 17025 - Testing	
	THIS DOCUMENT SHALL ONLY BE REPRODUCED IN FULL	

Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

Soils testing - Particle size distribution & consistency limits test report

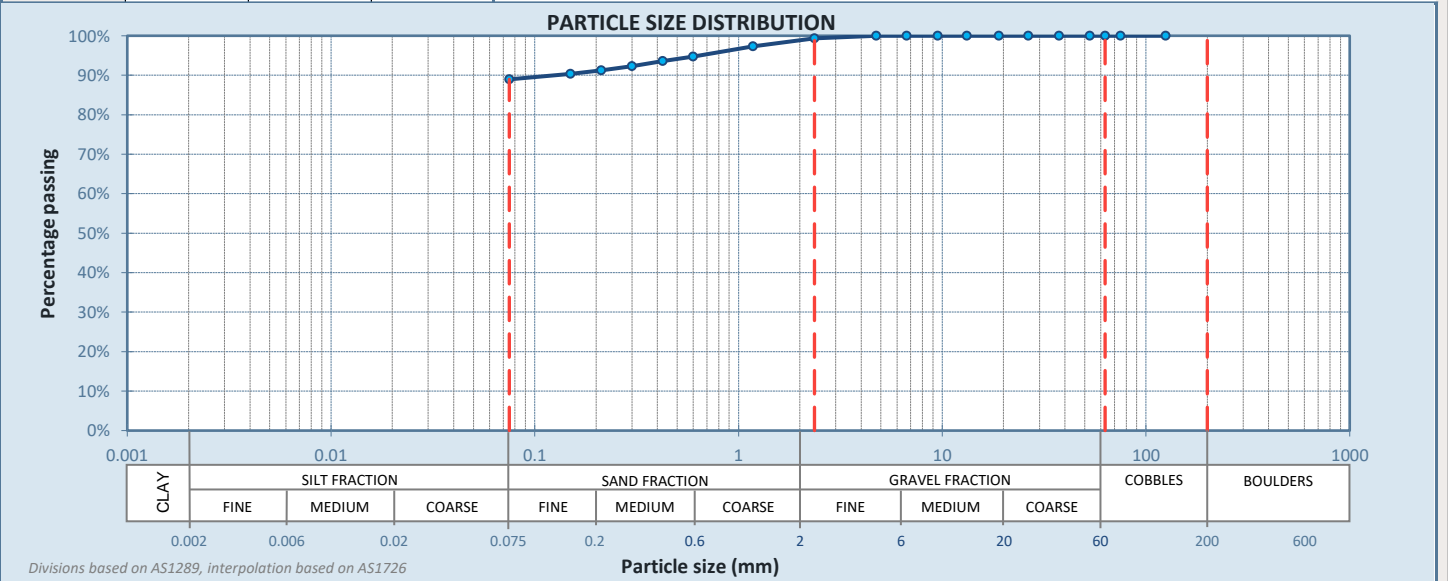


Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1 & 3.4.1

Test request #:	TRP22-0093	Specimen ID:	LPER202207190	Golder Associates Pty Ltd
Client:	Causeway Link Alliance			PERTH GEOTECHNICAL LABORATORY
Client address:				84 Guthrie Street, Osborne Park, Western Australia 6017
Project ID:	PS131735		Exploratory Hole	Sample depth (m): 12.50 - 13.00
Project name:	Causeway Footbridge Swan River		CPCB-BH08	Client sample ref:
Project reference:		Loc. ref.:		Perth, WA

Specimen description:				Sampling: Tested as received						
PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1				(CH) CLAY, high plasticity, grey, trace of fine to coarse grained brown sand.		Easting (m)	Northing (m)	Level (m)		
Sieve Size	Passing	LB S	UB S	Method:	AS 1289.2.1.1	AS 1289.3.1.2	AS 1289.3.2.1	AS 1289.3.3.1	AS 1289.3.4.1	
125 mm	100%			Moisture content	47.1% As Rcvd.	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking
75 mm	100%									
63 mm	100%			Result:	82%	25%	57%	15.0%	None	
53 mm	100%									
37.5 mm	100%			LB S:					-	
26.5 mm	100%									
19 mm	100%			UB S:					-	
13.2 mm	100%									
9.5 mm	100%			Att. preparation method:		Dry sieved		LSM length (mm):		125
6.7 mm	100%			Specimen history/notes:						
4.75 mm	100%			Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK Preparation of specimen and testing performed on sample supplied to the laboratory						
2.36 mm	99%			Definitions:		LB S = Lower bound specification LSM = Linear shrinkage mould UB S = Upper bound specification N/A = Not applicable ND = Not determined; SIB = Slip in bowl NO = Not obtainable; NP = Non plastic				
1.18 mm	97%			GRADING SUMMARY						
600 µm	95%			Fines	Sand*	Gravel*	Cobbles*			
425 µm	94%			(<75 µm)	(>75 µm - <2.36 mm)	(>2.36 mm - <63 mm)	>63mm - <200 mm)			
300 µm	92%			89.0%	10.4%	0.6%	0.0%			
212 µm	91%			*Proportions based on guidance in AS1726-2017 Section 6.1.4.2						
150 µm	90%									
75 µm	89%									



Testing by: **DP** Dates: **03/08/22 - 10/08/22** Results reviewed by: **PKent** Date reported: **11/08/2022**

Cert. ref.:	PS131735_CPCB-BH08_TRP22-0093_PSD_2207190_Rep22083621	Approved signatory:
	NATA accreditation number: 1961 - Site:1598 - Perth Accredited for compliance with ISO/IEC 17025 - Testing	
THIS DOCUMENT SHALL ONLY BE REPRODUCED IN FULL		Paul Kent - Laboratory Manager

Phone: +61 (0)8 9441 0700 Fax: +61 (0)8 9441 0701 E-mail: perthlab@golder.com.au Web: www.golder.com.au

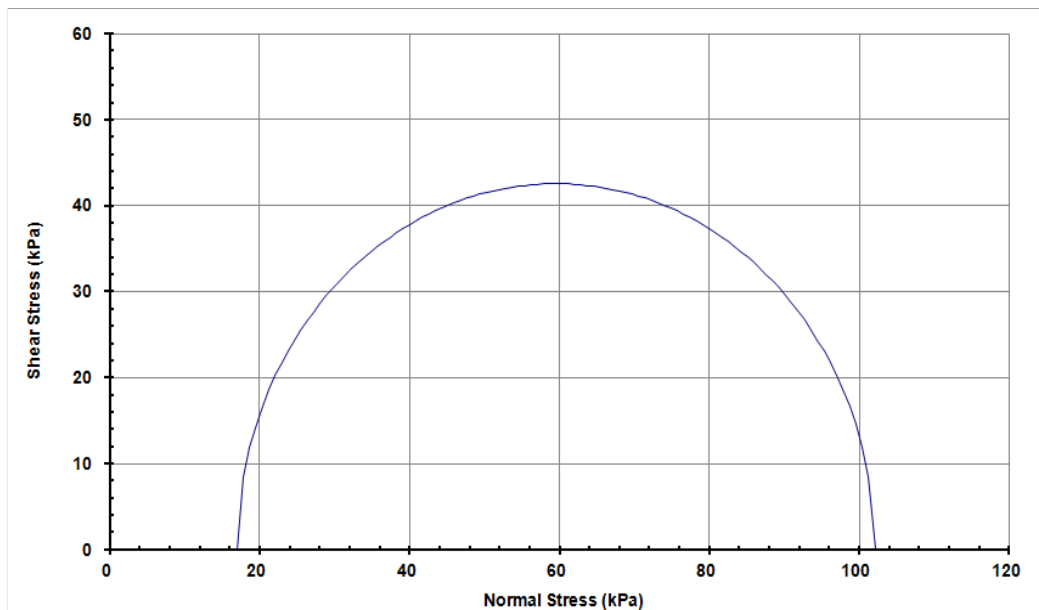


SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	Golder Associates	Date Tested:	02-07/08/2022
Project:	Causeway Footbridge Swan River 2022	EP Lab Job Number:	GOLDER
Sample No:	CPCB-BH06	Lab:	EPLab
Sample ID:	LPER202207194_CU1	Issue Date:	08/08/2022
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 18°C
Tested by:	Phil Li	Initial Moisture (%):	78.74
Height (mm):	128.85	Final Moisture (%):	54.57
Diameter (mm):	61.96	Bulk Density (t/m ³):	1.66
L/D Ratio:	2.08	Dry Density (t/m ³):	0.93
		Strain Rate (mm/min):	0.007
		Skempton's (B):	1
		Initial Void Ratio (e _i):	-
		Particle Density (t/m ³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -
 Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING
 NATA: 19078

Authorised Signatory (Geotechnical Engineer):



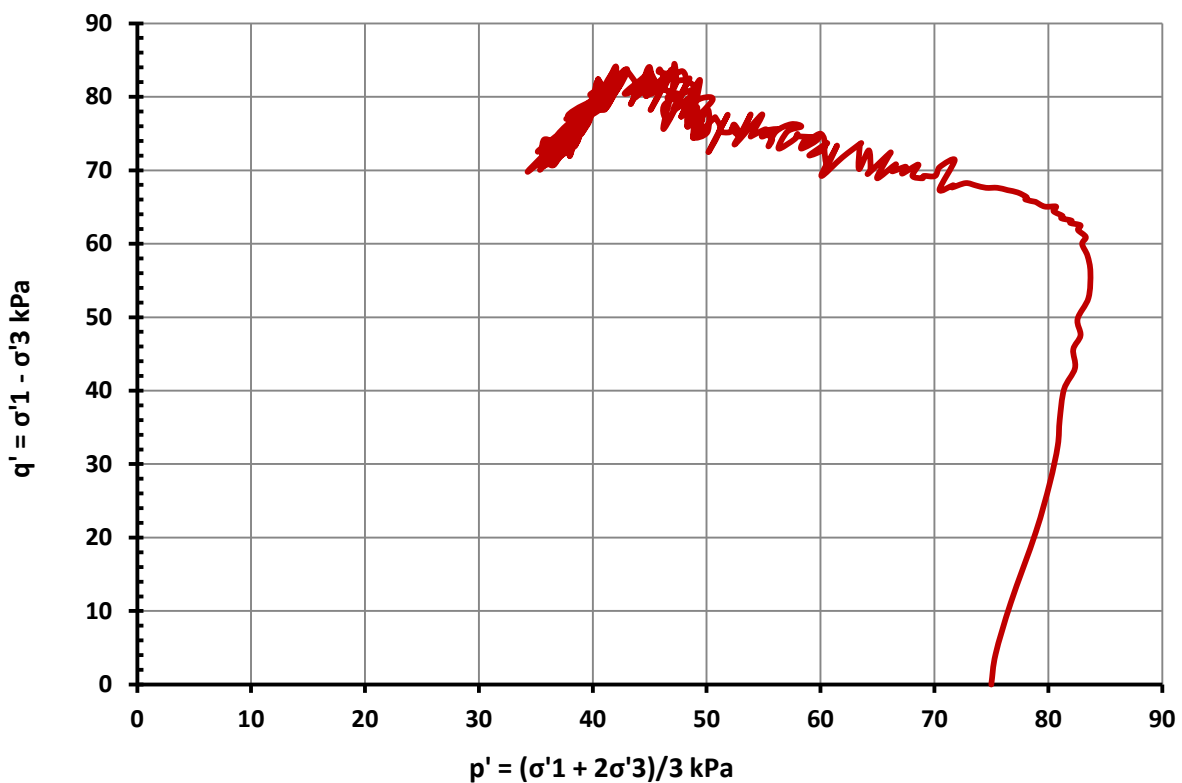


SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	Golder Associates	Date Tested:	02-07/08/2022
Project:	Causeway Footbridge Swan River 2022	EP Lab Job Number:	GOLDER
Sample No:	CPCB-BH06	Lab:	EPLab
Sample ID:	LPER202207194_CU1		
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -
 Angle of Shear Resistance Φ' (Deg) : -



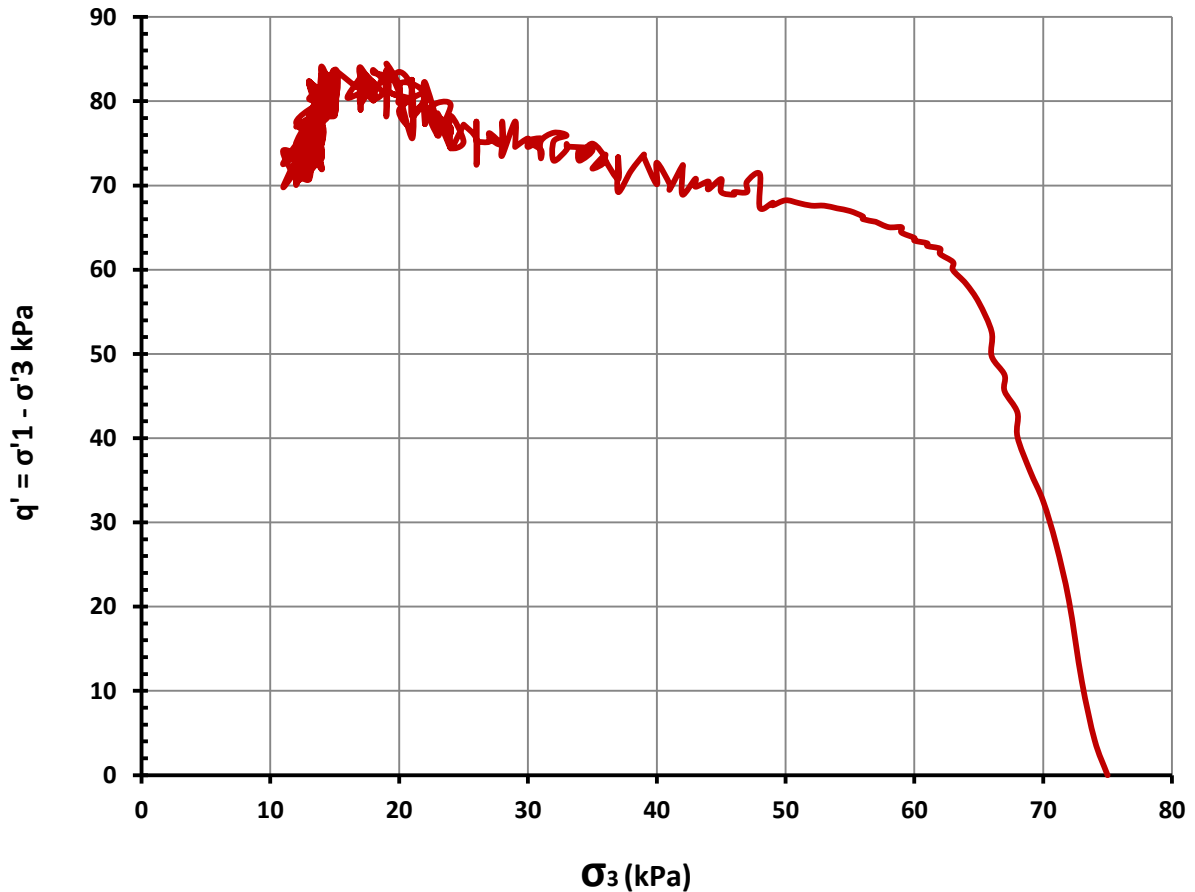
E-PRECISION LABORATORY

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	Golder Associates	Date Tested:	02-07/08/2022
Project:	Causeway Footbridge Swan River 2022	EP Lab Job Number:	GOLDER
Sample No:	CPCB-BH06	Lab:	EPLab
Sample ID:	LPER202207194_CU1		
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Cambridge Method - Using Stress Path Tangency Method

Cohesion C' (kPa) : -
 Angle of Shear Resistance Φ' (Deg) : -



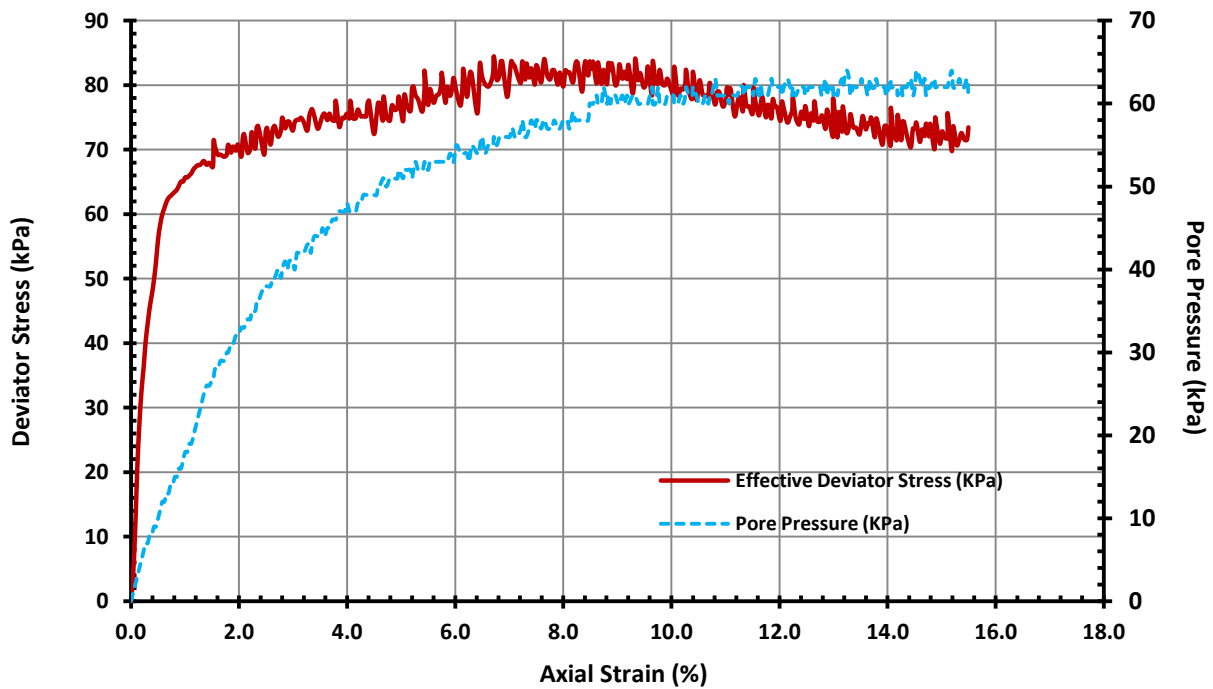
E-PRECISION LABORATORY

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client: Golder Associates	Date Tested: 02-07/08/2022
Project: Causeway Footbridge Swan River 2022	EP Lab Job Number: GOLDER
Sample No: CPCB-BH06	Lab: EPLab
Sample ID: LPER202207194_CU1	
Depth (m): 8.00 - 8.45	Room Temperature at Test: ~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U ⁰	U ^f	Principal Effective Stresses			σ ¹ - σ ³	Strain (%)
				σ ¹	σ ³	σ ¹ / σ ³		
1	75	0	58	101	17	5.92	84	8.24



SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	Golder Associates	Date Tested:	02-07/08/2022
Project:	Causeway Footbridge Swan River 2022	EP Lab Job Number:	GOLDER
Sample No:	CPCB-BH06	Lab:	EPLab
Sample ID:	LPER202207194_CU1		
Depth (m):	8.00 - 8.45	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	CPCB-BH06	Depth (m):	8.00 - 8.45
Lab ID:	LPER202207194_CU1	Date Tested:	02-07/08/2022



Failure Mode: **Bulging Failure**

Notes: Sample collected from Shelby Tube

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078

Authorised Signatory (Geotechnical Engineer):

The results of tests performed apply only to the specific sample at time of test unless otherwise clearly stated. Reference should be made to E-Precision Laboratory's "Standard Terms and Conditions" E-Precision Laboratory ABN 431 559 578 87

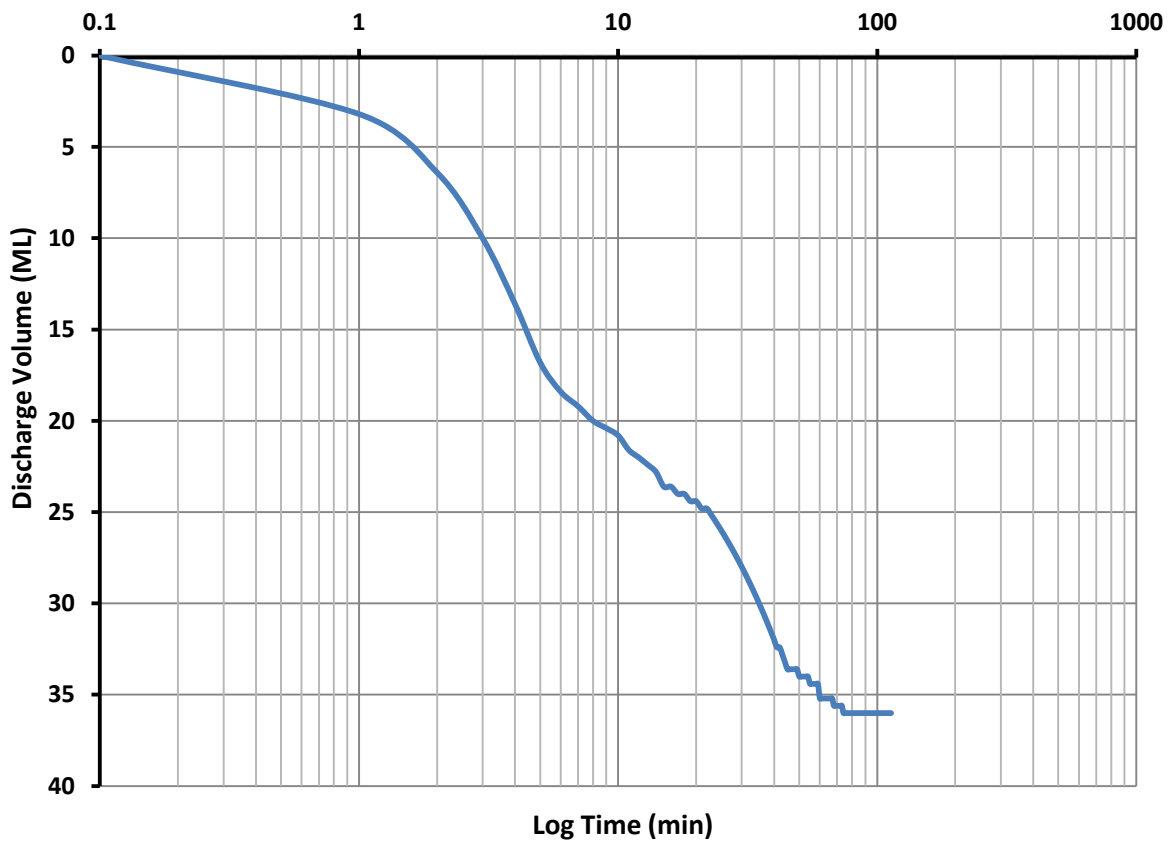


SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client: Golder Associates	Date Tested: 02-07/08/2022
Project: Causeway Footbridge Swan River 2022	EP Lab Job Number: GOLDER
Sample No: CPCB-BH06	Lab: EPLab
Sample ID: LPER202207194_CU1	
Depth (m): 8.00 - 8.45	Room Temperature at Test: ~ 18°C

Discharge Volume (ML) Vs Log Time (min)



C_v (cm²/s): 0.018 based on **t₉₀**

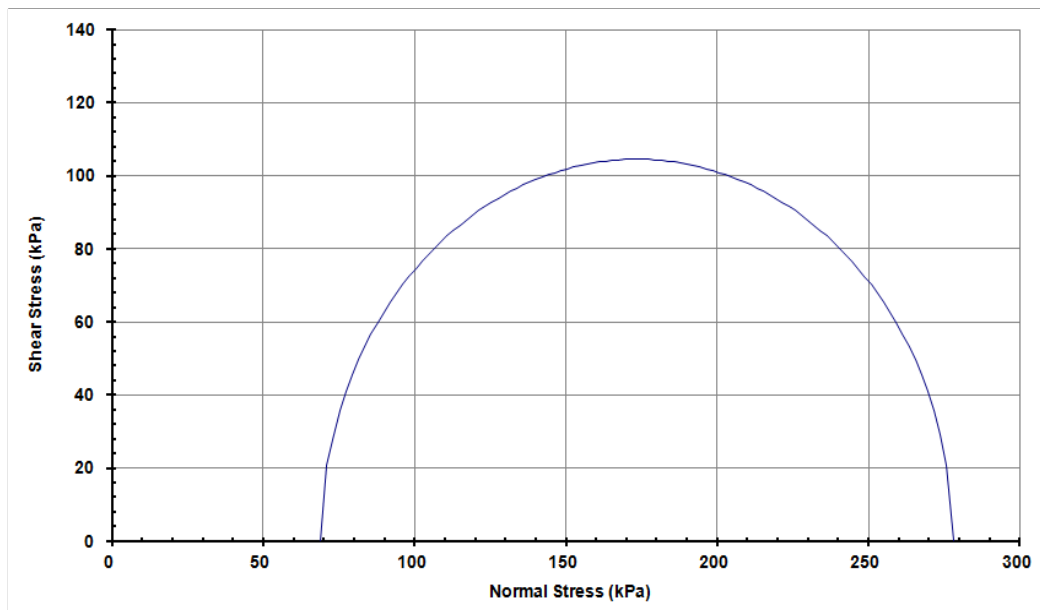


SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	Golder Associates	Date Tested:	02-07/08/2022
Project:	Causeway Footbridge Swan River 2022	EP Lab Job Number:	GOLDER
Sample No:	CPCB-BH06	Lab:	EPLab
Sample ID:	LPER202207195_CU1	Issue Date:	08/08/2022
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 18°C
Tested by:	Phil Li	Initial Moisture (%):	17.55
Height (mm):	124.63	Final Moisture (%):	17.74
Diameter (mm):	62.63	Bulk Density (t/m ³):	2.11
L/D Ratio:	1.99	Dry Density (t/m ³):	1.79
		Strain Rate (mm/min):	0.007
		Skempton's (B):	1
		Initial Void Ratio (e _i):	-
		Particle Density (t/m ³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -
 Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING
 NATA: 19078

Authorised Signatory (Geotechnical Engineer):



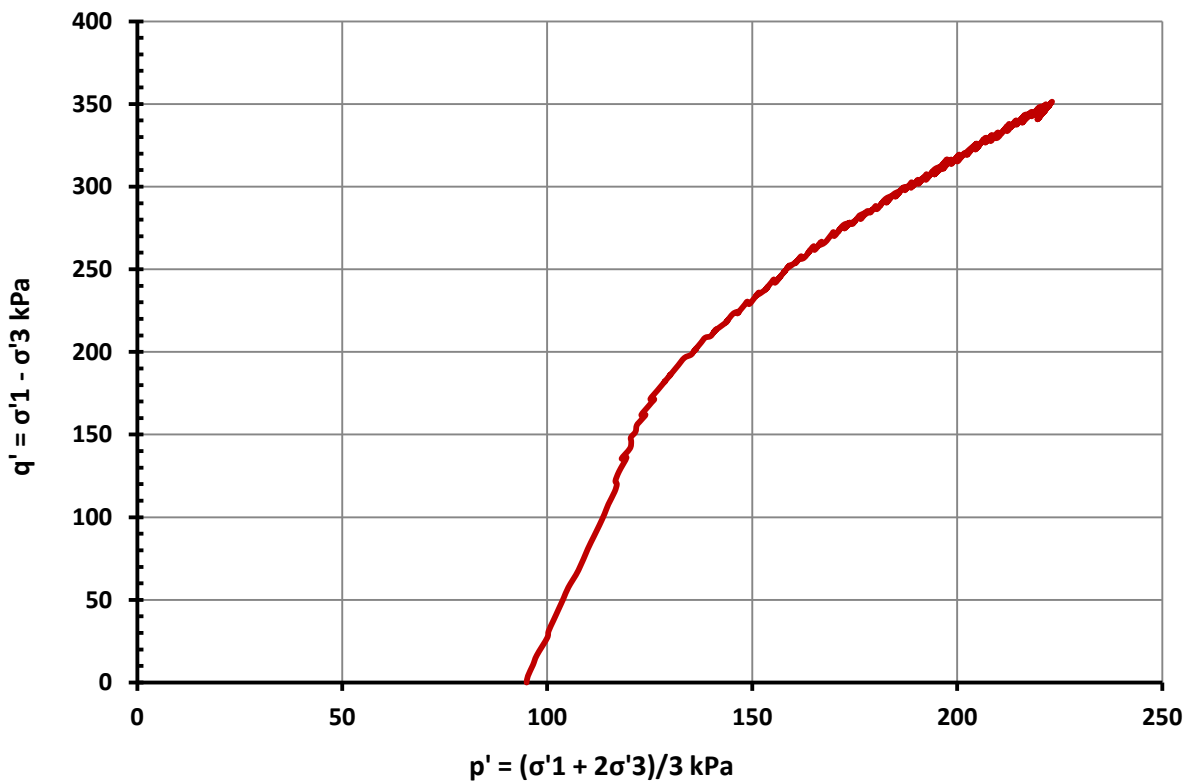


SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	Golder Associates	Date Tested:	02-07/08/2022
Project:	Causeway Footbridge Swan River 2022	EP Lab Job Number:	GOLDER
Sample No:	CPCB-BH06	Lab:	EPLab
Sample ID:	LPER202207195_CU1		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -
 Angle of Shear Resistance Φ' (Deg) : -



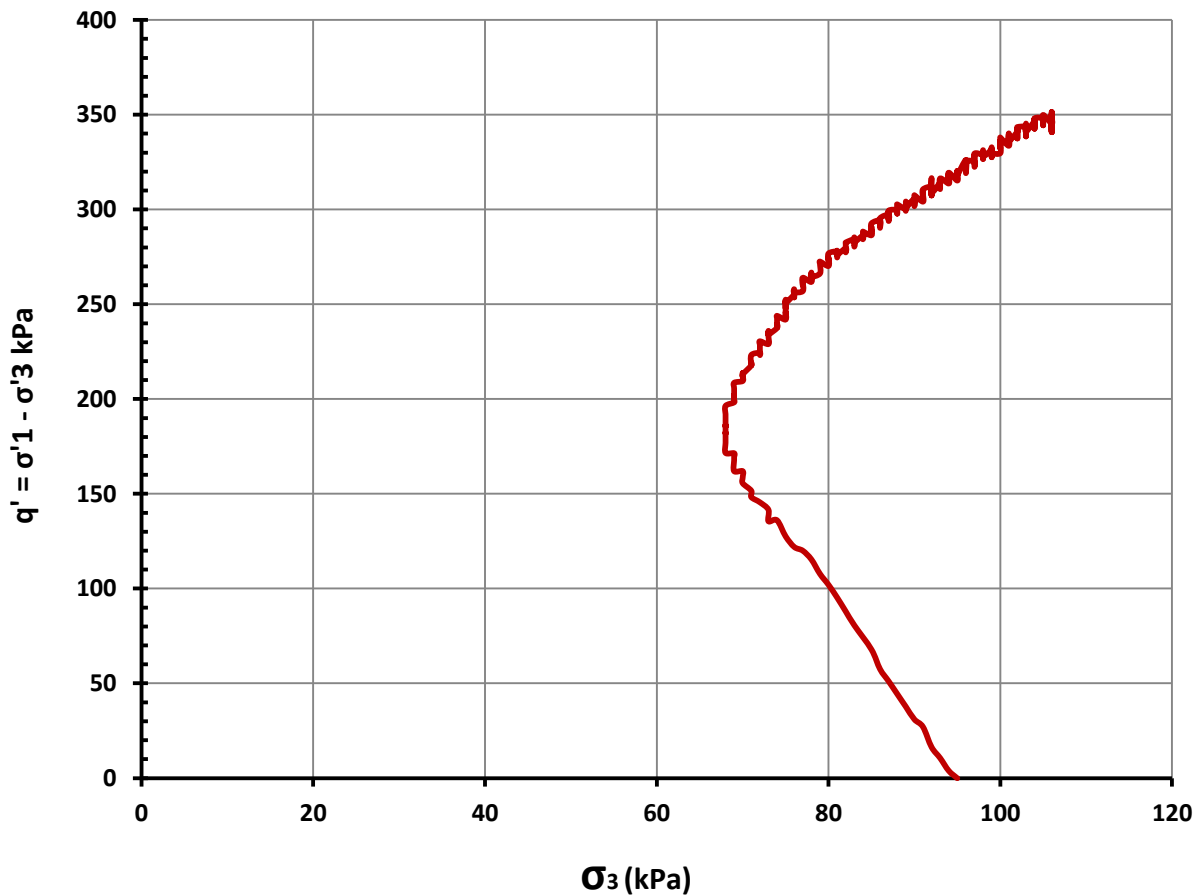
E-PRECISION LABORATORY

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	Golder Associates	Date Tested:	02-07/08/2022
Project:	Causeway Footbridge Swan River 2022	EP Lab Job Number:	GOLDER
Sample No:	CPCB-BH06	Lab:	EPLab
Sample ID:	LPER202207195_CU1		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Cambridge Method - Using Stress Path Tangency Method

Cohesion C' (kPa) : -
 Angle of Shear Resistance Φ' (Deg) : -



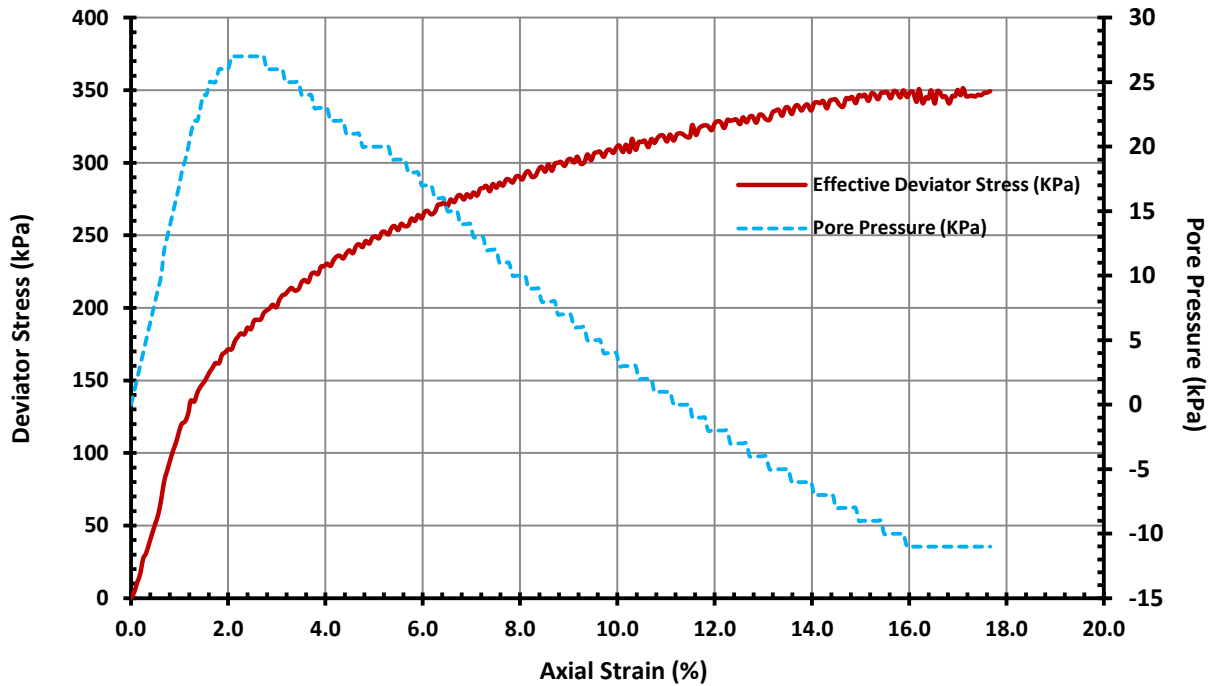
E-PRECISION LABORATORY

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	Golder Associates	Date Tested:	02-07/08/2022
Project:	Causeway Footbridge Swan River 2022	EP Lab Job Number:	GOLDER
Sample No:	CPCB-BH06	Lab:	EPLab
Sample ID:	LPER202207195_CU1		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U ⁰	U ^f	Principal Effective Stresses			σ ¹ - σ ³	Strain (%)
				σ ¹	σ ³	σ ¹ / σ ³		
1	95	0	26	278	69	4.02	209	3.11



SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	Golder Associates	Date Tested:	02-07/08/2022
Project:	Causeway Footbridge Swan River 2022	EP Lab Job Number:	GOLDER
Sample No:	CPCB-BH06	Lab:	EPLab
Sample ID:	LPER202207195_CU1		
Depth (m):	12.50 - 12.95	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: CPCB-BH06	Depth (m): 12.50 - 12.95
Lab ID: LPER202207195_CU1	Date Tested: 02-07/08/2022



Failure Mode: Shear Failure to Vertical @ 37.3°

Notes: Sample collected from Shelby Tube

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078

Authorised Signatory (Geotechnical Engineer):

The results of tests performed apply only to the specific sample at time of test unless otherwise clearly stated. Reference should be made to E-Precision Laboratory's "Standard Terms and Conditions" E-Precision Laboratory ABN 431 559 578 87

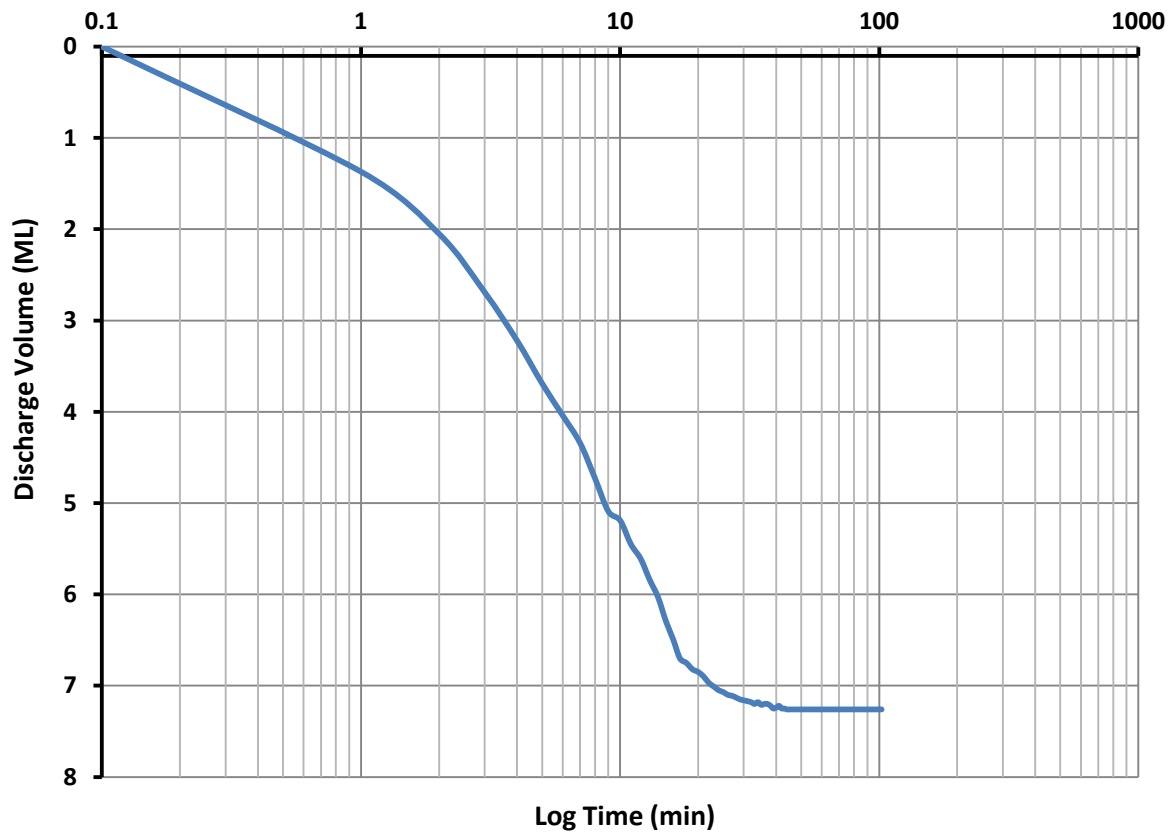


SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client: Golder Associates	Date Tested: 02-07/08/2022
Project: Causeway Footbridge Swan River 2022	EP Lab Job Number: GOLDER
Sample No: CPCB-BH06	Lab: EPLab
Sample ID: LPER202207195_CU1	
Depth (m): 12.50 - 12.95	Room Temperature at Test: ~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.201 based on **t₉₀**