8 April 2025

Auckland Thoroughbred Racing Incorporated
Attn: Adam Sadgrove
80-100 Ascot Avenue
Remuera
Auckland 1051

Dear Adam

Private Plan Change - 222-250 Manukau Road, Pukekohe, Auckland

(Our Reference: 25208.000.001_17)

1 Introduction

ENGEO Ltd was requested by Auckland Thoroughbred Racing Incorporated to assess the geotechnical suitability of a portion of the property at 222-250 Manukau Road, Pukekohe, Auckland for future residential housing. We understand this letter will be used in support of the private plan change application by Auckland Thoroughbred Racing Incorporated (ATR) seeking to rezone a portion of the property.

In preparation of this report, we have been provided with the Pukekohekohe Gateway Plan Change Zoning Plan (unreferenced). The plans have been appended to this report as Appendix 1.

The plans show that the plan change boundary area is part of Pukekohe Park. The area that is to be rezoned and included in this private plan change application from Special Purpose – Major Recreation Facility Zone' to 'Residential – Mixed Housing Urban Zone' (MHU) and 'Open Space – Informal Recreation Zone' (OS-IR) under the Auckland Unitary Plan (Operative in Part) (AUP).

The overall 'Pukekohekohe Gateway Plan Change' also includes an additional 'Business – light industry' (B-IL) zone located to the north-western corner . The total area denoted by the 'Pukekohekohe Gateway Private Plan Change' is located within the western and south-western portion of the property and covers a total area of 22.967 Ha.

This geotechnical private plan change letter has been prepared to support the areas seeking rezoning within the encompassed by precinct boundary denoted 'Pukekohe Gateway Private Plan Change'. The 'Business – light industry (B-IL)' zones have not been included as part of our assessment as these areas are part of the private plan change but not seeking rezoning.

This work has been carried out as a variation under our signed agreement dated 18 July 2024.

2 Desktop Study

This section of the report has been taken from our previous report (ENGEO 2024.06.26 – Pukekohe Park Geotechnical Preliminary Investigation Report) and has been modified to refer specifically to the private plan change area. The full report has been included as Appendix 4.

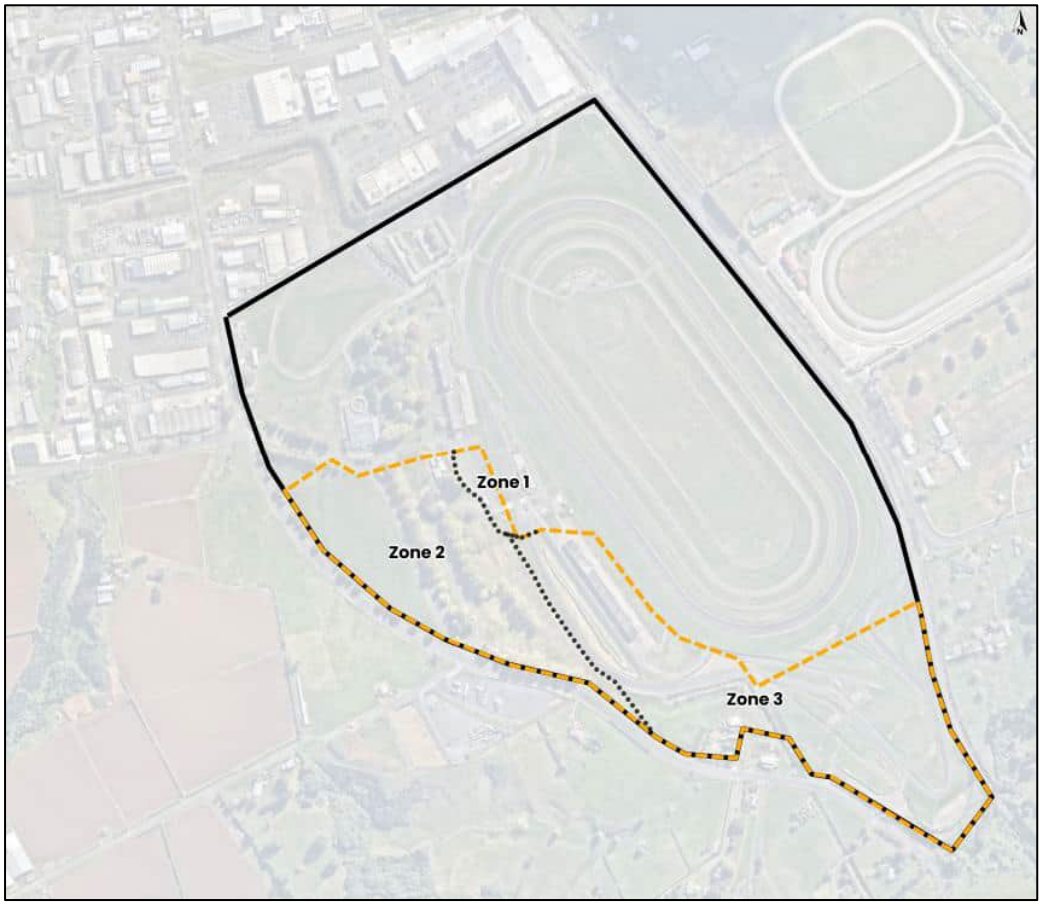
2.1 Site Description

The irregular shaped property at 222-250 Manukau Road, Pukekohe comprises a 72.5 ha special purpose – major recreational facility zone (i.e. horse training / racing track and motorcar racing track) on land legally described as Lots 1 and 2 DP 337473, Lot 2 DP 100207, Lot 1 DP 610920, and Lot 2 DP 610920. The proposed new Residential Mixed Housing Urban & Open Space – Informal Recreation zones (shown in Appendix 2) is located in the south-western portion of this property and has an approximate area of 22.967 ha.

The property can be accessed from two locations on the western boundary off Buckland Road. The property is bounded to the east, south, and west by agricultural land, public roads, and a railway line. Commercial warehouse buildings are located north of the property.

For the purpose of discussing geotechnical risks, this property has been broken up into three geotechnical zones. The location of these zones are presented in Figure 1, listed below and included in Appendix 2

Figure 1: Geotechnical Zone Areas



- Zone 1 – This area comprises the low-lying areas in the northern portion of the property.
- Zone 2 – This area comprises the elevated area of the property between the western boundary and the motor racing track.
- Zone 3 – This area comprises the low-lying areas in the southern portion of the property.

The proposed private plan change area is predominantly located with Zones 2 and 3 but does cross into the southern corner of Zone 1. Within the private plan change area, Zones 1 and 3 are low lying (between approximately 50 and 55 m RL) and includes most of the existing or recently removed structures present on the property. Elevation changes within these zones are in the order of 1 m – 2 m with isolated low points in stormwater swales up to 5 m below the surrounding area. Other ancillary structures are present within the property and are understood to be used as support facilities. An open swale is located between the pit lane and the motor racing track. The lowest elevation land within the plan change area is located in the base of this swale in Zone 3, at an elevation of 50 m RL. These areas are largely undeveloped apart from access roads and support buildings for the motor racing track.

Zone 2 is elevated (between approximately 55 and 66 m RL) and includes paddock / lawn areas with several internal roads providing access down to the existing buildings and lower lying portions of the property. Slopes in this zone have grades of up to approximately 1(V):4(H).

2.2 Auckland Council GeoMaps

Based on our review of the publicly available contours on Auckland Council GeoMaps, we note the following:

- Mapped public services that intersect the plan change area are:
    - A 900 mm diameter wastewater line that runs northeast from the Watercare Services Limited Wastewater Pump Station immediately south of the property plan change area through the centre of the horse track to the north of the plan change area. Based on surveyed invert levels the service line is approximately 3.0 to 4.8 m below ground level.
    - A 600 mm diameter wastewater line that runs northeast from the Watercare Services Limited Wastewater Pump Station immediately south of the plan change area between the motor racing track and horse track to the north of the plan change area. Based on surveyed invert levels the service line is approximately 2.3 to 4.0 m below ground level.
    - Two 2500 mm diameter stormwater lines extending from the northern end of the open stormwater swale within Zone 3 to past the northern extent of the plan change area. Depth to the invert of this service line generally ranges from 3.5 – 4.0 m.
- Multiple flood prone areas, flood plains and overland flow paths are mapped through the property. These overland flow paths have catchment areas of up to and more than 100 ha.

2.3 Geology

The GNS Science Map 12B Geology of the Pukekohe Area (scale 1:50,000) shows that the plan change area contains three geological units (Figure 2).

The low-lying eastern portion of the plan change area is mapped as Anthropogenic engineered ground, mixed cut and fill deposits (He). A small section of the plan change area, adjacent to the southern boundary of the site is mapped as being underlain by (Qtp) Alluvial/Colluvial deposits of the Takaanini Formation. This material is typically described as poorly to moderately consolidation clastic fluvial, lacustrine, paralic and shallow marine deposits dominated by sand and mud.

The western elevated portion of the property is mapped Basaltic Lava (Qsl) of the Kerikeri Volcanic Group (South Auckland Volcanic Field). This consists variably weathered lava flows, often hard and in places displaying columnar jointing. Surficial soils are anticipated to comprise a mixture of ashes, tephra and tuff, overlying weathered basaltic lava.

Figure 2: Mapped Geology

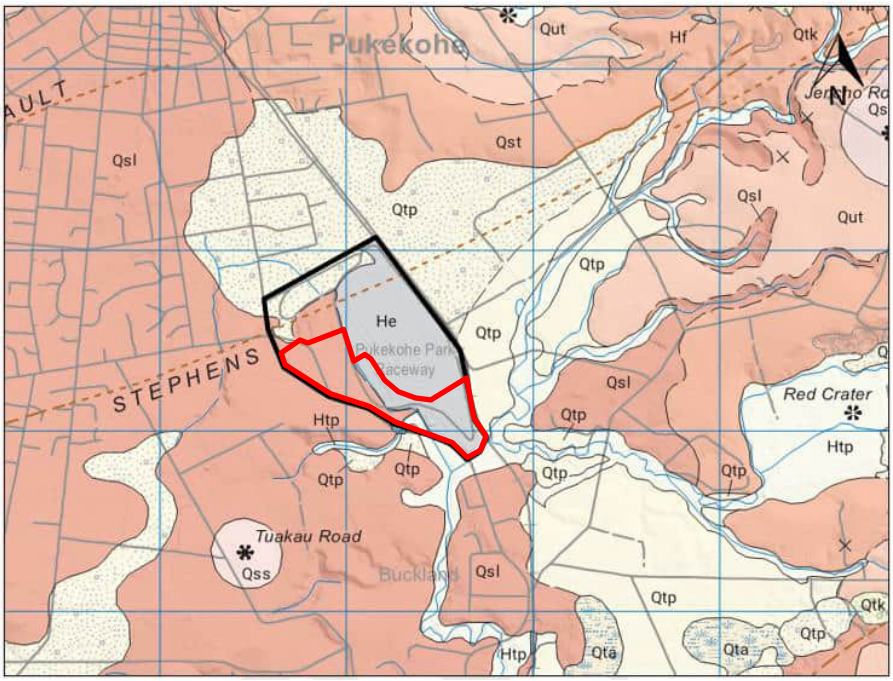


Image not to scale. Property boundary shown in black, indicative plan change area boundary shown in red.

2.4 Seismicity

GNS science maps the St Stephens Fault intersecting the northern portion of the property (approximately 100 m north of the plan change area). This fault is mapped as a possibly active fault with a dip direction of 340 degrees and dip angle of 90 degrees. This fault has a total displacement of 0.1 – 1 km, with throw down to the northwest (I.e. the direction of vertical displacement from faulting).

The Pukekohe Fault is mapped 1.7 km north of the plan change area.

The Stephens Fault and Pukekohe Fault are mapped on Figure 2 above.

The closest known active fault is the Wairoa South Fault and is located approximately 20 km east of the property.

2.5 Historical Aerial Photography Review

Aerial photographs dating from 1942 to 2024 have been reviewed in the context of changing landforms and geological features. The aerial photographs were sourced from Auckland Council GeoMaps, Retrolens, National Library, and Google Earth Pro. Relevant visible features on the property and surrounding area are summarised in Table 1 below.

Table 1: Aerial Photograph Summary

Date	Description
1942	The property is predominantly used as agricultural land. A racing track, more or less the same size as the existing main horse track occupies a large area in Zones 1 and 3; associated stands and auxiliary buildings are located within Zone 2. Undeveloped areas of the property appear to be used for grazing. A gully feature is observed in the southern portion of the property.
1961	Additional lanes have been added to the horse racing track noted adjacent to the eastern boundary within the property. Additionally, the pastoral land located within the northern portion of the property has been cleared to construct buildings (same shape and size as existing horse stables). Outside of the property an additional large horse racing track has been constructed to the east of the property on the eastern side of station road. Additionally, light horticultural activity is noted on adjacent land to the south of the property.
1963	A large racetrack (motor racing based on publicly available information online) has been built within the property. A lot of vehicles are parked along the western portion of the property and centre of the track, as well as on adjacent land to the north. The area in the northern portion of the property (existing stables) appears to be used as carparking.
1976	Additional buildings have been constructed within Zone 2 of the property; pathways / roads connect these buildings. The gully features at the southern portion of the property have been infilled (likely associated with construction of the track circa 1963). Outside of the property some additional buildings have been constructed alongside the horse racing track to the east of the property. The horticultural activity noted on adjacent land to the south of the property on the 1961 aerial has expanded with a small glasshouse observed and additional areas of cropping up to the southern boundary of the property.
1981	An access road from the outer ring of the horse track to the inner track has been constructed within the property. Outside of the property additional horticultural activity is noted to the west of the property, on the opposite side of Manukau Road.
1988	No significant changes are observed to the property. Outside of the property light industrial development is noted to the north / northwest, with yards and warehouses observed.
2001	No significant changes are observed to the property. Outside of the property the horticultural activity that was present to the south has been cleared. Additional light industrial development is noted to the north of the property. An additional track has been constructed to the northeast of the property.

Date	Description
2003	The existing stewards / race control rooms and pit lane building have been constructed in the property. Additionally, two buildings (likely the former grandstands) have been constructed in Zone 3. A large stockpile is observed in the southern portion of Zone 3 (recorded as a 'landfill' in the property file); this stockpile is understood to be a runoff area for the raceway. Earthworks associated with construction of the pony stable and training area are observed, with a stockpile present to the southwest of this area. Bulk earthworks are occurring along the northern boundary outside of the property boundary.
2006	The two grandstands at the southern end of Zone 3 have been removed. The earthworks within the west of the property have been finished and the pony stable / training area has been constructed. The large stockpile associated with these earthworks (noted in 2003) remains. Four large tanks are observed along the south-western boundary, within Zone 3 of the property.
2008 – 2011	The main horse racetrack is undergoing maintenance with an excavator, loader, and a soil grading machine sorting material into different stockpiles. A tractor towing a large tanker is observed on the northern end of the horseracing track. The earthworks noted beyond the northern boundary of the property northern border in the 2003 aerial have concluded and two large multi-storey buildings with associated carparking are present.
2017 – 2023	Within the site the pitlane entranceway to the north has been widened and resealed. A gravel yard with trucks parked in it has been created along the south-western border of Zone 3.

2.6 Existing Geotechnical Data

2.6.1 Ground Consulting Ltd Geotechnical Feasibility Assessment (November 2018, revised December 2022)

Ground Consulting Ltd (GCL) completed investigations within the western portion of the property to support a geotechnical assessment. As part of their investigation, GCL completed the following:

- Ten hand auger boreholes to a target depth of 3.0 m.
- Five cone penetration tests to a target depth of 30.0 m or prior refusal.

GCL identified two distinct soil formations below topsoil which comprised Tauranga Group (now Takaanini Formation) alluvial deposits and South Auckland Volcanic Field ash deposits. Tauranga Group alluvial deposits typically consisted of clayey silts and silty clays with occasional sand layers. Cohesive soils were generally firm to very stiff. South Auckland Volcanic Field ash deposits typically consisted of silts and clayey silts which were generally very stiff to hard. Undocumented fills up to 2.2 m depth were encountered across lower lying areas of the investigation area.

GCL divided the area investigated two different zones based on encountered ground conditions (Zone 1 and Zone 2, respectively). Zone 1 encompassed topsoil underlain by Tauranga Group alluvial deposits down to depths of 3.6 to 11.8 m depth which was overlying South Auckland Volcanic Field ash deposits to termination depths of investigations. Zone 2 encompassed shallow topsoil directly underlain by South Auckland Volcanic Field ash deposits to termination depths of investigations.

GCL suggested the following for development of Zone 1, noting significant development constraints due to the underlying ground conditions:

- Structural in-filling and diversion of overland flowpaths / water course features.
- Removal of weak soil and replacement with suitable engineered fill.
- Pre-loading of weak soil to provide engineered building platforms.
- Engineered foundation design with raft type floors to accommodate low bearing capacity soils.
- Deep pile foundations embedded within the very dense volcanic deposits at depth.
- Specialised stormwater diversion and soakage structures including recharge pits and rain gardens.

GCL suggested that there were only limited constraints on development of Zone 2 which were generally associated with high loads (multi-storey buildings).

2.6.2 Tonkin + Taylor Pre-Purchase Geotechnical and Contaminated Land Assessment (April 2022)

Tonkin + Taylor completed investigations across the property to assess the suitability of the property for development. As part of their investigation, Tonkin + Taylor completed the following:

- Eight hand auger boreholes to a target depth of 3.0 m or prior refusal.
- Eight cone penetration tests to a target depth of up to 30.0 m or prior refusal.

From their desktop study and investigation results Tonkin + Taylor identified three distinct soil formations below topsoil which were Tauranga Group (now Takaanini Formation) alluvial deposits, South Auckland Volcanic Field deposits and Kaawa Formation. Three subgroups within the Tauranga Group alluvial deposits were defined within their geological model. These were:

- Very soft to soft Tauranga Group Alluvium – predominantly consisted of clay and silts with isolated peat layers.
- Firm to stiff Tauranga Group Alluvium – predominantly consisted of silty clay or clayey silt.
- Loose to medium dense Tauranga Group – predominantly consisted of silty sand and sand.

South Auckland Volcanic Field deposits comprised ash (silts and clayey silts which were generally very stiff to hard), basalt and welded tuff. Both basalt and tuff were only identified within one investigation point from a previously drilled well. Kaawa Formation was identified to be underlying Tauranga Group alluvium at depth. Based on the ground model within the Tonkin + Taylor report, the Kaawa Formation is approximately 100 m below existing ground level. Undocumented fills up to 2.2 m depth were encountered across lower lying areas of the investigation area and are inferred to be associated with landform modification for the racetracks.

Following this investigation, Tonkin + Taylor identified the following hazards for the proposed land use of the property:

- Liquefaction and Lateral Spreading – Tonkin + Taylor identified that there was a generally insignificant to mild liquefaction risk based on the categories set out in MBIE 2021 Module 3. Based on ground conditions in the southern portion of the property, it is expected that there is a low to moderate risk of lateral spreading such that it is expected that stabilisation measures near stream banks will be required to reduce lateral spread displacements to acceptable levels.

- Settlement – Soils at the property, particularly within the low-lying area of the property, are generally highly compressible and have low permeability. As such, settlement is expected to be a significant design consideration.

- Expansive Soils – No laboratory testing was conducted by Tonkin + Taylor but based on their experience with similar soils they have assumed to have an expansive soil class of “moderately” or “highly” expansive based on classifications in B1/AS1.

Tonkin + Taylor suggests that a detailed geotechnical investigation and assessment will be required for each proposed building as part of the development to allow for mitigation measures such as preloading to be implemented.

2.6.3 New Zealand Geotechnical Database

We have carried out a review of the New Zealand Geotechnical Database (NZGD) and identified the data listed below as relevant to the private plan change area of the property:

- Two hand auger boreholes were completed within the property by Babbage Consultants with one at either end of the pedestrian bridge which crosses the motor racing track. Both hand augers typically encountered stiff, silt dominant alluvium to termination depths of the hand augers at 5.0 m below ground level.

- One hand auger borehole was completed by Fraser Thomas at the northern end of Zone 2. This hand auger encountered very stiff, cohesive dominant, ash soils to termination depth of the hand auger borehole at 3.0 m below ground level.

2.6.4 ENGEO Ltd Geotechnical Preliminary Investigation Report (26 June 2024)

As previously stated in Section 2, ENGEO has previously completed a geotechnical investigation of the property which has been included as Appendix 4. This report has been used to inform the risk matrix in Section 3 below.

3 Risk Matrix

Based on the desktop study above and ENGEO’s own preliminary investigation of the property, the risk matrix in Table 2 below has been developed.

Risk maps for each of the hazards listed in Table 2 are included as Appendix 3.

Table 2: Risk Matrix

Zone	Hazard	Risk Level				Comment	Residual Risk Following Mitigation
		Low	Moderate	High	Very High		
1	Liquefaction and Lateral Spreading	X				Less than 1 mm of vertical settlement may be anticipated during a ULS (Ultimate Limit State) event. As such, this zone should be considered to be at low risk of liquefaction induced settlement and specific design measures are not likely required.	Low
	Consolidation Settlement				X	Based on analysis of CPT data from this zone, risk of consolidation settlements under inferred future fill and building loads are considered to be high. As significant fills are anticipated to be placed in this area, risk of consolidation settlement where these fills are near existing structures or existing public services is considered very high. Consolidation settlement risk under lightweight residential dwelling loads may be reduced through placement and monitoring of preload fills. The timeline for driving settlement may be accelerated with vertical wick drains. Specific engineering works will be required to manage settlement effects on nearby existing structures and existing public services. Further analysis is required to assess possible effects and specifically design a preload and monitoring programme. Minor undocumented fills up to 1.4 m thickness were encountered in this zone. These fills should be removed where they are below future engineered fills.	Moderate
	Expansive Soils			X		Based on laboratory testing, near surface soils fit within Classes H (highly expansive) to E (extremely expansive). The future risk to foundation dwellings can be mitigated by specific design of foundations.	Low
	Slope Instability	X				This zone is generally near level.	Low
	Material Reuse			X		Materials within this portion of the plan change area are generally unsuitable for reuse as engineered fill. This material can be used for landscape fills.	Low

Zone	Hazard	Risk Level				Comment	Residual Risk Following Mitigation
		Low	Moderate	High	Very High		
	Groundwater		X			Groundwater is anticipated to be approximately 1.9 – 2.7 m below existing ground level within this zone. It is not anticipated that there will be significant excavations within this portion of the plan change area. If significant excavations are proposed, these may intersect groundwater and may require specific measures, such as sump and pumping, sheet piling etc. to facilitate works.	Low
	Flooding			X		This area is crossed by multiple flood prone areas, flood plains and overland flow paths. As such, the flooding risk has been interpreted to be high. Significant fills and new stormwater drainage may be required to increase the elevation of future developments above the current flood level and divert stormwater flows, respectively. The addition of fills in this zone of the plan change area will induce consolidation settlements. Flooding potential will need to be assessed in more detail by a third party.	Low
2	Liquefaction and Lateral Spreading	X				Based on depth to groundwater and the presence of generally very stiff cohesive soils, risk of liquefaction induced settlements is low. Based on the low risk of liquefaction, the lateral spread risk should also be considered low and specific design measures are not likely required.	Low
	Consolidation Settlement		X			Based on analysis of CPT data from this zone, risk of consolidation settlements under inferred future building loads and minor fills (~0.5 m) are low across the majority of this area. We also understand that this landform may be cut as part of future development; cutting work will compensate future building loads further reducing the risk of consolidation settlement. Areas along future cut / fill boundaries will require further assessment as differential settlements may be concentrated at the cut to fill line.	Low

Zone	Hazard	Risk Level				Comment	Residual Risk Following Mitigation
		Low	Moderate	High	Very High		
	Expansive Soils			X		Based on laboratory testing, near surface soils fit within Classes H (highly expansive) to E (extremely expansive). The future risk to foundation dwellings can be mitigated by specific design of foundations.	Low
	Slope Instability		X			Existing slopes that have not been modified and are not supported by existing retaining walls were noted to grade at 1V:4H. The stability of slopes should be reassessed when proposed cuts and fills are known. Site grading, mechanically stabilised earth embankments or retaining structures may be adopted where steep transition grades are required between adjacent platforms.	Low
	Material Reuse		X			Site won volcanic ash soils may be considered appropriate for reuse as engineered fill, however considerable care should be undertaken as the surficial volcanic ashes are expected to be highly sensitive and can easily turn into a waste product by overworking, particularly during a state of high moisture content. Major earthworks should be avoided during winter months or during periods of high rainfall. Engaging a contractor experienced with similar soils is advised.	Low
	Groundwater	X				Groundwater is anticipated to be approximately 5.0 – 6.0 m below existing ground level within this zone. It is not anticipated that cuts within this zone will be deep enough to intercept this.	Low
	Flooding	X				This portion of the plan change area is generally elevated above the surrounding areas and not mapped as susceptible to flooding by Council. Overland flow paths with catchment areas of up to 100 ha flow across the north-western extent of the plan change area. Flooding potential will need to be assessed in more detail by a third party.	Low

Zone	Hazard	Risk Level				Comment	Residual Risk Following Mitigation
		Low	Moderate	High	Very High		
3	Liquefaction and Lateral Spreading	X				LPI and LSN values both fall within 'low risk of liquefaction triggering' and 'little to no expression of liquefaction' respectively. Up to 32 mm of settlement predicted to trigger below approximately 3 m depth, should liquefaction trigger. Based on this analysis, this zone should be considered to be at low risk of liquefaction induced settlement. This should be reassessed once the proposed development is known. Filling to reduce flood hazard will also reduce liquefaction risk.	Low
	Consolidation Settlement				X	Based on analysis of CPT data from this zone, risk of consolidation settlements under inferred future fill and building loads are considered to be high. As significant fills are anticipated to be placed in this area, risk of consolidation settlement where these fills are near existing structures, railway lines or existing public services is considered very high. Consolidation settlement risk under lightweight residential dwelling loads may be reduced through placement and monitoring of preload fills. The timeline for driving settlement may be accelerated with vertical wick drains. Specific engineering works will be required to manage settlement effects on nearby existing structures and existing public services. Further analysis is required to assess possible effects and specifically design a preload and monitoring programme. Widespread undocumented fills ranging in thickness from 0.5 to 2.8 m were encountered in this zone. These fills should be removed where they are below future engineered fills.	Moderate
	Expansive Soils			X		Based on laboratory testing, near surface soils fit within Classes H (highly expansive) to E (extremely expansive). The future risk to foundation dwellings can be mitigated by specific design of foundations.	Low

Zone	Hazard	Risk Level				Comment	Residual Risk Following Mitigation
		Low	Moderate	High	Very High		
	Slope Instability		X			This zone is generally near level except for the existing swale drain. It is anticipated that this drain will be rerouted. The stability of the proposed swale drain slopes should be reassessed when proposed contours are known. Mechanically stabilised earth embankments or retaining structures may be required if high or steep embankments are proposed.	Low
	Material Reuse			X		Materials within this portion of the plan change area are generally unsuitable for reuse as engineered fill. This material can be used for landscape fills.	Low
	Groundwater			X		Groundwater is anticipated to be approximately 2.0 – 3.5 m below existing ground level within this zone. As it is anticipated that there will be significant excavations for the rerouting of the existing stormwater swale within this portion of the property remediation will be required. If significant excavations are proposed, these may intersect groundwater and may require specific measures, such as sump and pumping, sheet piling etc. to facilitate works.	Moderate
	Flooding			X		This area is crossed by multiple flood prone areas, flood plains and overland flow paths. As such, the flooding risk has been interpreted to be high. Significant fills and new stormwater drainage may be required to increase the elevation of future developments above the current flood level and divert stormwater flows, respectively. The addition of fills in this zone of the plan change area will induce consolidation settlements. Flooding potential will need to be assessed in more detail by a third party.	Low

4 Closing Remarks and Future Work

We consider the level of previous investigations completed for the property to be sufficient to support this application for private plan change for the 'Pukekohekohe Gateway' Precinct from 'Special Purpose Zone' to 'Residential – Mixed Housing Urban Zone' and 'Open Space – Informal Recreation Zone'. Based on our assessment, the land is considered suitable for the proposed rezoning and subsequent residential development subject to effective management of the geotechnical risk items identified in this report.

The geotechnical risks identified above can be managed appropriately through ground improvement, specific engineering design and specific foundation design such that residual risks are reduced to tolerable levels. Further detailed assessment and reporting should be undertaken to support landform design and a future application for Resource Consent as identified in the risk assessment above.

5 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Auckland Thoroughbred Racing Incorporated, its professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the Client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

iv. This Limitation should be read in conjunction with the Engineering NZ / ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on (09) 972 2205 if you require any further information.

Report prepared by

Rhys Bridges

Geotechnical Engineer

Report reviewed by

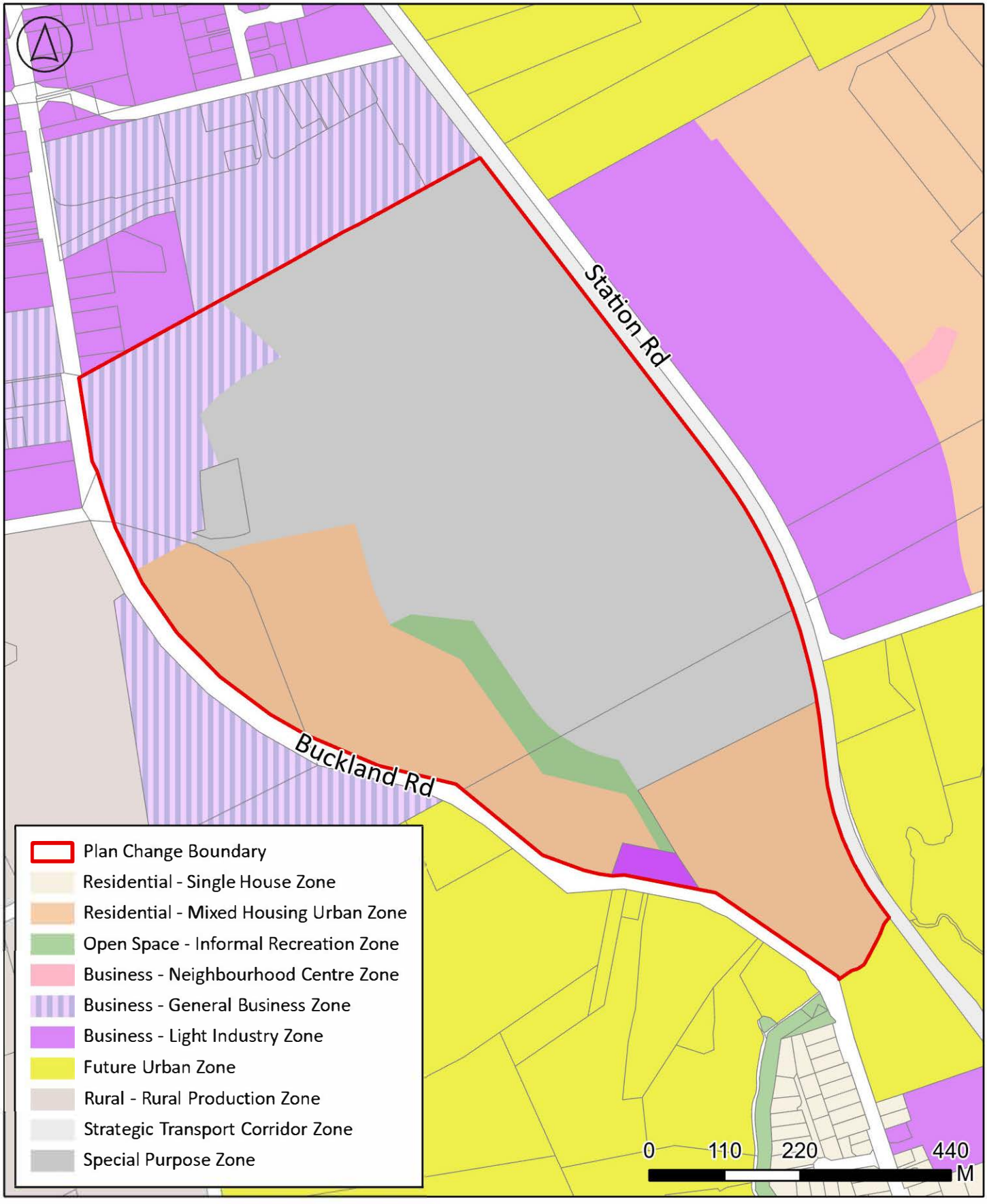
Max McLean, CMEngNZ (PEngGeol)

Associate Engineering Geologist

APPENDIX 1

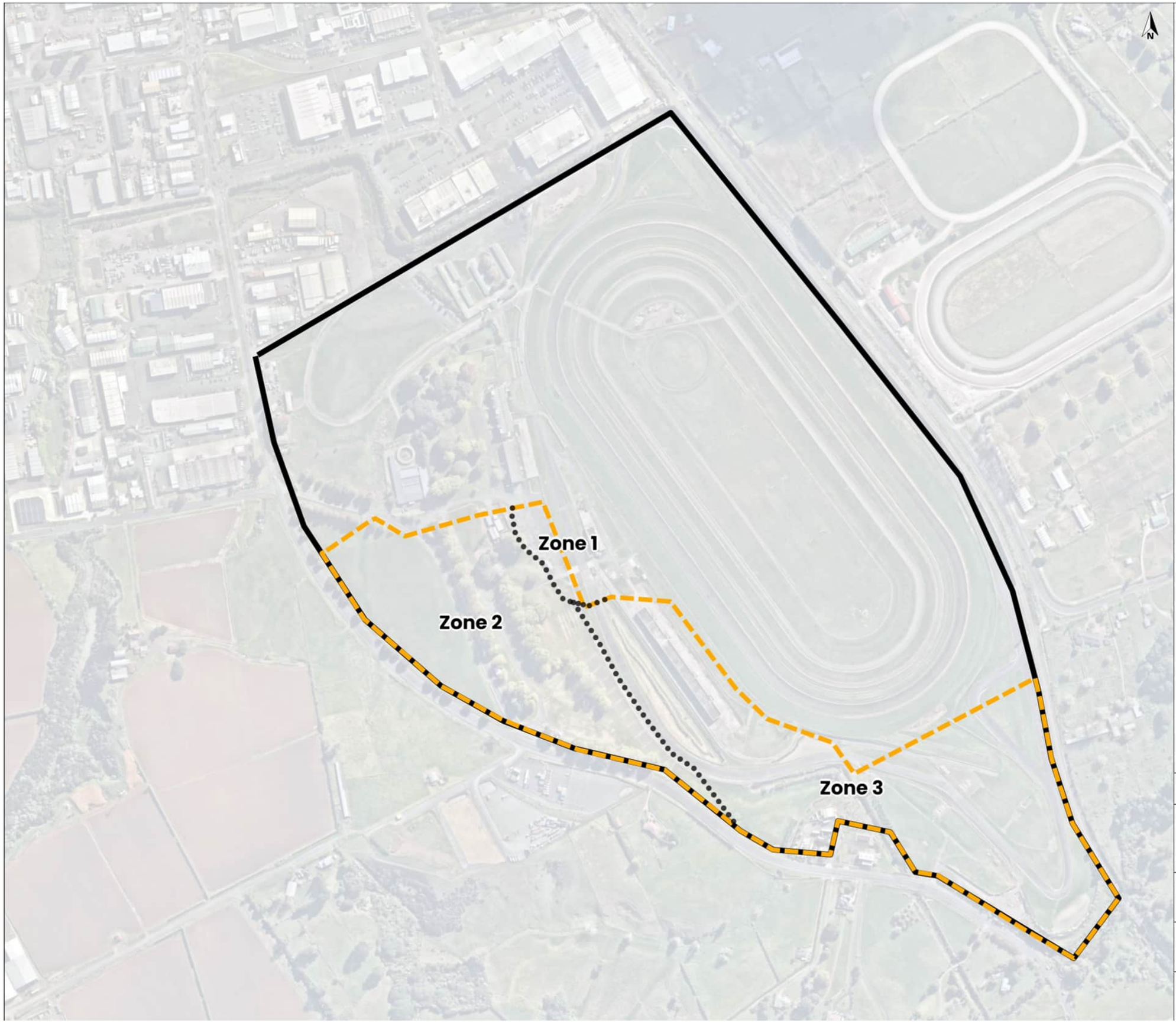
Private Plan Change Pukekohe Gateway

Pukekohekohe Gateway Plan Change: Proposed Zoning



APPENDIX 2

Private Plan Change – Site Plan



Legend

- Zone Boundaries
- Private Plan Change Boundary
- Approximate Site Boundary

0 50 m 100 m

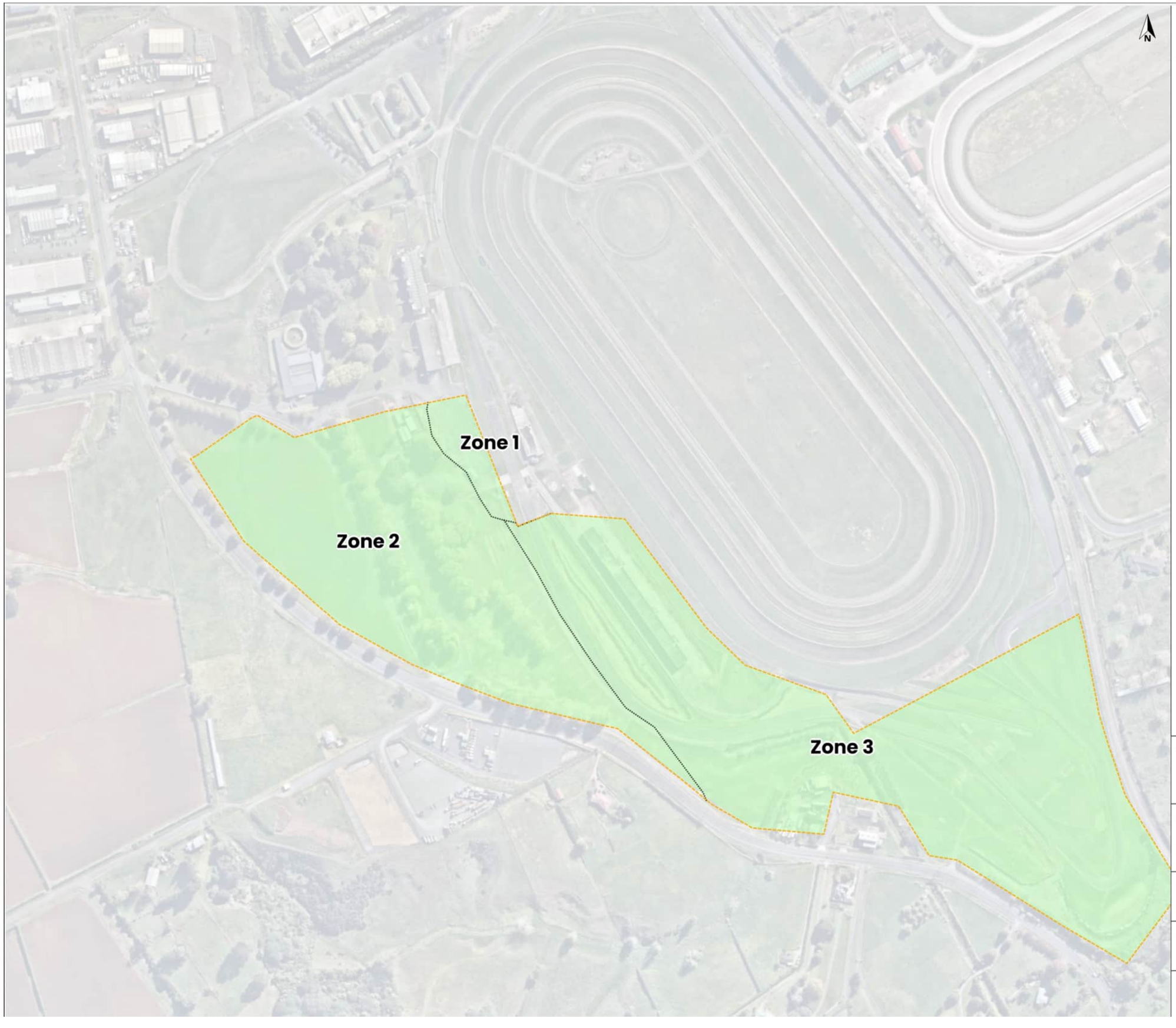
ENGEO

Produced by **Datanest.earth**

Title: Private Plan Change Area Site Plan		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: RB	Appendix No.: 1
Date: 18-12-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:5000	Version: Final

APPENDIX 3

Private Plan Change – Risk Maps



Legend

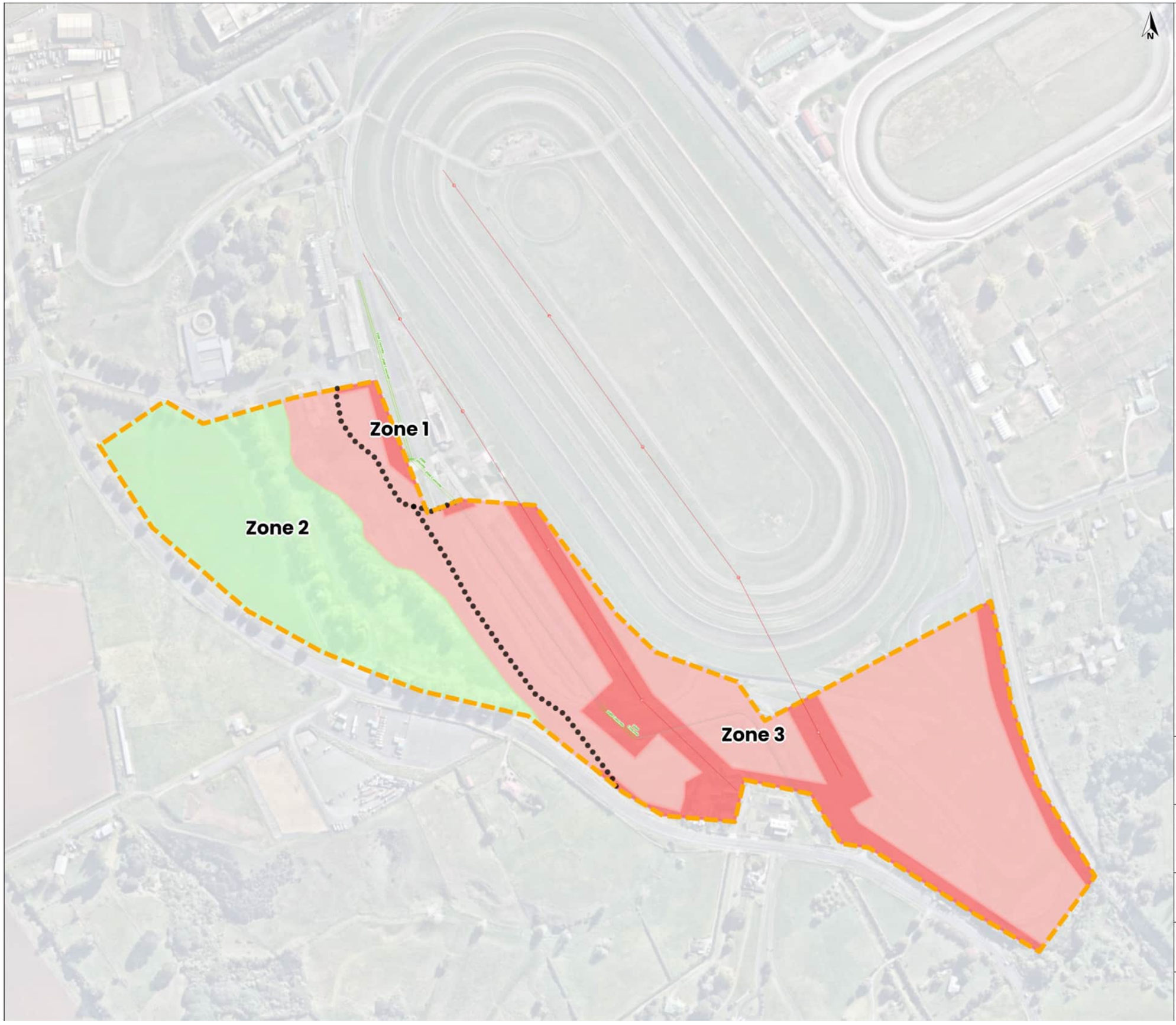
- Private Plan Change Boundary
- Zone Boundaries
- Low Risk
- Moderate Risk
- High Risk
- Very High Risk

0 50 m 100 m

ENGEO

Produced by **Datanest.earth**

Title: Private Plan Change Liquefaction and Lateral Spread Risk Map		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: KE	Figure No.: 1
Date: 23-07-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:4000	Version: draft



Legend

- Private Plan Change Boundary
- Zone Boundaries
- Low Risk
- Moderate Risk
- High Risk
- Very High Risk

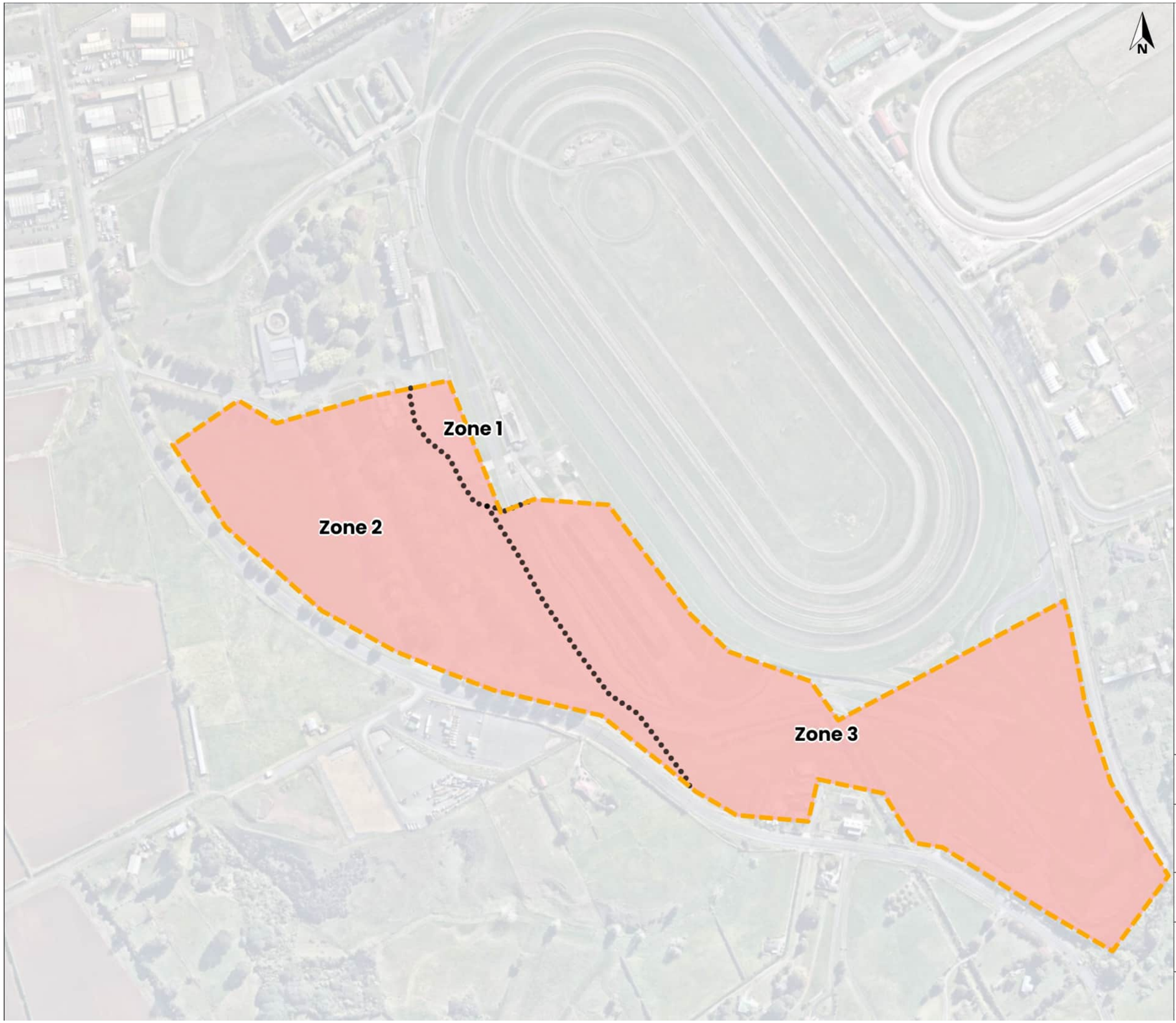
0 50 m 100 m

ENGEO

Produced by **Datanest.earth**

Title:
Private Plan Change Consolidation
Settlement Risk Map

Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: RB	Figure No.: 2
Date: 18-12-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:4000	Version: Final



Legend

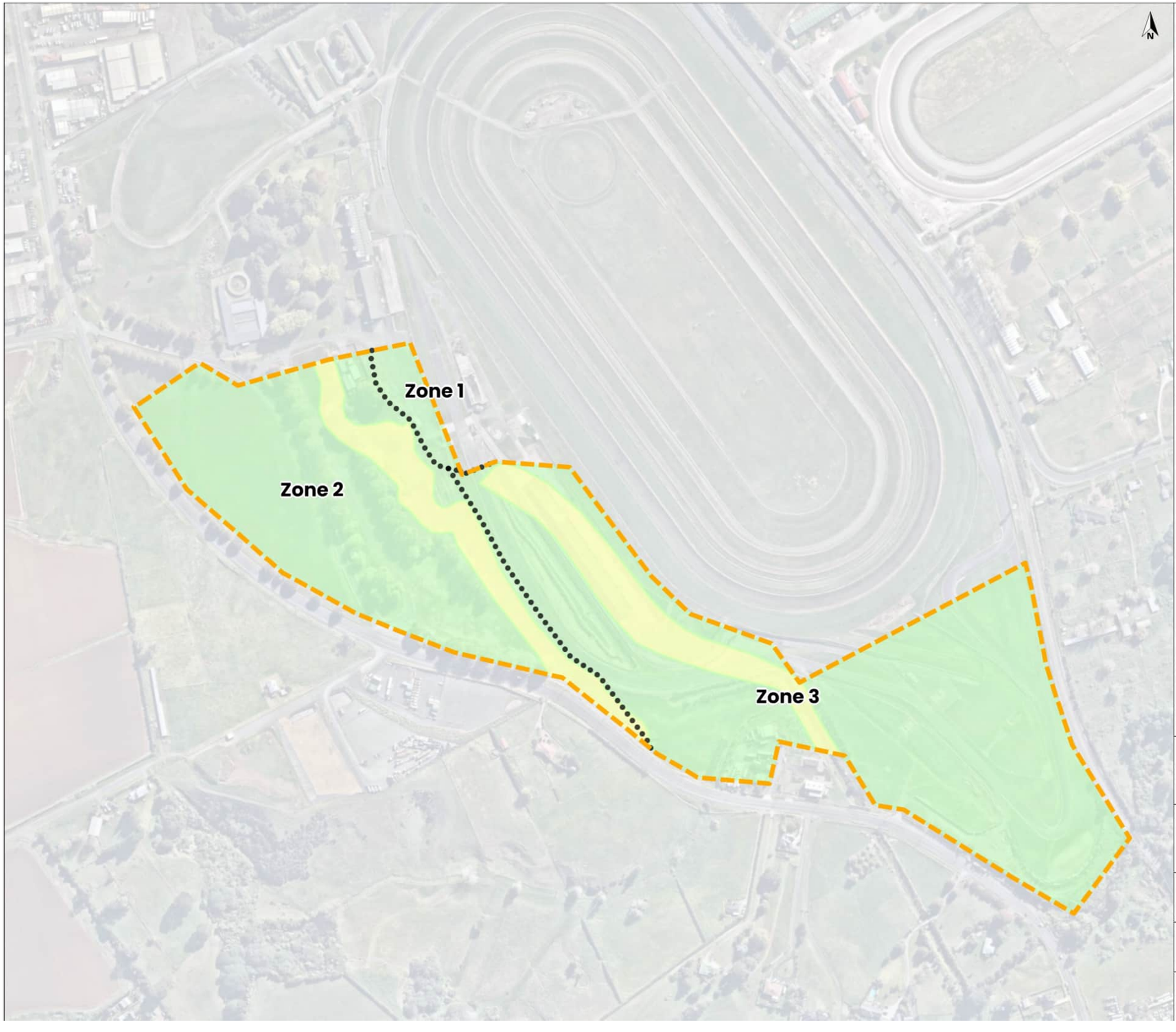
- Private Plan Change Boundary
- Zone Boundaries
- Low Risk
- Moderate Risk
- High Risk
- Very High Risk

0 50 m 100 m

ENGEO

Produced by **Datanest.earth**

Title: Private Plan Change Expansive Soils Risk Map		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: RB	Figure No.: 3
Date: 18-12-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:4000	Version: Final



Legend

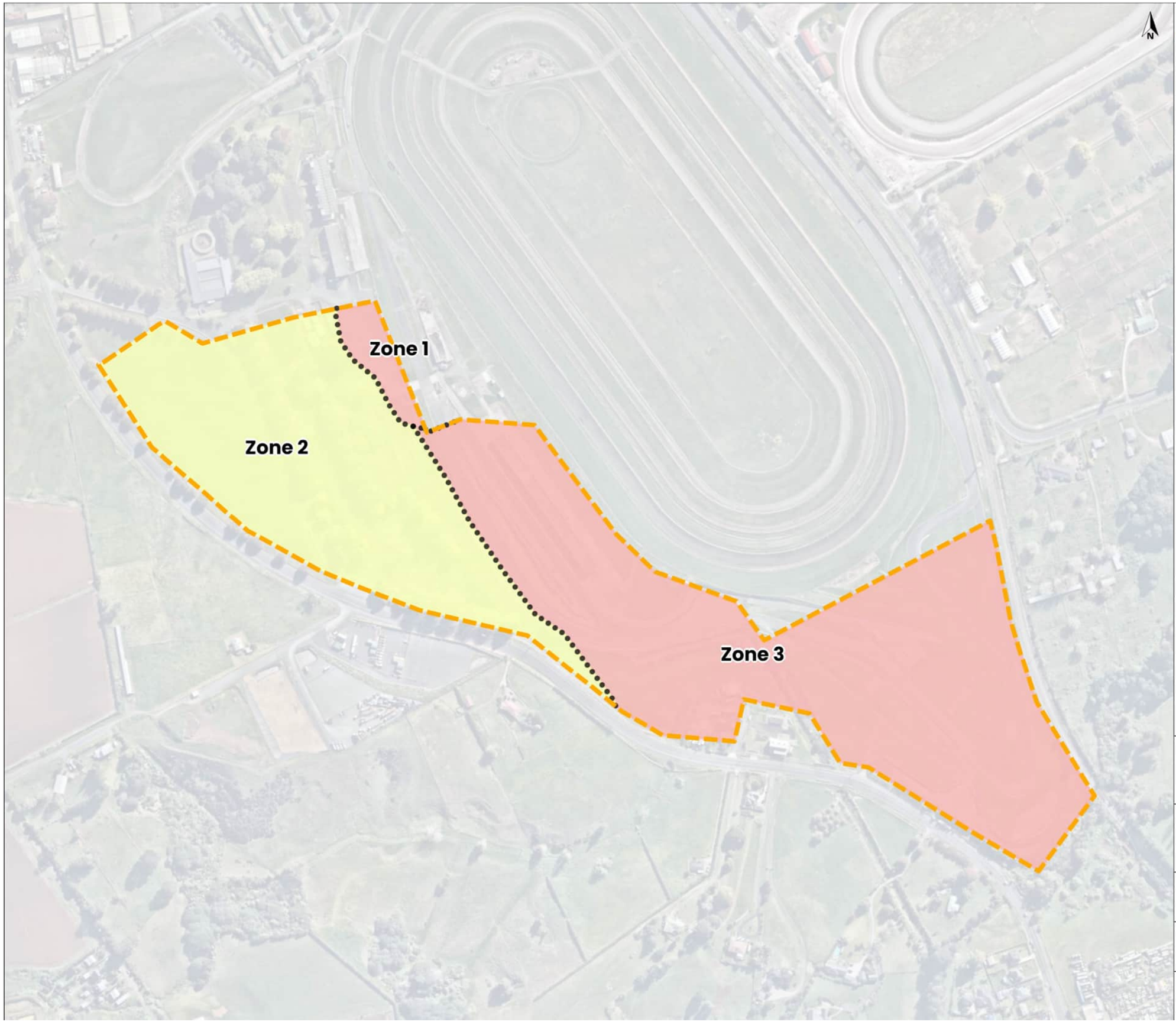
- Private Plan Change Boundary
- Zone Boundaries
- Low Risk
- Moderate Risk
- High Risk
- Very High Risk

0 50 m 100 m

ENGEO

Produced by **Datanest.earth**

Title: Private Plan Change Slope Instability Risk Map		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: RB	Figure No.: 4
Date: 18-12-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:4000	Version: Final



Legend

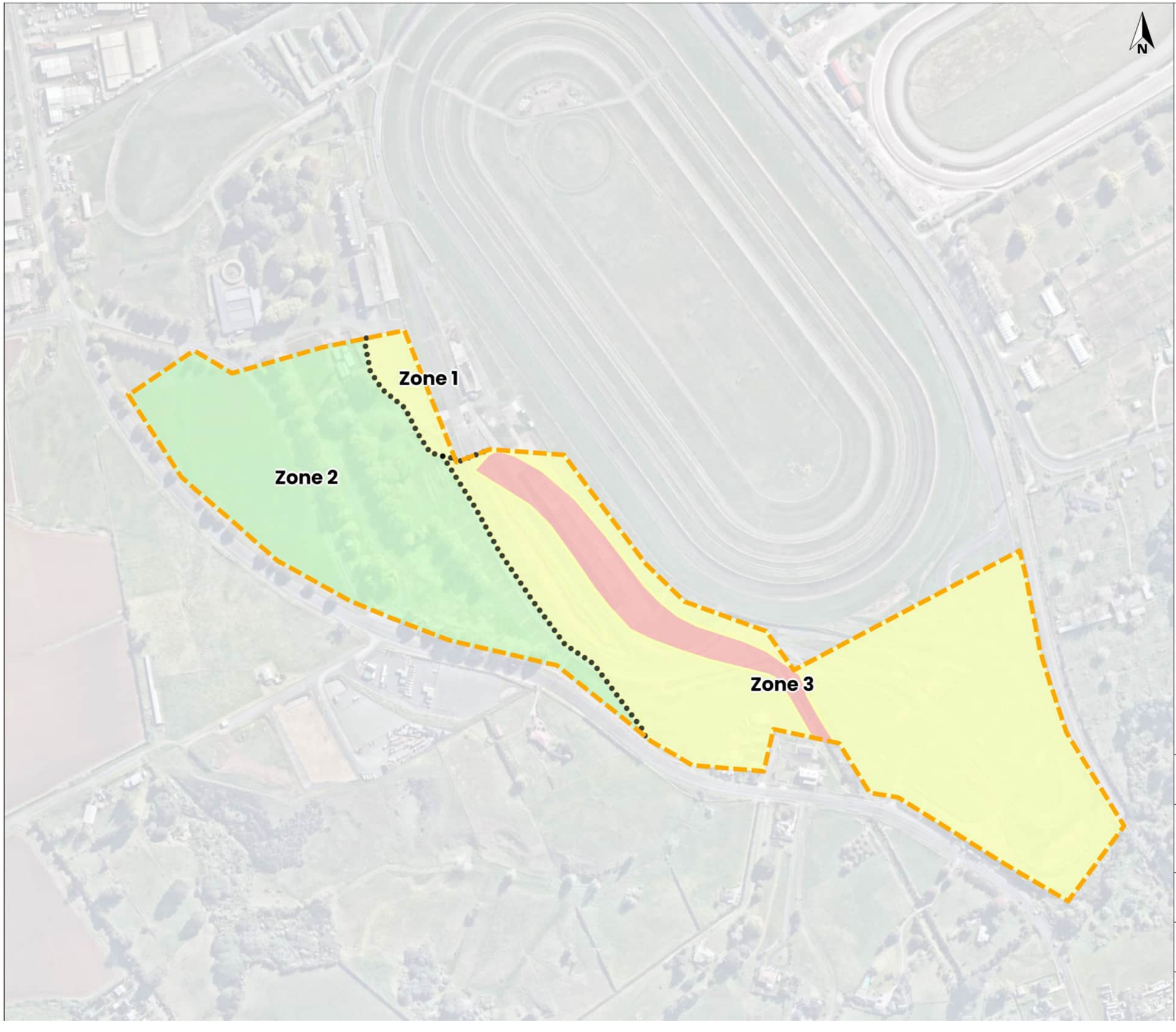
- Private Plan Change Boundary
- Zone Boundaries
- Low Risk
- Moderate Risk
- High Risk

0 50 m 100 m

ENGEO

Produced by **Datanest.earth**

Title: Private Plan Change Material Reuse for Engineered Fill Risk Map		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: RB	Figure No.: 5
Date: 18-12-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:4000	Version: Final



Legend

- Private Plan Change Boundary
- Zone Boundaries
- Moderate Risk - Groundwater
- Low Risk
- Moderate Risk
- High Risk
- Very High Risk

0 50 m 100 m

ENGEO

Produced by **Datanest.earth**

Title: Private Plan Change Groundwater Risk Map		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: RB	Figure No.: 6
Date: 18-12-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:4000	Version: Final

Legend

- Private Plan Change Boundary
- Zone Boundaries
- Low Risk
- High Risk

0 50 m 100 m

ENGEO

Produced by **Datanest.earth**

Title: Private Plan Change Flooding Risk Map		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: RB	Figure No.: 7
Date: 18-12-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:4000	Version: Final

APPENDIX 4

ENGEO Geotechnical Preliminary Investigation Report

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Project Number 25208.000.001

Geotechnical Preliminary Investigation Report

222-250 Manukau Road, Pukekohe, Auckland

Submitted to:
Auckland Thoroughbred Racing Incorporated
80-100 Ascot Avenue
Remuera

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ENGEO Document Control:

Report Title	Draft Geotechnical Preliminary Investigation Report - 222-250 Manukau Road, Pukekohe				
Project No.	25208.000.001	**Doc ID**	05		
Client	Auckland Thoroughbred Racing Incorporated	**Client Contact**	Adam Sadgrove		
Distribution (PDF)	ENGEO File Copy Draft Issued to Client				
Date	**Revision**	**Description**	**Author**	**Reviewer**	**WP**
17/05/2024	0	Draft For Comment	RB & KE	MM	-
31/05/2024	1	Draft For Comment	RB & KE	MM	-
26/06/2024	2	Issued to Client	RB & KE	MM	DF

1 Introduction

ENGEO Ltd was requested by Auckland Thoroughbred Racing Incorporated to undertake a geotechnical preliminary investigation report of the property at 222-250 Manukau Road, Pukekohe, Auckland ('the site').

The purpose of the assessment was to undertake site wide geotechnical investigations, prepare an engineering geological model for the site and identify and discuss geological hazards present within the site. This report has been prepared to inform of the site geology and hazards and is not to be used to support an application for resource and building consent for future development (which will require additional geotechnical assessment and reporting).

This work has been carried out in accordance with our signed agreement P25208.000.001_01 dated 01 March 2024

Our scope of works included the following:

- Review published geotechnical and geological information relevant to the site.
- Site assessment by an experienced ground engineering professional.
- Advance thirty-four hand auger boreholes to maximum depths of 3.0 m to 5.0 m below ground level or prior refusal.
    - Retrieve ten soil samples for Atterberg and linear shrinkage laboratory testing.
- Co-ordination and technical supervision of ten machine boreholes up to 30 m below ground level or practical refusal, including strength testing (standard penetration tests (SPTs)) at 1.5 m intervals.
    - Retrieve eight soil samples for one dimensional consolidation laboratory testing.
    - Installation of five piezometers to support groundwater monitoring.
- Co-ordination of eleven Cone Penetration tests (CPT) and four Seismic Cone Penetration Tests (SCPTs) up to 20 m below ground level or practical refusal.
- Co-ordination of 10 Dilatometer Tests (DMTs) to a depth of up to 30 m with measurement intervals of 0.2 m.
- Two site visits to undertake groundwater monitoring.
- Analysis of field data and preparation of a sitewide Leapfrog Model and preparation of five cross sections illustrating the interpreted geological ground model.
- Assessment of geohazards on-site relevant to the potential future use for development. This excludes site wide detailed analysis.
- Preparation of a geotechnical Preliminary Investigation Report, which includes site wide investigation, geological cross sections and identify / discussion of geological hazards present within the site.

Investigation Location Plans are presented as Figures 1, 2 and 3 in Appendix 1. These plans also include investigation data points from previous investigations (by others) summarised below.

2 Desktop Study

2.1 Site Description

The irregular shaped site at 222-250 Manukau Road, Pukekohe comprises a 72.5 ha mixed-use commercial section (i.e. horse training / racing track and motorcar racing track) on land legally described as Lots 1 and 2 DP 337473, Lot 2 DP 100207, LOT 3 DP 511480 and LOT 2 DP 511480.

The site can be accessed from two locations on the western boundary off Buckland Road. The site is bounded to the east, south and west by agricultural land, public roads, and a railway line. Commercial warehouse buildings are located north of the site.

A zone plan is attached as Figure 4 of Appendix 1. This breaks the site up into three geotechnical zones which are listed and described below:

- **Zone 1** – This area comprises the low lying areas in the northern portion of the site.
- **Zone 2** – This area comprises the elevated area of the site between the western boundary and the motor racing track.
- **Zone 3** – This area comprises the low lying areas in the southern portion of the site.

Zones 1 and 3 are low lying (between approximately 50 and 55 m RL) and includes most of the existing structures present on the site. Elevation changes within these zones are in the order of 1 m – 2 m with isolated low points in stormwater swales up to 5 m below the surrounding area. These zones include horse stables / circular trainer track, two grandstands and structures to support the motor racing track (i.e. pit stop buildings, maintenance / workshop buildings etc.) as well as both the horse track and the motor racing track. Other ancillary structures are present within the site and are understood to be used as support facilities. An open swale is located between the pit lane and the motor racing track. The lowest elevation land within the site is located in the northwest and north of Zone 1, generally at an elevation between 50 and 52 m RL. These areas are largely undeveloped apart from access roads and a presumed horse stable.

Zone 2 is elevated (between approximately 55 and 66 m RL) and includes paddock / lawn areas with several internal roads providing access down to the existing buildings and lower lying portions of the site. Slopes in this zone have grades of up to approximately 1(V):4(H).

2.2 Auckland Council GeoMaps

Based on our review of the publicly available contours on Auckland Council GeoMaps, we note the following:

- Public services are mapped that intersect the site are described below and are presented in Figure 5 of Appendix 1.
    - A 900 mm diameter wastewater lines intersects the site north to south and extends through the horse track. Based on surveyed invert levels the service line is approximately 2.9 to 3.2 m below ground level.

- A 600 mm diameter wastewater line intersects the site north to south running parallel to the western portion of the motor racing track. Based on surveyed invert levels the services line is approximately 2.3 to 3.0 m below ground level.

- Multiple flood prone areas, flood plains and overland flow paths are mapped through the site. These overland flow paths have catchment areas of up to and more than 100 ha. The locations of these overland flow paths are presented in Figure 6 of Appendix 1.

2.3 Geology

The GNS Science Map 12B Geology of the Pukekohe Area (scale 1:50,000) shows that the site contains three geological units (Figure 1). The northern low-lying portion of the site is mapped at the Pahurehure Member (Qtp) of the Takaanini Formation (PQt) and consists of alluvial gravel, silt, clay and carbonaceous matter.

The low-lying eastern portion of the site is mapped as Anthropogenic engineered ground, mixed cut and fill deposits (He). The map notes that these are areas where underlying geology is uncertain due to modification by human activities.

The western elevated portion of the site is mapped Basaltic Lava (Qsl) of the Kerikeri Volcanic Group (South Auckland Volcanic Field). This consists variably weathered lava flows, often hard and in places displaying columnar jointing. Surficial soils are anticipated to comprise a mixture of ashes, tephra and tuff, overlying weathered basaltic lava.

Figure 1: Mapped Geology

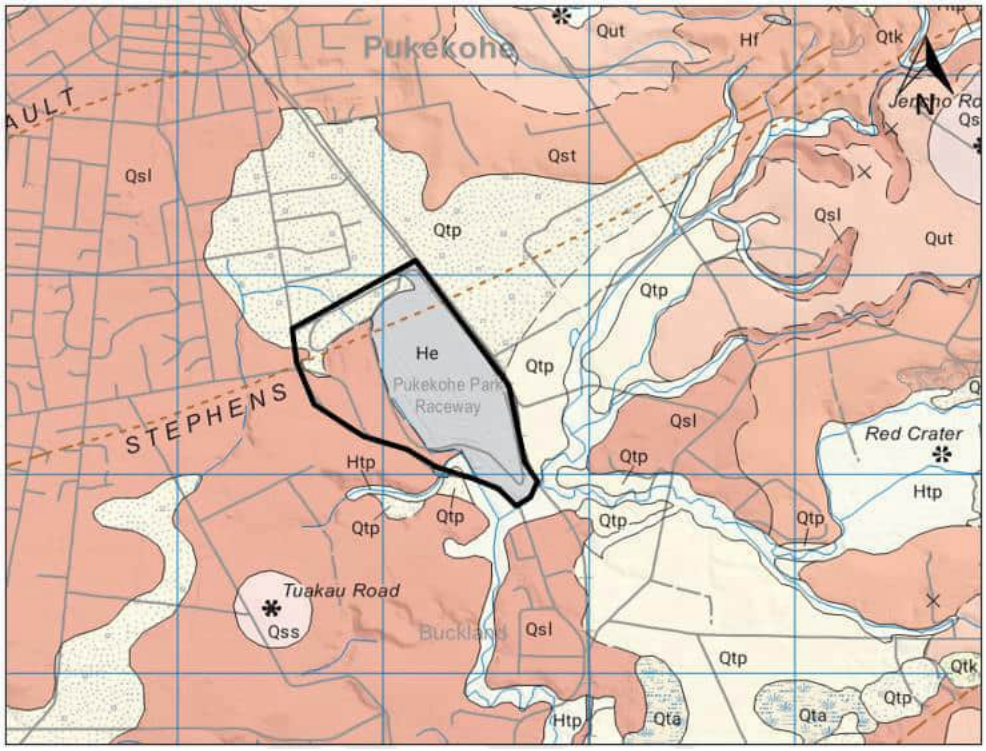


Image not to scale.

2.4 Seismicity

GNS science maps the St Stephens Fault intersecting the northern portion of the site. This fault is mapped as a possibly active fault with a dip direction of 340 degrees and dip angle of 90 degrees. This fault has a total displacement of 0.1-1 km, with throw down to the northwest.

The Pukekoke Fault is mapped 1.6 km north of the site and the Buckland Fault is mapped 3.2 km south of the site.

The closest known active fault is the Wairoa South Fault and is located approximately 20 km east of the site.

2.5 Historical Aerial Photography Review

Aerial photographs dating from 1942 to 2024 have been reviewed in the context of changing landforms and geological features. The aerial photographs were sourced from Auckland Council GeoMaps, Retrolens, National Library and Google Earth Pro. Relevant visible features on the site and surrounding area are summarised in Table 1 below.

Table 1: Aerial Photograph Summary

Date	Description
1942	The site is predominantly used as agricultural land. A racing track, more or less the same size as the existing main horse track occupies a large area in Zones 1 and 3; associated stands and auxiliary buildings are located within Zone 2. Undeveloped areas of the site appear to be used for grazing. A gully feature is observed in the southern portion of the site.
1961	Additional lanes have been added to the horse racing track noted along the eastern boundary of site. Additionally, the pastoral land located to the north of the horse racing track has been cleared to construct buildings (same shape and size as existing horse stables). An additional large racing track has been constructed to the east of the site on the eastern side of station road. Additionally, light horticultural activity is noted on adjacent land to the south of the site.
1963	A large racetrack (motor racing based on publicly available information online) has been built around the perimeter of the site. A lot of vehicles are parked along the western portion of the site and centre of the track, as well as on adjacent land to the north. Area in the northern portion of the site (existing stables) appear to be used as carparking.
1976	Additional buildings have been constructed within Zone 2 of the site, pathways / roads connect these buildings. The gully features at the southern portion of the site have been infilled (likely associated with construction of the track circa 1963). Some additional buildings have been constructed alongside the horse racing track to the east of the site. The horticultural activity noted to the south of the site on the 1961 aerial has expanded with a small glasshouse observed and additional areas of cropping up to the southern boundary of the site.
1981	An access road from the outer ring of the horse track to the inner track has been constructed. Additional horticultural activity is noted to the west of the site, on the opposite side of Manukau Road.

Date	Description
1988	No significant changes are observed to the site. Light industrial development is noted to the north / northwest, with yards and warehouses observed.
2001	No significant changes are observed to the site. The horticultural activity that was present to the south has been cleared. Additional light industrial development is noted to the north of the site. An additional track has been constructed to the northeast of the site.
2003	The existing stewards / race control rooms and pit lane building have been constructed. Additionally, two buildings (likely the former grandstands) have been constructed in Zone 3. A large stockpile is observed in the southern portion of Zone 3 (recorded as a 'landfill' in the property file); this stockpile is understood to be a runoff area for the raceway. Earthworks associated with construction of the pony stable and training area are observed, with a stockpile present to the southwest of this area. Bulk earthworks are occurring along the northern boundary.
2006	The two grandstands at the southern end of Zone 3 have been removed. The earthworks to the west of the site have been finished and the pony stable / training area has been constructed. The large stockpile associated with these earthworks (noted in 2003) remains. Four large tanks are observed along the south-western boundary, in Zone 3.
2008 - 2011	The main horse racetrack is undergoing maintenance with an excavator, loader, and a soil grading machine sorting material into different stockpiles. A tractor towing a large tanker is observed on the northern end of the horseracing track. The earthworks noted along the sites northern border in the 2003 aerial have concluded and two large multi-storey buildings with associated carparking are present.
2017 - 2023	The pitlane entranceway to the north has been widened and resealed. A gravel yard with trucks parked in it has been created along the south-western border of Zone 3. No other significant changes are observed to the surrounding area.

2.6 Existing Geotechnical Data

2.6.1 Ground Consulting Ltd Geotechnical Feasibility Assessment (November 2018, revised December 2022)

Ground Consulting Ltd (GCL) completed investigations within the western portion of the site to develop and progress [redacted] within this area of the site. As part of their investigation, GCL completed the following:

- Ten hand auger boreholes to a target depth of 3.0 m.
- Five cone penetration tests to a target depth of 30.0 m or prior refusal.

GCL identified two distinct soil formations below topsoil which comprised Tauranga Group (now Takaanini Formation) alluvial deposits and South Auckland Volcanic Field ash deposits. Tauranga Group alluvial deposits typically consisted of clayey silts and silty clays with occasional sand layers. Cohesive soils were generally firm to very stiff. South Auckland Volcanic Field ash deposits typically consisted of silts and clayey silts which were generally very stiff to hard. Undocumented fills up to 2.2 m depth were encountered across lower lying areas of the investigation area and are inferred to be associated with landform modification for the racetracks.

GCL divided the site into two different zones based on encountered ground conditions (Zone 1 and Zone 2 respectively). Zone 1 encompassed topsoil underlain by Tauranga Group alluvial deposits down to depths of 3.6 to 11.8 m depth which was overlying South Auckland Volcanic Field ash deposits to termination depths of investigations. Zone 2 encompassed shallow topsoil directly underlain by South Auckland Volcanic Field ash deposits to termination depths of investigations.

GCL suggested the following for development of Zone 1, noting significant development constraints due to the underlying ground conditions:

- Structural in-filling and diversion of overland flowpaths / water course features.
- Removal of weak soil and replacement with suitable engineered fill.
- Pre-loading of weak soil to provide engineered building platforms.
- Engineered foundation design with raft type floors to accommodate low bearing capacity soils.
- Deep pile foundations embedded within the very dense volcanic deposits at depth.
- Specialised stormwater diversion and soakage structures including recharge pits and rain gardens.

GCL suggested that there were only limited constraints on development of Zone 2 which were [redacted].

2.6.2 Tonkin + Taylor Pre-Purchase Geotechnical and Contaminated Land Assessment (April 2022)

Tonkin + Taylor completed investigations across the site to assess the suitability of the site for development of a [redacted]. As part of their investigation, Tonkin + Taylor completed the following:

- Eight hand auger boreholes to a target depth of 3.0 m or prior refusal.
- Eight cone penetration tests to a target depth of up to 30.0 m or prior refusal.

From their desktop study and investigation results Tonkin + Taylor identified three distinct soil formations below topsoil which were Tauranga Group (now Takaanini Formation) alluvial deposits, South Auckland Volcanic Field deposits and Kaawa Formation. Three subgroups within the Tauranga Group alluvial deposits were defined within their geological model. These were:

- Very soft to soft Tauranga Group Alluvium – predominantly consisted of clay and silts with isolated peat layers.

- Firm to stiff Tauranga Group Alluvium – predominantly consisted of silty clay or clayey silt.
- Loose to medium dense Tauranga Group – predominantly consisted of silty sand and sand.

South Auckland Volcanic Field deposits comprised ash (silts and clayey silts which were generally very stiff to hard), basalt and welded tuff. Both Basalt and tuff were only identified within one investigation point from a previously drilled well. Kaawa Formation was identified to be underlying Tauranga Group alluvium at depth. Based on the ground model within the Tonkin + Taylor report, the Kaawa Formation is approximately 100 m below existing ground level. Undocumented fills up to 2.2 m depth were encountered across lower lying areas of the investigation area and are inferred to be associated with landform modification for the racetracks.

Following this investigation, Tonkin + Taylor identified the following hazards to [redacted] development of the site:

- **Liquefaction and Lateral Spreading** – Tonkin + Taylor identified that there was a generally insignificant to mild liquefaction risk based on the categories set out in MBIE 2021 Module 3. Based on ground conditions in the southern portion of the site, it is expected that there is a low to moderate risk of lateral spreading such that it is expected that stabilisation measures near stream banks will be required to reduce lateral spread displacements to acceptable levels.
- **Settlement** – Soils at the site, particularly within the low-lying area of the site, are generally highly compressible and have low permeability. As such, settlement is expected to be a significant design consideration.
- **Expansive Soils** – No laboratory testing was conducted by Tonkin + Taylor but based on their experience with similar soils they have assumed to have an expansive soil class of “moderately” or “highly” expansive based on classifications in B1/AS1.

Tonkin + Taylor suggests that a detailed geotechnical investigation and assessment will be required for each proposed building [redacted] to allow for mitigation measures such as preloading to be implemented.

2.6.3 New Zealand Geotechnical Database

We have carried out a review of the New Zealand Geotechnical Database (NZGD) and identified the data listed below as relevant to the site:

- Located 200 m north of the northern boundary of the site are two machine boreholes to a target depth of 15.45 m completed by Mott MacDonald. These boreholes generally encountered soils with a high organic composition from immediately below undocumented fills (1.0 – 2.0 m depth) to depths of approximately 12.5 m below ground level.
- Two hand auger boreholes were completed within the site by Babbage Consultants with one at either end of the pedestrian bridge which crosses the motor racing track. Both hand augers typically encountered stiff, silt dominant alluvium to termination depths of the hand augers at 5.0 m below ground level.
- One hand auger borehole was completed by Fraser Thomas at the northern end of Zone 2. This hand auger encountered very stiff, cohesive dominant, ash soils to termination depth of the hand auger borehole at 3.0 m below ground level.

3 Site Investigation

ENGEO visited the site between 7 and 21 March 2024 to complete our site walkover and undertake intrusive testing. All soils in our investigations were logged on-site by ENGEO in general accordance with the New Zealand Geotechnical Society field classification guidelines (NZGS, 2005). Our investigation works are documented in the following subsections.

3.1 Site Walkover

ENGEO visited the site on 7 and 8 March 2024 to undertake a site walkover and mark out testing locations for the service locator prior to investigations taking place. During the site walkover, conditions at the site were observed to be generally in line with what was outlined during our desktop study of the site.

3.2 Investigations Completed

ENGEO attended site on 11 March 2024 to 2 April 2024 to complete or observe the following:

- Utility markout / clearance for proposed test locations.
- Thirty-four hand auger boreholes, named HA01 through HA35 (missing HA09), to depths of up to 5.0 m. Hand auger borehole logs are presented in Appendix 2.
- Ten machine boreholes, named MBH01 through MBH10, to depths of up to 30 m. Machine Borehole Logs are presented in Appendix 3.
- Groundwater monitoring standpipe piezometers were installed within five machine boreholes. These include MBH02, MBH05, MBH08, MBH09 and MBH10.Eleven Cone penetration tests (CPT), names CPT01 through CPT12 (missing CPT04), to depths of up to 30 m.
- Four Seismic Cone Penetration Tests (sCPT), named SCPT14 to SCPT17 to depths up to 30 m.
- Ten Dilatometer tests (DMTs), named DMT01 through DMT10, to depth up to 30 m.

Contractor supplied CPT, sCPT and DMT logs are presented in Appendix 4.

Some tests were abandoned due to the following reasons:

- The utility markout was either incomplete or unclear.
- The ground was unable to be penetrated due to the presence of shallow, dense hardfills.

3.3 Laboratory Testing

ENGEO retrieved soil samples to undertake the following laboratory tests:

- Retrieve ten soil samples for Atterberg and Linear shrinkage laboratory testing.
- Retrieve nine soil samples for one-dimensional consolidation laboratory testing.

Table 2 presents the results of the Atterberg and Linear Shrinkage Lab testing.

Table 2: Atterberg and Linear Shrinkage Testing

MBH ID	Depth (m)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Linear Shrinkage (%)	Expansive Soil Classification
HA01	0.80 – 1.10	76.2	97	48	49	17	Highly
HA05	0.10 – 0.50	58.2	114	58	56	26	Extremely
HA07	3.40 – 3.70	63.1	94	60	34	24	Highly
HA13	0.40 – 0.80	153	146	93	53	14	Extremely
HA17	0.50 – 1.20	149	243	115	128	38	Extremely
HA28	3.50 – 4.00	77.8	93	52	41	16	Highly
HA31	2.70 – 3.20	51.1	96	35	61	19	Highly
HA32	0.80 – 1.20	49.6	111	55	56	25	Extremely
HA34	2.10 – 2.80	83.7	115	50	65	23	Extremely
HA35	0.90 – 1.20	76	112	45	67	24	Extremely

Expansive soil classifications based off correlations from MBIE B1/AS1 Amendment 19 (November 2019).

Table 3 presents the results of the one-dimensional consolidation laboratory testing.

Table 3: One-dimensional Consolidation Testing

MBH ID	Depth (m)	Water Content (%)		Dry Density (t/m^3)		Void Ratio		
		Initial	Final	Initial	Final	Initial	After consolidation	After Rebound
MBH01	7.50 – 8.00	44.5	36.9	1.22	1.43	1.174	0.858	0.896
MBH02	4.50 – 5.00	97.6	65.6	0.7	0.98	2.810	1.707	1.784
MBH02	13.50 – 14.00	161	66.9	0.48	1.11	4.512	1.390	1.852
MBH04	7.95 – 8.45	100	44.6	0.71	1.27	2.737	1.093	1.187
MBH05	4.50 – 5.00	406	179	0.21	0.49	6.267	2.049	2.467
MBH05	10.50 – 11.00	192	95.1	0.43	0.83	5.192	2.201	2.512
MBH07	9.00 – 9.50	162.1	84.1	0.49	0.89	4.432	1.971	2.261
MBH08	10.50 – 11.00	56.9	44.4	1.04	1.30	1.540	1.032	1.087

The full laboratory test results are included in Appendix 5.

3.4 Instrumentation and Monitoring

Five groundwater monitoring piezometers were installed within the machine boreholes MBH02, MBH05, MBH08, MBH09 and MBH10. The as-builts of the piezometers are included in Appendix 6. ENGEO attended site to monitor groundwater levels within these piezometers. Table 4 presents the groundwater monitoring results:

Table 4: Groundwater Monitoring Results

Piezometer ID	Groundwater Monitoring (m bgl)		
	During Drilling	11/04/2024	26/04/2024
MBH02	2.80	1.02	0.62
MBH05	2.60	2.26	2.16
MBH08	11.89	5.65	5.62
MBH09	5.80	6.01	5.66
MBH10	6.05	4.44	4.37

4 Engineering Geological Model

4.1 Model Development

The ENGEO site investigations, historical investigations and observations described in Sections 1 and 4, and published geological maps and other published resources have been adopted to develop a 3-dimensional engineering geological model (EGM) for the site was created using the program Leapfrog (Version 2023.2.3). The EGM can broadly be summarised as follows:

- As noted in Section 3.2, the low-lying eastern portion of the site is mapped as Anthropogenic engineered ground, mixed cut and fill deposits and is referred to in the Leapfrog model as **Fill**. This fill is interpreted to have been encountered on-site as dominantly silt with occasional sand and gravel and locally underlain by buried topsoil. The fill may be derived from *in situ* native soil. Reworked native soil is difficult to distinguish from native soils. The area of fill appears to be generally in line with what was identified within the historical aerial photography review.

- **Takaanini Formation** (previously Tauranga Group) which is described by GNS Science to comprise poorly consolidated clastic sedimentary strata dominated by sand (stone) and mud (stone) deposited in terrestrial to shallow marine environments of Late Pliocene to Holocene age in the Auckland Area. This Formation is divided into a number of sub-members. The relevant sub-members to the site are described below:

    - The **Hobsonville Member** is described by GNS Science as being reworked rhyolitic / pumiceous sediments and / or silicic airfall or pyroclastic flow deposits. This may include gravel, sands and silt / clay components. Pumiceous alluvium encountered within the southern portion of the site in both ENGEO's and other consultants' investigation is inferred as Hobsonville Member. This member was found in isolated areas of Zone 3.

    - The **Runciman Member** is described by GNS Science as being a carbonaceous sand (stone) or mud (stone) with organic material being prominent but not dominant. This is interpreted to have been encountered on-site as predominantly organic-rich cohesive soils. This member was found throughout Zones 1 and 3.

    - The **Ardmore Member** is described by GNS Science as being peat (lignite) and various other materials with organic material being dominant by volume. This is interpreted to have been encountered on-site as thick units of fibrous organics and peat, deposited in an estuarine setting in and beyond the northern portion of the site. This member was generally encountered in Zone 1.

    - The **Pahurehure Member** is described by GNS Science as being predominantly fluvial sediments sourced from present day surface catchments with soils typically ranging from clay to gravel. This is interpreted to have been encountered on-site as fluvially-derived sediments where there is more or less of an absence or small percentage of low organic content. This member was found throughout Zones 1 and 3.

- The **South Auckland Volcanic Field** (SAVF) is described by GNS Science as comprising of Quaternary-age basalt plugs, lava flows, scoria and ash deposits. This is interpreted to have been encountered on-site as both non-welded and welded tuff / volcanic ash deposits. This member was encountered within Zone 2. Weathered basaltic lava flows may be encountered at depth but were not encountered within the reach of our investigations.

4.2 Groundwater

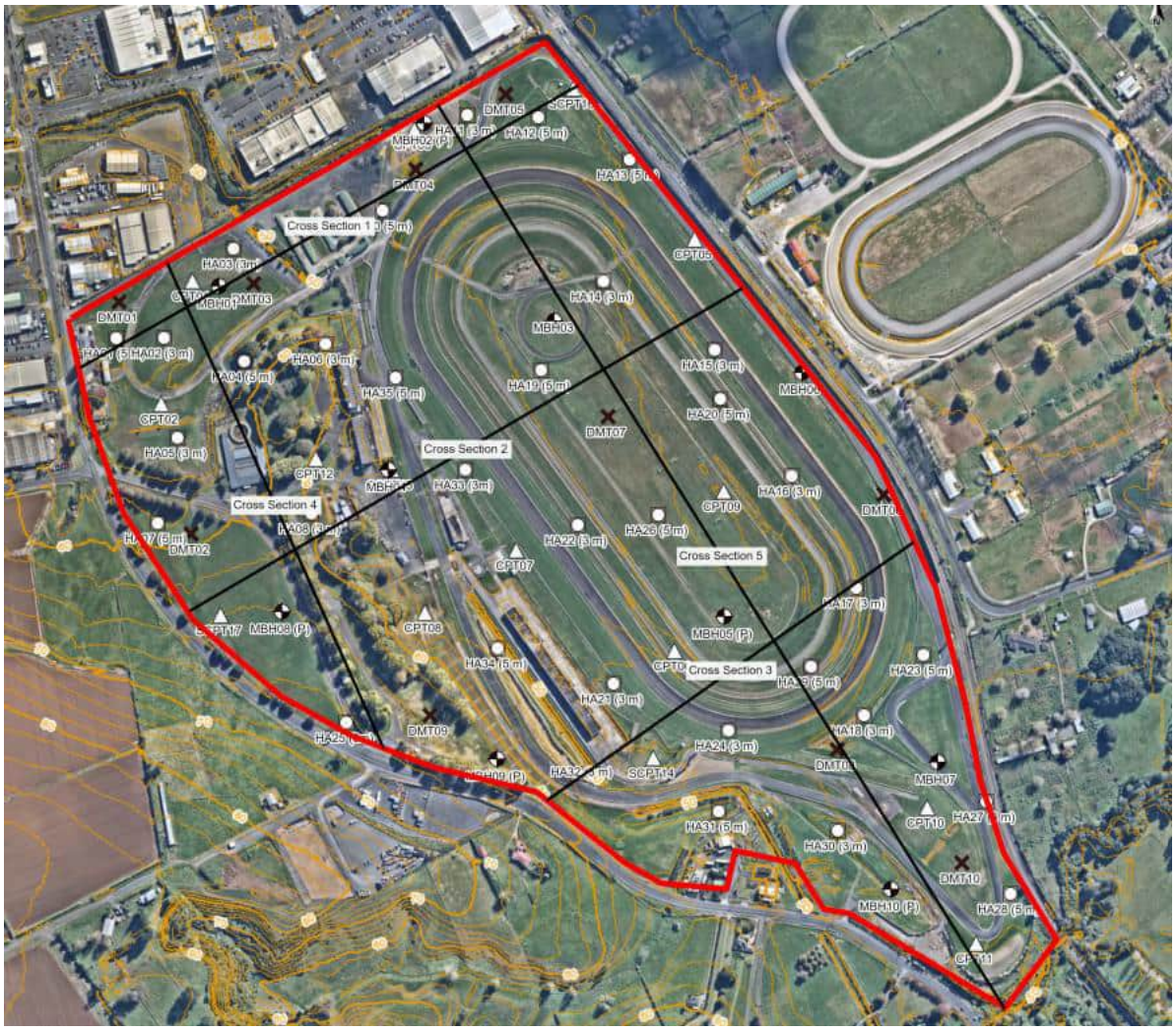
Groundwater has not been modelled as part of our Leapfrog 3D model. However, based on testing and monitoring data available on the NZGD and completed by ENGEO the following summarises groundwater levels across the site:

- Within Zone 2, groundwater levels are generally between 5.0 and 6.0 m below ground level.
- Within Zones 1 and 3, groundwater levels range between 0.5 m and 4.5 m below ground level. Groundwater is typically shallower towards the northern corner of the site, associated with lowering landform elevation.

4.3 Plans and Sections

Five cross-sections have been cut from the Leapfrog Interpretive Geological Model. Figure 2 below shows the locations of these cross-sections within the site. All cross-sections are presented within Appendix 7.

Figure 2: Cross-Section Location Plan



4.4 Assumptions and Uncertainties

The key assumptions and uncertainties in the engineering geological model are listed below:

- This model uses testing available on the NZGD and completed by ENGEO. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this model does not purport to completely describe all the site characteristics and properties.
- All data between test locations has been interpolated using the Leapfrog (Version 2023.2.3) software. Therefore, subsurface conditions vary from those mapped within the EGM and the derived cross-sections at specific points across the site.
- Surfaces (interpolated geological contacts) are generated from control points. Control points are established at our intrusive test locations and mapped surface exposures (outcrops), thus surfaces / contacts are forced to conform to the findings of our testing.
- We have used our machine borehole and hand auger data as well as correlated our machine borehole and hand auger observations with *in situ* CPT testing to interpret the locations, depths and extents of the soil units referred to above. This information is interpretive and as such the locations of these units within the EGM are interpretive, based on interpolations between topography, mapped geology, our site observations, intrusive testing and review of published literature.

5 Geotechnical and Geohazard Assessment

As part of the site wide geotechnical study, we have identified a number of geohazards present across the site. These geohazards are listed below and have been further discussed in Section 6.0. Depending on the future land use and development type, these geohazards will need to be assessed in detail to outline the risk and mitigation measures.

- Variability in ground conditions
- Seismic Hazard
- Liquefaction
- Consolidation Settlement
- Bearing Capacity
- Expansive Soils
- Undocumented Fills
- Slope Stability
- Flooding.

5.1 Variability in Ground Conditions

The site subsoils encountered within our testing are highly variable (in terms of depth to strata) across the site, particularly within the lower lying areas. This is due to both the alluvial nature of the deposits and the site use history and associated landform modifications completed across the site. Typically, alluvial deposits do not occur in any regular or predictable stratigraphic pattern. Therefore, native site subsoils will be highly variable. Undocumented fill soils may also be highly variable in depth, extent and composition. It may be impossible to de-risk the potential for encountering unexpected conditions, particularly where prior landform modification has occurred.

5.2 Seismic Hazards

Potential seismic hazards resulting from nearby moderate to major earthquakes can generally be classified as primary and secondary. The primary effect is ground rupture, also called surface faulting. The common secondary seismic hazards include ground shaking, ground lurching, regional subsidence or uplift, soil liquefaction, lateral spreading, and landslides.

The following sections present a discussion of seismic hazards as they apply to the site.

5.2.1 Site Subsoil Class

A site soil classification of 'Class E – Very Soft Soil Site' as per NZS 1170.5:2004 is considered to be appropriate for Zones 1 and 3 based on soil strength materials to the base of the investigations and our understanding of the geological setting.

A site soil classification of 'Class D – Deep or Soft Soil Site' as per NZS 1170.5:2004 is considered to be appropriate for Zone 2 based on soil strength materials to the base of the investigations and our understanding of the geological setting. Further deep testing may allow adoption of 'Class C – Shallow Soil Site' should underlying basaltic lava be encountered, however we would only recommend additional testing if this categorisation would allow significant efficiencies in design of the proposed development.

5.2.2 Ground Rupture

As cited in Section 3.3, the site intersects the active St Stephens fault. Due to this close proximity, fault related ground rupture and ground lurching are considered possible should this fault segment rupture. We are not aware of Council or GNS studies recommending a Fault Avoidance Zone in proximity to this fault, nor are we aware of any planning restrictions recently imposed by Council on nearby developments.

Given this tectonic setting, regional subsidence may be experienced following a large earthquake on faults in the area. In seismically active areas there is always a risk that unmapped active faults may be present, particularly when the faults may have a low recurrence interval and may be buried under younger alluvial sediments. The risk of this at the site is no different to the surrounding landform.

5.2.3 Ground Shaking

Ground shaking and subsequent effects on structures, infrastructure and engineering systems can be extensive and affect large areas. The intensity, frequency and duration of ground shaking drives the effect of earthquake loading on structures, while the severity of ground shaking drives the level of ground deformation.

In geotechnical assessments, amplitude, frequency and duration of shaking are the main factors considered.

Through discussions with the client, we understand the potential site development may include Importance Level 2 (IL2) structures. Peak horizontal ground accelerations (a_{max}) for use in geotechnical assessments are provided in Table 3. A_{max} values have been taken from the recommended values provided in Table A1 - Appendix A of MBIE/NZGS Module 1 for Pukekohe.

Table 5: Peak Horizontal Ground Acceleration

Limit State	Return Period	a_{max}	Magnitude
SLS	25 years	0.05 g	5.9
ULS	500 years	0.19 g	6.5

5.3 Liquefaction

5.3.1 Vertical Settlements

A preliminary liquefaction analysis of the site has been conducted under both SLS and ULS conditions using the Cone Penetration Tests (CPT's) and Seismic CPT's conducted by McMillan Drilling and the GeoLogismiki software CLiq (Version 2.3.1.15).

Under SLS conditions, liquefaction triggering is not predicted, no vertical settlement occurred during this event in all zones. The results of the analysis completed under ULS conditions is presented as a heat map of vertical settlements in Figure 7 of Appendix 1 below. This map shows total vertical settlements of up to and above 70 mm through the central area across both Zones 1 and 3 and vertical settlements of less than 10 mm within Zone 2. This map assumes no modification of the current landform and as such should be interpreted as a map of where liquefaction induced settlements may be more or less in the future rather than exact values for settlements following a ULS event. It should be noted however that during a ULS event both the liquefaction potential index (LPI) and the liquefaction severity number (LSN) are both relatively low in all zones. The LPI is low risk (0 – 3.56) and hence, there is a low-likelihood that liquefaction would trigger during an ULS event. The LSN values also all fall within the category of "little to no expression of liquefaction" (0 – 6.71). Liquefaction risk should be reassessed once the proposed development types and landform modifications are known.

Specific liquefaction analysis outputs have not been provided because of the high level nature of this report. These outputs can be provided should this development advance to resource consent stage.

5.3.2 Lateral Spreading

Our analyses have indicated low risk of liquefaction triggering, which translates to a low risk of lateral spread occurring within the majority of the site. Our observations, and prior assessments by Tonkin + Taylor identify the presence of up to 5 m deep stormwater culverts indicate there may be a risk of lateral spread triggering, and a degree of free-face stabilisation (or incorporating lateral movement into foundation design) may be recommended to protect future development. This should be reassessed once a proposed landform is available.

5.4 Consolidation Settlement

5.4.1 General

Zone 1 of the site is underlain by highly compressible peat ranging in thickness from 0.8 m to 5.4 m. The peat (Ardmore Member) appears to be present largely within Zone 1. In addition to the peat encountered on-site, much of the Takaanini Formation alluvium within Zones 1 and 3 comprises generally soft to firm silt and clay soils which are also highly compressible. Generally, soils with a tip resistance (q_c) of less than 1 MPa are likely at risk of consolidation settlement.

The placement of fill and future building loads across the peat deposits and soft soils, will induce significant primary consolidation settlements and long-term creep settlements which may continue for many years after earthworks and building construction. Managing these effects is likely to be a key constraint on future development.

The elevated portion of the site is generally underlain by very stiff to hard volcanic derived silts. Loading of these soils is less likely to induce significant future settlements where these deposits are sufficiently thick. Care should be taken when considering future settlements for fills and buildings near the boundaries of the volcanic deposits (the edge of the elevated Zone 2 landform) where the volcanics interfinger with softer Takaanini Formation soils described above.

The location of any proposed future filling should consider the presence of existing or future public or private services, particular in the low-lying areas of the site (Zones 1 and 3). This is because filling is likely to induce consolidation settlements in the underlying soils which may compromise the function of utilities, particularly those which rely on gravity.

5.4.2 Anticipated Settlements

A preliminary static settlement analysis of the site has been conducted using the CPT's and Seismic CPT's conducted by McMillan Drilling and the GeoLogismiki software CPeT-IT (Version 2.2.1.1). Uniform loads of 20 kPa, 30 kPa, 40 kPa and 60 kPa have been modelled over an area of 20 x 20 m. This analysis considers both primary settlements and long-term creep settlements. Long-term creep settlements have been calculated over a period of 50 years. The results of this analysis are presented in Table 6 below. These results should be interpreted as a reference for which areas are most at risk of consolidation settlement as part of preliminary future development planning.

Table 6: Preliminary Settlement Estimates

Zone	CPT ID	Settlement (mm)							
		20 kPa		30 kPa		40 kPa		60 kPa	
		P	L	P	L	P	L	P	L
1	CPT01	120	190	180	250	240	310	350	430
	CPT02	30	50	40	70	60	80	80	110
	CPT03	500	1100	750	1300	1000	1550	1500	2050
	CPT05	120	170	180	240	240	300	360	420
	CPT07	180	330	270	420	350	510	450	680
	CPT09	120	200	170	260	270	320	350	440
	SCPT15	100	200	150	240	200	300	300	400
	SCPT16	140	220	200	300	270	380	410	500
2	CPT08	20	40	30	50	40	60	60	80
	CPT12	30	80	40	90	60	120	80	140
	SCPT17	20	60	30	70	40	80	60	100
3	CPT06	80	150	120	200	170	230	250	320
	CPT10	40	70	60	90	80	120	120	150
	CPT11	80	190	120	230	160	250	230	330
	SCPT14	80	170	130	210	170	260	250	350

P = Primary settlement L = Long term settlement with creep

5.4.3 Discussion

These results show that larger settlements are likely to occur in Zone 1. Generally CPT's in this area had long term settlements of 400 mm or more under a 60 kPa uniformly distributed load, with a high degree of variability between CPT locations. This area of the site generally aligns with where the Ardmore Member of the Takaanini Formation was encountered. This is as expected given that the Ardmore Member is comprised of highly compressible fibrous peat. Within this area of the site alluvial soils generally have a constrained modulus of less than 1 MPa for several meters.

Settlements within Zone 2 were generally lower with less than 150 mm of long term settlement experienced under a 60 kPa widespread load in this area. We understand that this landform may be cut as part of future development, therefore cutting work may compensate future building loads. Further assessment is recommended, particularly where future buildings may straddle a cut to fill line. Care should also be taken when considering the scale of excavations within the elevated portion of the site. This is because any significant excavations may remove the competent crust that can be used for supporting future building foundation loads.

Settlements within Zone 3 were generally higher than that within Zone 2 but lower than that within Zone 1. This is as expected given that alluvial soils with a constrained modulus of less than 1 MPa for several meters were encountered which are significantly softer than those soils encountered in Zone 2. However, highly compressible fibrous peat was less widely distributed in this zone compared to Zone 1.

A series of consolidation settlement laboratory samples were obtained during our site investigations targeting soils susceptible to consolidation settlement. The results of these laboratory testing will be used to refined settlement analysis for detailed design if required in the future rather than relying on correlated parameters. The laboratory testing will also support time-dependant analysis to estimate how long settlement would take to occur should a pre-load solution be required based on the development type.

5.4.4 Consolidation Settlement Remedial Options

It is anticipated that a combination of the following remedial methods may be adopted across the lower lying portion of the site for future developments.

Option 1: Preload

Following bulk earthworks it is expected that constructing a specifically designed temporary surcharge (pre-load) fill embankment, with or without wick drains, may over-consolidate the compressible clay, silt and peat deposits. The pre-load design will need to account for future building loads and be monitored so that the geo-professional can confirm when settlements are effectively complete and building work may commence. For preliminary planning purposes, we recommend allowing between one and three years for preloading in the Zone 1 and 3 landform (without wick drains). The inclusion of wick drains will allow dissipation of excess pore pressure (and settlement) on a shorter timeframe if the project requires acceleration. Further assessments of the timeframe for settlement should be undertaken when preliminary landform and development drawings are available.

A trial embankment can also be constructed prior to widespread earthworks to back-calculate consolidation parameters.

Option 2: Ground Improvement

Where post construction settlements are considered to be excessive, deep ground improvement such as stone columns, soil mixed columns, CFA piles or similar rigid inclusions could be considered to transfer loads from the embankment, infrastructure or buildings to more competent soils at depth. Due to the majority of soils encountered still being soft at the base of our investigations, deep ground improvement depths will be in excess of 30 m.

It is noted deep ground improvement techniques will be cost prohibitive for the majority of the site. However, deep ground improvement may be utilised for isolated portions of the site where Takaanini Formation alluvium overlies harder South Auckland Volcanic Field soils and the magnitudes of post construction settlement cannot be tolerated by higher importance level structures and / or infrastructure facilities. The analysis and design of deep ground improvement measures will be subject to specific investigation. It is recommended that further investigations and analysis are undertaken to evaluate likely deep ground improvement options. Recommendations are provided in Section 6 below.

5.4.5 Groundwater Effects

Additional consolidation settlements may be experienced due to groundwater fluctuations over the design life of future preloads. Groundwater monitoring to understand seasonal fluctuations and effects of preload construction will be important to assess the likelihood of additional consolidation settlement. A network of groundwater monitoring instruments is recommended to support development design and consenting.

5.5 Foundations

Based on our investigations within Zone 2 having encountered generally very stiff to hard soils, this area of the site should be considered generally suitable for development of lightweight timber structures on shallow foundations and relatively light-weight, single level commercial developments with specific design. Should piled foundations be adopted to reduce site contouring, higher loads may be acceptable depending where on the site these developments are proposed or if bridging details are required where buildings extend across existing services.

Further detailed investigation may be required should structures with higher loads or lower settlement tolerances be proposed.

Currently Zones 1 and 3 are generally unsuitable for bearing shallow foundations for lightweight timber framed structures. As it is anticipated that significant earthworks will be required in the low-lying portion of the site, bearing capacities should be determined by site specific testing following earthworks.

5.6 Expansive Soils

Based on laboratory testing results cited in Section 4.2, most site subsoils are ‘Class H - Highly Expansive’ to ‘Class E – Extremely Expansive’ based on classifications in B1/AS1. For slightly reactive soils the 500-year design characteristic surface movement (y_s) of 78 mm to more than 90 mm may be anticipated. The risk of damage to timber framed residential structures constructed in accordance with NZS3604:2011 due to shrink-swell movement is therefore considered to be high. This assessment should be confirmed on a lot or landform basis following completion of earthworks.

5.7 Undocumented Fills

Undocumented fill was encountered in some of our investigations, extending to depths of up to 2.3 m, as outlined in Section 5.1. The fill encountered in our investigations is limited in depth and extent, appearing to be predominantly associated with the development of paved areas and landform modification associated with both the horse and car racing tracks within the site. Existing fill is likely to be encountered in other areas of the site outside of our investigation test locations where land modification has occurred and / or existing structures are present.

Our review of historic aerial imagery revealed areas within the site where structures have been built and taken down throughout time. Construction and demolition of these structures could have involved localised earthworks that implicate in the potential presence of undocumented fill. This includes the building platform area and adjacencies of present-day buildings.

Undocumented fill is not a suitable bearing stratum, nor is it suitable to remain in place below future engineered fills. Site development is likely to require removal and replace undocumented fills with engineered fills.

5.8 Slope Stability

Existing slopes that have not been modified and are not supported by existing retaining walls were noted to grade at 1V:4H. As such, the majority of the landform is gentle to moderately graded and the risk of deep-seated global instability affecting the site is considered to be low. This should be reassessed for the final landform when earthworks plans for the site are available.

5.9 Flooding

As cited in Section 3.1, the site is crossed by multiple flood prone areas, flood plains and overland flow paths are mapped through the site. These overland flow paths have catchment areas of up to and more than 100 ha. Earthworks planners will need to be aware of these areas when determining finished ground levels and future drainage networks to minimise flood risk for future developments. Specialist flood modelling may be required where earthworks may modify flood risk to surrounding land.

5.10 Material Reuse

Site won volcanic ash soils from Zone 2 may be considered appropriate for re-use as fill, however considerable care should be undertaken as the surficial volcanic ashes are expected to be highly sensitive and can easily turn into a waste product by overworking, particularly during a state of high moisture content.

Where undocumented fills are encountered, these should be assessed on-site for their suitability for reuse. If the soils are not overly wet and do not contain deleterious inclusions (such as topsoil, organic soils, domestic rubbish or demolition debris) they may be geotechnically suitable to be reworked and placed as engineered fill.

6 Sustainability

We encourage you to consider sustainability when assessing the options available for your project. Where suitable for the project, we recommend prioritising the use of sustainable building materials (such as timber in favour of concrete or steel), locally sourced (materials readily available to Contractors as opposed to materials requiring import), and installed in an environmentally friendly way (e.g., reduced carbon emissions and minimal contamination). If you would like to discuss these options further, ENGEO staff are available to offer suggestions.

7 Future Work

We consider that the level of investigations completed for the site would likely be suitable to support earthworks design and / or an application for resource consent. Depending on the development type and associated building loads, specific investigations may be required to support the detailed design of a ground improvement or foundation option. However, we would be able to undertake concept / feasibility design of options based on the information we have obtained to date.

8 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Auckland Thoroughbred Racing Incorporated, its professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

iv. This Limitation should be read in conjunction with the Engineering NZ/ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on (09) 972 2205 if you require any further information.

Report prepared by

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Geotechnical Engineer

Kyle Edge

Engineering Geologist

Report reviewed by

Max McLean, CMEngNZ (PEngGeol)

Associate Engineering Geologist

9 References

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We also acknowledge the New Zealand GeoNet project and its sponsors EQC, GNS Science and LINZ, for providing data used in this report.

APPENDIX 1:

Site Plans

Legend

- ENGEO Machine Drilled Boreholes
- ENGEO Cone Penetration Tests
- ENGEO Hand Augured Boreholes
- ENGEO Dilatometer Tests
- T&T Machine Drilled Boreholes
- T&T Hand Augured Boreholes
- T&T Cone Penetration Tests
- Third Party Machine Drilled Boreholes
- Third Party Hand Augured Boreholes
- Third Party Cone Penetration Tests
- Third Party Test Pits
- Third Party Water Bores
- Site Boundary

ENGEO

Produced by **Datanest.earth**

Title: Site Investigation Location Plan		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: KE	Figure No.: 1
Date: 11-04-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:5000	Version: draft

Legend

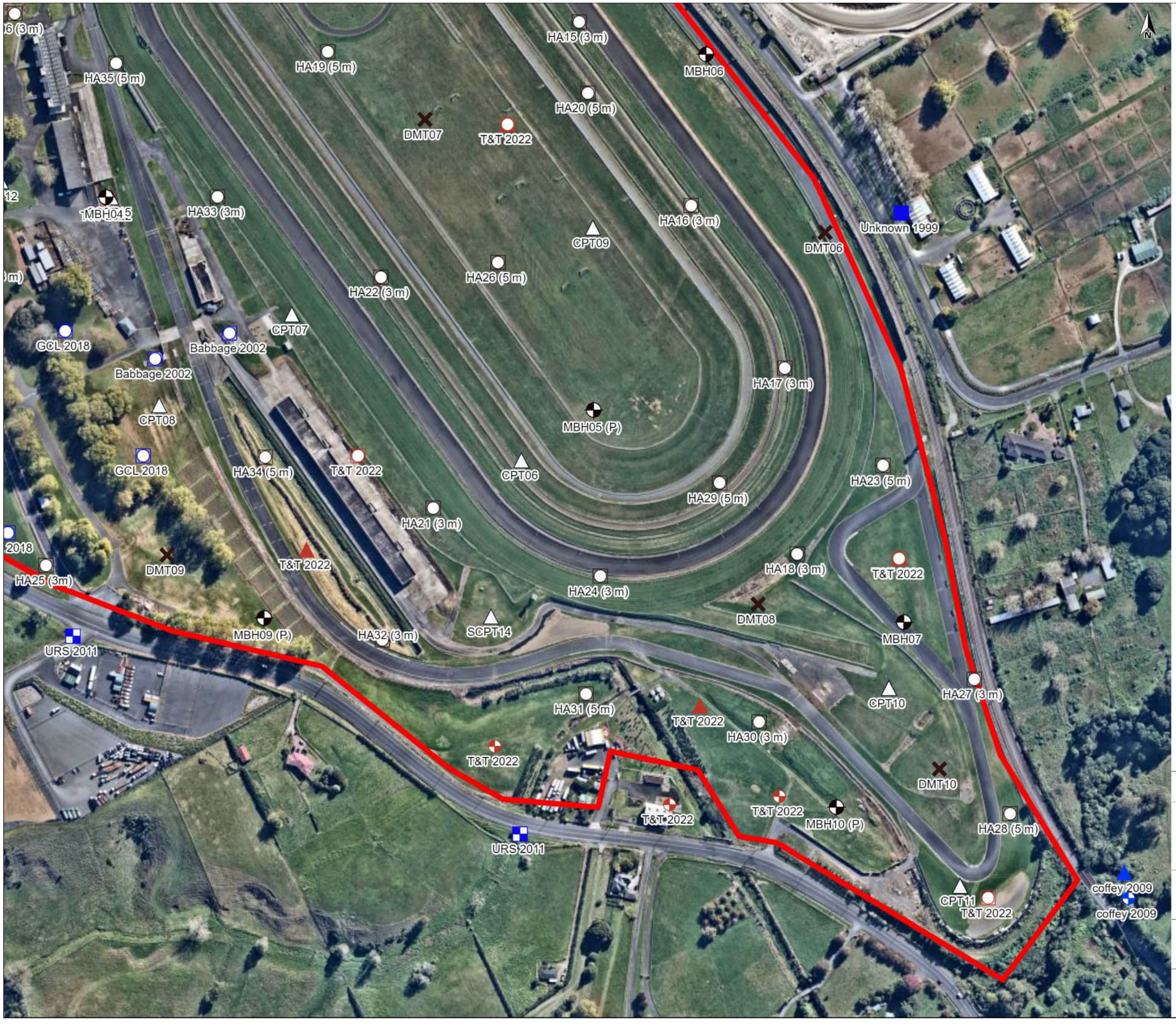
- ENGEO Machine Drilled Boreholes
- ENGEO Cone Penetration Tests
- ENGEO Hand Augured Boreholes
- ENGEO Dilatometer Tests
- T&T Machine Drilled Boreholes
- T&T Hand Augured Boreholes
- T&T Cone Penetration Tests
- Third Party Machine Drilled Boreholes
- Third Party Hand Augured Boreholes
- Third Party Cone Penetration Tests
- Third Party Test Pits
- Third Party Water Bores
- Site Boundary

0 50 m 100 m

ENGEO

Produced by **Datanest.earth**

Title: Site Investigation Location Plan (North)		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: KE	Figure No.: 2
Date: 11-04-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:3000	Version: draft



Legend

- ENGEO Machine Drilled Boreholes
- ENGEO Cone Penetration Tests
- ENGEO Hand Augured Boreholes
- ENGEO Dilatometer Tests
- T&T Machine Drilled Boreholes
- T&T Hand Augured Boreholes
- T&T Cone Penetration Tests
- Third Party Machine Drilled Boreholes
- Third Party Hand Augured Boreholes
- Third Party Cone Penetration Tests
- Third Party Test Pits
- Third Party Water Bores
- Site Boundary

0 50 m 100 m

ENGEO

Produced by **Datanest.earth**

Title: Site Investigation Location Plan (South)		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: KE	Figure No.: 3
Date: 11-04-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:3000	Version: draft

Legend

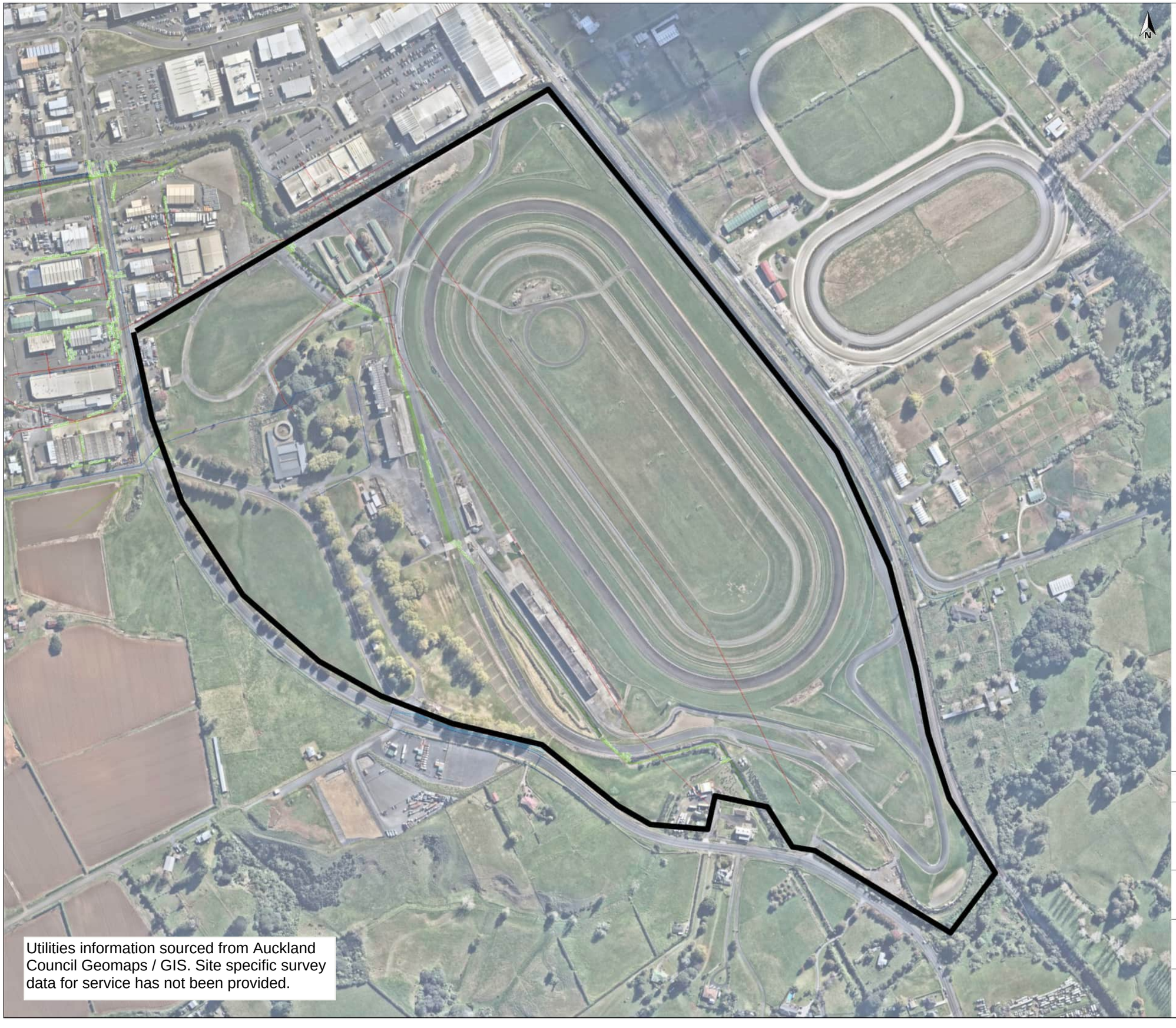
— Site Boundary

0 50 m 100 m

ENGEO

Produced by **Datanest.earth**

Title: Zone Plan		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: KE	Figure No.: 4
Date: 15-05-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:5000	Version: draft



Utilities information sourced from Auckland Council Geomaps / GIS. Site specific survey data for service has not been provided.

Legend

- Site Boundary

Services

Wastewater Pipe (Local)
- Operational

Stormwater Manhole And Chamber
- Public - Standard/Custom

Stormwater Watercourse
- Public

Stormwater Pipe
- Public - Gravity Mains
- Public - Subsoil Drain

Stormwater Channel
- Public lined

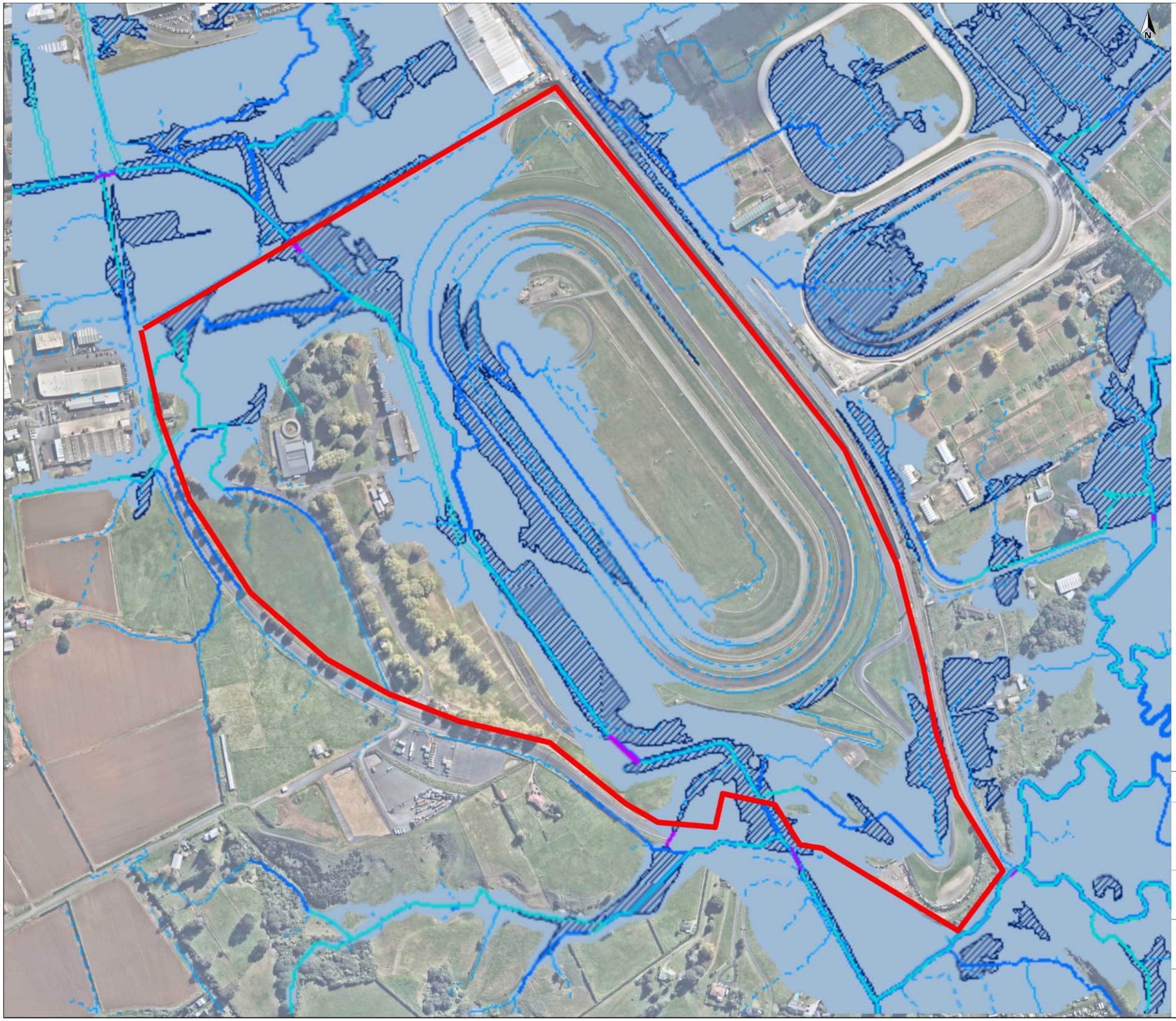
Water Pipe (Local)
- Operational (Potable)

0 50 m 100 m

ENGEO

Produced by **Datanest.earth**

Title: Public Service Plan		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: KE	Figure No.: 5
Date: 11-04-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:5000	Version: draft



Legend

- Site Boundary

Hydrology

Rivers and Permanent Streams

- Open Watercourse
- Piped Watercourse
- Culvert
- Pond
- Overland Flow Paths - 100ha and above (100,000)
- Overland Flow Paths - 100ha and above (25,000)
- Overland Flow Paths - 3ha to 100ha (50,000)
- Overland Flow Paths - 3ha to 100ha (25,000)
- Overland Flow Paths - 1ha to 3ha (25,000)
- Overland Flow Paths - 1ha to 3ha (15,000)
- Overland Flow Paths - 4000m2 to 1ha (8,000)
- Overland Flow Paths - 2000m2 to 4000m2 (5,000)
- Flood Prone Areas
- Flood Plains

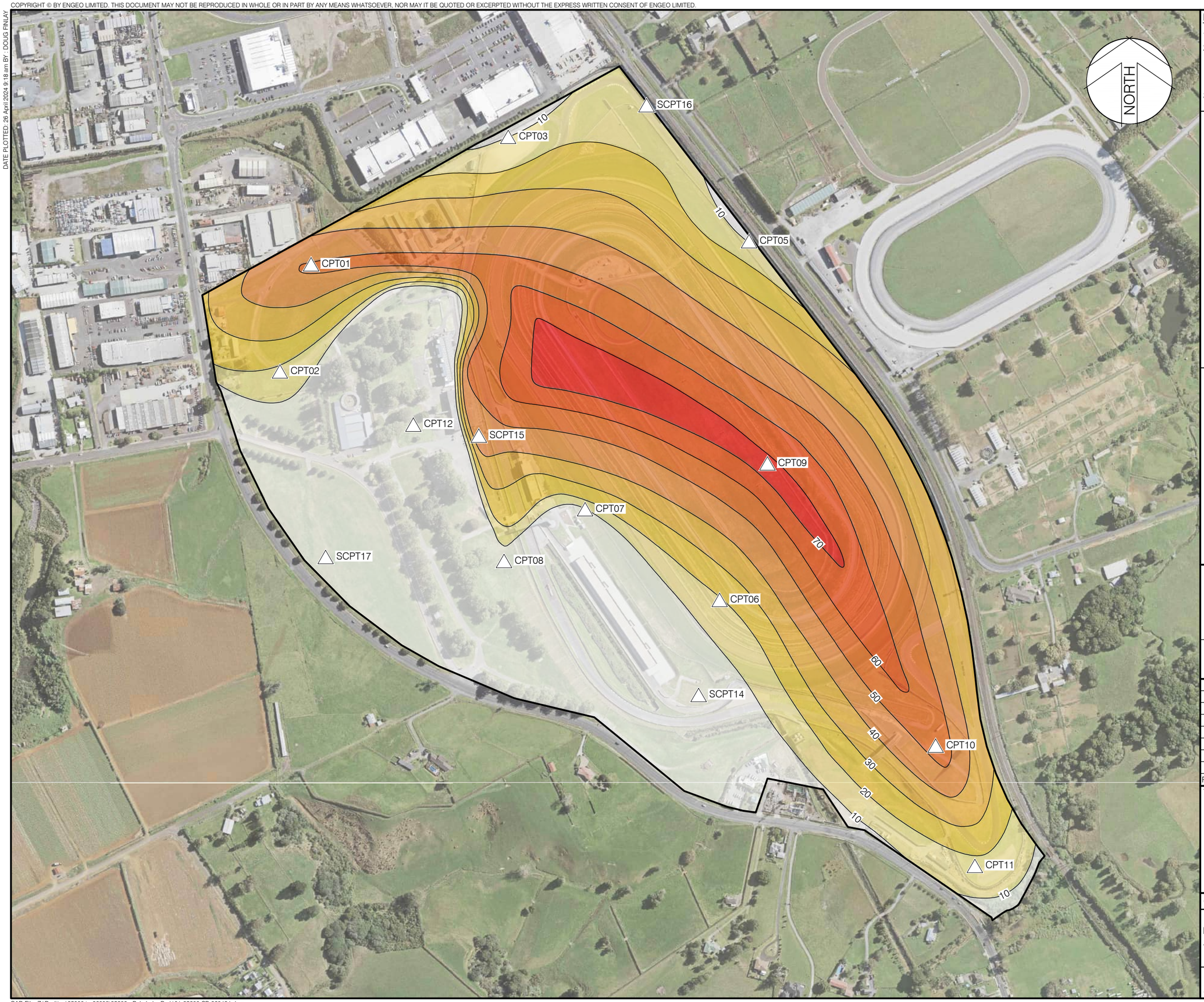
0 50 m 100 m

ENGEO

Produced by **Datanest.earth**

Title: Overland Flow Paths		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: KE	Figure No.: 6
Date: 11-04-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:5000	Version: draft

DATE PLOTTED: 26 April 2024 9:18 am BY: DOUG FINLAY



Notes:

1. Boundaries from Quickmap Enterprise.
2. Aerial image from LINZ Data Service and licensed for re-use under the Creative Commons Attribution 4.0 International License (Auckland 0.075m Urban Aerial Photos 2017).
3. Coordinate Datum: NZTM 2000.

Legend

- Site Boundary
- Proposed Cone Penetration Test

ULS Vertical Settlements (mm)

70 — 60 — 50 — 40 — 30 — 20 — 10

DRAFT

0 50 100 200m

SCALE 1:5000

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Rev	Date	Description	Drwn	Chkd
A	26.04.24	Draft for review	DF	-

Title:

ULS LIQUEFACTION INDUCED SETTLEMENTS HEAT MAP

Client: Auckland Thoroughbred Racing Inc		Figure: 7
Project: Pukekohe Park Auckland	Designed: KE Drawn: DF Checked: - Date: 26.04.24	Size: A3
Project No: 25208.000.001	Scale: 1:5000	Rev: A

CAD File: Z:\Drafting\25000 to 26000\25208 - Pukekohe Park\01-25208-SP-260424.dwg
XREF's:

ORIGINAL SHEET PRINTED IN COLOUR

APPENDIX 2:

Hand Auger Borehole Logs

LOG OF AUGER HA01

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 14/03/2024
Hole Depth : 2.9 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2138683
Longitude : 174.9117153

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	T	ML	[TOPSOIL]				N/A		
	S	ML	Clayey SILT; reddish orange with occasional orange brown streaks. Low plasticity.				St	95/42	
0.5	PAHUREHURE MEMBER	ML	Clayey SILT with trace sand and trace organics; dark greyish brown. Low plasticity. Sand is fine; organics are partially decomposed rootlets.	54		M	St	70/21	
1.0					▼			59/17	
		ML	SILT with minor sand; blackish brown. Low plasticity. Sand is fine to medium. 1.2 m - Becomes saturated. 1.3 - 2.0 m - No Recovery due to groundwater.			W	F	45/14	
1.5			1.65 m - Becomes stiff.	53			St	31/17	
2.0								84/39	
		ML	Sandy SILT; light greyish brown with orange and black mottles. Low plasticity; dilatant; sand is fine to coarse. 2.0 - 2.9 m - Poor recovery due to groundwater.			S	St - VSt	109/42	
2.5								87/31	
				52				UTP	
3.0			End of Hole Depth: 2.9 m Termination Condition: Practical refusal						>>
3.5									
4.0									
4.5									
5.0									

Hand auger met practical refusal on hard material at 2.9 m depth.
Scala Penetrometer met practical refusal at 2.9 m bgl.
Dip test showed standing groundwater at 1.1 m post drilling.
Coordinates and Elevation estimated using Auckland Council GeoMaps.

T = Topsoil; N/A = Not Applicable; UTP = Unable to Penetrate.
S = South Auckland Volcanic Field.

LOG OF AUGER HA02

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 11/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2557
Logged By : JCh
Reviewed By : CL/HL
Latitude : -37.2138652
Longitude : 174.9123632

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm (2 4 6 8 10 12)
0.0	T	OL	[TOPSOIL]				D	N/A	160/41	
0.5	PAHUREHURE MEMBER	ML	Clayey SILT with minor sand; dark brown. Low plasticity, sand is fine.		54		M	VSt	66/15	
								St	73/4	
1.0		CH	Silty CLAY with trace sand; dark brown. High plasticity, sand is fine. 1.2 m - Becomes soft. 1.3 - 2.0 m - No Recovery, inferred as above.		53		W	St	20/15	
1.5								S	19/16	
2.0		ML	Sandy SILT; greyish brown. Low plasticity; sand is fine to medium. 2.0 - 2.7 m - Poor recovery due to groundwater.		52			F	35/15	
2.5								VSt	183/35	
	AM	OL	Organic clayey SILT with minor sand; black. Low plasticity. Amorphous; sand is fine.					F	UTP	
3.0			End of Hole Depth: 3 m Termination Condition: Target depth						29/23	
3.5										
4.0										
4.5										
5.0										

Hand auger met target depth at 3 m.
Dip test showed standing groundwater at 0.81 m post drilling
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable; UTP = Unable to Penetrate

AM = Ardmore Member.

LOG OF AUGER HA03

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 11/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2557
Logged By : JCh
Reviewed By : CL/HL
Latitude : -37.2128966
Longitude : 174.9133086

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0	T	OL	[TOPSOIL]			N/A	149/54	
0.5	FILL	ML	Sandy SILT; light orange with occasional dark brown mottles. Low plasticity; sand is fine to medium.			VSt - H	200+	
1.0	PAHUREHURE MEMBER	ML	Sandy SILT; light greyish brown with occasional dark brown and orange mottles. Low plasticity; sand is fine to medium.	54	M	St	80/35	
1.5		ML	Clayey SILT with trace sand; light grey with occasional dark greyish brown streaks. Low plasticity. Sand is fine.			St	63/31	
			1.8 m - Becomes firm.		W		61/13	
2.0			2 .0 - 3.0 m - No Recovery - soil is saturated, inferred as above.	53			45/6	
2.5					S	F	41/15	
3.0			End of Hole Depth: 3 m Termination Condition: Target depth	52			32/17	
							35/15	
							32/20	
3.5								
4.0								
4.5								
5.0								

Hand auger met target depth at 3 m.
Dip test showed standing groundwater at 1.8 m bgl.
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

SAVF = South Auckland Volcanic Field.

GEOTECH HAND AUGER GINT HA01 - 35.GPJ NZ DATA TEMPLATE 2.GDT 5/20/24

LOG OF AUGER HA04

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 13/03/2024
Hole Depth : 3.3 m
Hole Diameter : 50 mm

Shear Vane No : 1858
Logged By : HM
Reviewed By : CL/HL
Latitude : -37.2141193
Longitude : 174.9134575

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0	T		[TOPSOIL]					N/A		
0.5	SAVF	ML	SILT; brown. Low plasticity.		55		D	VSt	111/25	
			0.6 m - With trace rootlets.						UTP	
			0.7 m - Becomes light brown.						102/22	
1.0			1.0 m - Becomes brown.						190/32	
1.5	PAHUREHURE MEMBER	ML	Clayey SILT; light brown. Low plasticity.		54				193/25	
			1.5 m - Becomes light grey with light brown mottles.					VSt - H	220+	
2.0							M		143/51	
		CH	CLAY with some silt with trace sand; light grey with light brown and light brownish orange mottles. High plasticity. Sand is fine.		53			St	79/29	
2.5			2.8 m - Sand becomes fine to coarse.						67/57	
3.0		CH	CLAY with trace sand; light grey. High plasticity. Sand is fine to medium.			▼	W	F	48/32	
									38/16	
3.5			End of Hole Depth: 3.3 m Termination Condition: Practical refusal							
4.0										
4.5										
5.0										

Hand auger met practical refusal due to hole collapse at 3.3 m depth.
Dip test showed standing groundwater at 3.1 m
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable; UTP = Unable to Penetrate

SAVF = South Auckland Volcanic Field.

LOG OF AUGER HA05

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 12/02/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2557
Logged By : JCh
Reviewed By : CL/HL
Latitude : -37.2149499
Longitude : 174.9125505

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded
0.0	T	OL	[TOPSOIL]		D	N/A	
0.0	SAVF	ML	Clayey SILT with minor sand; orange brown with light to dark orange streaks and mottles. Low plasticity. Sand is fine.		M	F	45/13
0.5	PAHUREHURE MEMBER	CH	Silty CLAY with trace sand; dark grey. High plasticity. Sand is fine.	54		F	42/3
1.0		ML	Clayey SILT with minor sand; greyish black. Low plasticity. Sand is fine to coarse.		W	F	44/3
1.5		ML	1.2 - 2.2 m - No Recovery.	53		S - F	26/7 29/15 23/4
2.0							32/28
2.5		CH	Silty CLAY; greyish white. High plasticity.	52		F	42/29 47/44
3.0			End of Hole Depth: 3 m Termination Condition: Target depth				48/39

Scala Penetrometer
Blows per 100mm
2 4 6 8 10 12

Hand auger met target depth at 3 m.
Dip test showed standing groundwater at 0.7 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

SAVF = South Auckland Volcanic Field.

GEOTECH HAND AUGER GINT HA01 - 35.GPJ NZ DATA TEMPLATE 2.GDT 5/20/24

LOG OF AUGER HA06

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 11/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2139263
Longitude : 174.9145599

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	T	ML	[TOPSOIL]				N/A		
	SOUTH AUCKLAND VOLCANIC FIELD	ML	SILT with some clay and trace sand; dark brown. Low plasticity. Sand is fine.				VSt	195+	
0.5			Clayey SILT with trace sand; orange brown. Low plasticity. Sand is fine to medium.					92/62	
							St	92/64	
1.0				59					
			1.2 m - With minor sand and becomes brownish orange.					96/65	
1.5			1.5 m - With trace fine sand and becomes red.			M		138/78	
		ML					VSt	105/50	
2.0			1.9 - 2.1 m - With some fine to medium sand and becomes red with black specks.	58				140/68	
								90/42	
2.5							St		
								88/32	
3.0			End of Hole Depth: 3 m Termination Condition: Target depth	57			VSt	102/50	
3.5									
4.0									
4.5									
5.0									

Hand auger met target depth at 3 m.
Standing groundwater was not encountered
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

LOG OF AUGER HA07

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 18/03/2024
Hole Depth : 5 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2158794
Longitude : 174.9122819

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded
0.0	TOPSOIL	ML	[TOPSOIL]			D	N/A	UTP
0.5	FILL	ML	[FILL] SILT with some sand, trace clay and trace gravels; dark brown with orange and light greyish brown streaks. Low plasticity. Sand is fine to medium. Gravel is fine, angular, greywacke.				H	UTP
1.0				57				UTP
1.5								195+
2.0	SOUTH AUCKLAND VOLCANIC FIELD	ML	Clayey SILT with trace sand; orange brown with occasional red mottles. Low plasticity. Sand is fine.			M	H	195+
		ML	1.9 m - With some fine to medium sand and becomes orange brown and red intermixed with white clay inclusions.	56			H	195+
2.5		SM	Sandy SILT; orange brown with occasional white mottles. Low plasticity. Sand is fine to coarse. Silty fine to coarse SAND; orange brown. Well graded.				D	
3.0		ML	Clayey SILT with trace sand; light orange brown. Low plasticity. Sand is fine.				VSt	140/42
		ML	Sandy SILT; reddish orange with black mottles. Low plasticity. Sand is fine to coarse.	55	▼		H	154/50
3.5		ML	Clayey SILT with minor sand; orange brown with occasional black mottles. Low plasticity. Sand is fine to medium.			W	VSt - H	195+
4.0				54				195+
4.5			4.5 m - Becomes reddish orange.					181/134
								195+
5.0		ML	Sandy SILT with minor organics; reddish orange with black mottles. Low plasticity. Sand is fine to coarse; organics are carbonaceous inclusions.	53			H	195+
			End of Hole Depth: 5 m					UTP
			Termination Condition: Target depth					

Scala Penetrometer

Blows per 100mm

2 4 6 8 10 12

Hand auger met target depth at 5 m.
Dip test showed standing groundwater at 3.2 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
N/A = Not Applicable; UTP = Unable to Penetrate

GEOTECH HAND AUGER GINT HA01 - 35.GPJ NZ DATA TEMPLATE 2.GDT 5/20/24

LOG OF AUGER HA08

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 11/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2157729
Longitude : 174.9143723

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	T	ML	[TOPSOIL]					N/A		
	SOUTH AUCKLAND VOLCANIC FIELD	ML	SILT with minor sand; dark brown. Low plasticity. Sand is fine.					H	195+	
0.5		ML	Clayey SILT with some sand; orange brown. Low plasticity. Sand is fine to medium.						UTP	
1.0					59			VSt - H	UTP	
		ML							195+	
1.5							M		102/52	
								St - VSt	88/30	
2.0					58				UTP	
		ML	Sandy SILT with some clay; reddish brown. Low plasticity; sand is fine to medium.					H	195+	
2.5									UTP	
3.0			End of Hole Depth: 3 m Termination Condition: Target depth		57				195+	
3.5										
4.0										
4.5										
5.0										

Hand auger met target depth at 3 m.
Standing groundwater was not encountered post drilling.
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable; UTP = Unable to Penetrate

LOG OF AUGER HA10

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 19/03/2024
Hole Depth : 5 m
Hole Diameter : 50 mm

Shear Vane No : 2557
Logged By : JCh
Reviewed By : CL/HL
Latitude : -37.2124794
Longitude : 174.9153342

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	T	ML	[TOPSOIL]				D	N/A		
0.5	RUNCIMAN MEMBER	OL	Organic clayey SILT with trace sand; dark brown with some black streaks and mottles. Low plasticity. Amorphous; sand is fine.		53		M	VSt	109/26	
1.0						▼		St	55/7	
		PT	Fibrous PEAT with some silt; black. Organics are partially decomposed wood fragments (0 - 30 mm).					N/A	58/6	
1.5			1.4 - 5.0 m - No Recovery (inferred as above).	NR	52		W		35/9	
									28/7	
2.0									15/13	
									32/22	
2.5					51				32/15	
3.0		PT						N/A	77/32	
									51/17	
3.5					50				44/19	
									44/15	
4.0									39/23	
4.5					49				42/28	
									109/87	
5.0			End of Hole Depth: 5 m Termination Condition: Target depth							

Hand auger met target depth at 5 m.
Dip test showed standing groundwater at 1.05 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

LOG OF AUGER HA11

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 18/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2114381
Longitude : 174.9164791

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	T	OL	[TOPSOIL] Organic SILT with trace rootlets; dark brown. Low plasticity.	54		M	N/A	78/25	
0.5	RUNCIMAN MEMBER	OL	Organic SILT with trace sand and clay; blackish brown. Low plasticity. Amorphous; sand is fine.				St	75/14	
			0.8 m - Becomes wet.		▼	W		77/11	
1.0			1.0 m - With partially decomposed wood fragments.					UTP	
1.5				53				UTP	
								UTP	
2.0						S	F	34/11	
2.5				52				25/14	
								36/8	
3.0			End of Hole Depth: 3 m Termination Condition: Target depth					25/8	

Hand auger met target depth at 3 m.
Dip test showed standing groundwater at 1 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

UTP = Unable to Penetrate (due to wood fragments).

LOG OF AUGER HA12

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 19/03/2024
Hole Depth : 5 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2114632
Longitude : 174.9174465

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm (2 4 6 8 10 12)
0.0	T	ML	[TOPSOIL]	55		M	N/A	84/25	
0.5	RUNCIMAN MEMBER	OL	Organic SILT with some clay; dark brown with black mottles. Low plasticity. Amorphous.				F - St	42/11	
1.0			0.9 m - With fibrous organic inclusions and decomposing roots.			W	F	64/11	
			1.2 m - Becomes saturated.	54	▼			31/14	
1.5							S	17/11	
2.0				53				20/6	
2.5								14/11	
3.0				52		S	F	20/8	
3.5							St	20/11	
4.0								45/21	
4.5				51				59/22	
5.0			End of Hole Depth: 5 m Termination Condition: Target depth					56/20	
								UTP	
								53/22	
								59/20	
								50/22	

Hand auger met target depth at 5 m.
Dip test showed standing groundwater at 1.2 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

UTP = Unable to Penetrate (due to wood fragments).

LOG OF AUGER HA13

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 21/03/2024
Hole Depth : 4.4 m
Hole Diameter : 50 mm

Shear Vane No : 2557
Logged By : JCh
Reviewed By : CL/HL
Latitude : -37.21192
Longitude : 174.9186898

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm (2 4 6 8 10 12)
0.0	T	OL	[TOPSOIL]				D	N/A		
0.5	RUNCIMAN MEMBER	ML	SILT with minor clay, minor sand and trace organics; light brown with occasional light orange mottles. Low plasticity. Sand is fine to coarse; organics are rootlets.		55		M	VSt	185/50	
								F	32/9	
1.0		ML	Clayey SILT with minor sand and trace organics; dark brown. Low plasticity. Sand is fine; organics are rootlets.			▼		F	36/3	
			Organic SILT with trace sand and clay; black. Organics are partially decomposed wood fragments (5 - 100 mm).						33/4	
1.5									73/22	
					54				42/23	
2.0			2.0 m - Encounter partially decomposed wood fragments (5 - 100 mm).						UTP	
									UTP	
2.5		OL			53		S	N/A	131/38	
3.0									92/33	
									90/50	
3.5			3.5 m - Encounter partially decomposed wood fragments (5 - 100 mm).						UTP	
					52				UTP	
4.0									125/76	
4.4			End of Hole Depth: 4.4 m Termination Condition: Practical refusal							
4.5										
5.0										

Hand auger met practical refusal on hard material at 4.4 m depth.
Dip test showed standing groundwater at 1.0 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

UTP = Unable to Penetrate (due to wood fragments).

LOG OF AUGER HA14

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 14/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.213242
Longitude : 174.9183372

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	T	OL	[TOPSOIL]				D	N/A	103/39	
0.5	FILL	ML	[FILL] Sandy SILT with trace fibrous organics; dark greyish brown. Low plasticity; sand is fine. Organics are rootlets.		55			St	52/25	
1.0	RUNCIMAN MEMBER	ML	SILT with, minor clay and trace fine sand; dark brown. Low plasticity.					St	75/12	
1.5		OH	Organic CLAY with some silt; dark blackish brown. High plasticity. Organics are partially decomposed fibrous wood fragments.		54		M	S	15/4	
2.0								St	UTP	
2.5		ML	SILT; dark greyish brown. Low plasticity.		53	▼	S	S	52/12	
3.0			End of Hole Depth: 3 m Termination Condition: Target depth						16/8	
									14/8	
									14/8	
									16/6	

Hand auger met target depth at 3 m.
Dip test showed standing groundwater at 2.2 m.
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

LOG OF AUGER HA15

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 15/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2139211
Longitude : 174.9200051

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	T	ML	[TOPSOIL]				N/A		
	FILL	ML	[FILL] Sandy SILT; light greyish brown. Low plasticity; sand is fine to coarse.	55		D	VSt	165/42	
0.5								123/34	
	RUNCIMAN MEMBER	ML	Clayey SILT with trace sand; brownish grey. Low plasticity. Sand is fine.				St	61/20	
1.0			Organic SILT with trace sand and trace clay; blackish brown. Low plasticity. Amorphous; sand is fine.	54		M		59/17	
1.5			1.5 m - Becomes wet.			W	St	63/17	
		OL			▼			39/17	
2.0			2.1 - 3.0 m - No recovery due to groundwater suction and saturated soil.	53		S	F	34/17	
2.5								28/17	
								34/14	
3.0			End of Hole Depth: 3 m Termination Condition: Target depth					35/14	
3.5									
4.0									
4.5									
5.0									

Hand auger met target depth at 3 m.
Dip test showed standing groundwater at 2.0 m post drilling.
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

LOG OF AUGER HA16

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 14/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2153551
Longitude : 174.9208962

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	T	OL	[TOPSOIL]		55			N/A		
	F	ML	Sandy SILT; dark brown. Low plasticity; sand is fine to medium.					VSt	154/60	
0.5	B	OL	[BURIED TOPSOIL]							
	PAHUREHURE MEMBER	ML	Sandy SILT; dark orange brown with occasional light greyish mottles. Low plasticity. Sand is fine to medium.						81/28	
1.0					54			St	73/25	
1.5		ML	Clayey SILT with some sand; dark orange brown with occasional black mottles. Low plasticity. Sand is fine to coarse.				M	VSt	168/50	
									131/39	
2.0		ML	Clayey SILT with minor sand and trace organics; dark greyish brown with occasional black and orange mottles. Low plasticity. Sand is fine to medium; organics are partially decomposed fibrous wood fragments.		53			St - VSt	89/28	
									98/21	
2.5						▼			117/22	
		CH	Silty CLAY; dark greyish brown with occasional black and white specks. High plasticity.				W	VSt	109/25	
3.0			End of Hole Depth: 3 m Termination Condition: Target depth							
3.5										
4.0										
4.5										
5.0										

Hand auger met target depth at 3 m.
Dip test showed standing groundwater at 2.8 m post drilling.
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; F = Fill; B = Buried Topsoil

N/A = Not Applicable.

LOG OF AUGER HA17

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 14/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2165696
Longitude : 174.9217747

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer (Blows per 100mm)
0.0	T	OL	[TOPSOIL]				D	N/A		
0.0	FILL	ML	[FILL] Sandy SILT; light greyish brown with occasional orange mottles. Low plasticity. Sand is fine to medium.						147/39	
0.5			0.6 m - With fine to coarse sand and becomes dark greyish brown.						154/53	
1.0			0.9 m - Becomes orange brown with occasional black mottles.		55		M	VSt	140/39	
1.5			1.2 m - Becomes light greyish brown with orange brown streaks and reddish orange specks.						156/47	
2.0	PAHUREHURE MEMBER	ML	Clayey SILT with minor sand; light greyish brown with orange brown streaks and dark orange mottles. Low plasticity. Sand is fine to medium.		54	▼		St	168/46	
2.0									135/22	
2.0		CH	Silty CLAY with trace sand; light greyish brown with occasional dark orange mottles. High plasticity. Sand is fine.				W		71/17	
2.5			2.7 - 3.0 m - No Recovery due to groundwater suction.				S	St	63/42	
2.5									67/21	
3.0					53			F	39/17	
3.0			End of Hole Depth: 3 m Termination Condition: Target depth							

Hand auger met target depth at 3 m.
Dip test showed standing groundwater at 2.2 m bgl post drilling
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

LOG OF AUGER HA18

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 18/03/2024
Hole Depth : 1.3 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2179547
Longitude : 174.9218889

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	T	ML	[TOPSOIL]					N/A		
	FILL	SM	[FILL] Sandy SILT; light greyish brown with black, orange and light grey mottles. Low plasticity. Sand is fine to medium.		55		M		UTP	
0.5								H	UTP	
			0.8 m - Becomes orange brown and with trace gravel; gravel is fine, angular, greywacke.						UTP	
1.0		ML	[FILL] Sandy SILT with trace fine gravel; dark greyish brown with black and light grey mottles. Low plasticity. Sand is fine to coarse. Gravel is fine, angular, greywacke.		54			VSt	168/81	
1.3			End of Hole Depth: 1.3 m Termination Condition: Practical refusal							
1.5										
2.0										
2.5										
3.0										
3.5										
4.0										
4.5										
5.0										

Scala Penetrometer: Blows per 100mm — 2 4 6 8 10 12

Hand auger met practical refusal on hard material at 1.3 m depth.
Standing groundwater was not encountered post drilling.
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable; UTP = Unable to Penetrate

LOG OF AUGER HA19

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 13/03/2024
Hole Depth : 5 m
Hole Diameter : 50 mm

Shear Vane No : 1858
Logged By : HM
Reviewed By : CL/HL
Latitude : -37.2142096
Longitude : 174.9174911

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm (2 4 6 8 10 12)
0.0	T	ML	[TOPSOIL]							
	FILL	ML	[FILL] SILT; light brownish grey. Low plasticity.		54		D	VSt - H	220+	
0.5									181/32	
1.0	RUNCIMAN MEMBER	OL	Organic SILT with some clay; black with blackish brown mottles. Low plasticity; organic odour.					VSt	111/16	
		OH	Organic CLAY with trace sand; dark brown with black mottles. High plasticity. Amorphous; sand is fine to medium.		53	▼	M	F	143/16	
1.5									40/6	
			1.7 - 5.0 m - Poor recovery due to soil saturation.						40/10	
2.0								F		
									44/16	
2.5					52			S	16/8	
									32/16	
3.0									35/19	
									29/10	
3.5					51		S	F		
									32/13	
4.0									41/29	
									41/29	
4.5					50				57/38	
								St	63/29	
5.0			End of Hole Depth: 5 m Termination Condition: Target depth							

Hand auger met target depth at 5 m.
Dip test showed standing groundwater at 1.7 m bgl.
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

LOG OF AUGER HA20

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 13/03/2024
Hole Depth : 3.7 m
Hole Diameter : 50 mm

Shear Vane No : 1858
Logged By : HM
Reviewed By : CL/HL
Latitude : -37.2145172
Longitude : 174.9199269

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0	T	ML	[TOPSOIL]					N/A		
0.5	FILL	ML	[FILL] SILT with trace clay; light brown. Low plasticity. 0.5 m - Becomes dark brown with brown mottles.		55		D	VSt - H	125/31 144/16	
1.0	BTS	OL	[BURIED TOPSOIL]					N/A	220+	
1.5	RUNCIMAN MEMBER	ML	SILT with minor clay; brown. Low plasticity.		54			H	220+ 220+	
2.0		OH	Organic silty CLAY; dark brown. High plasticity.				M	St	135/16	
2.5		OH	Organic CLAY with trace sand; brown. High plasticity. Sand is fine to medium. 2.2 - 3.7 m - No Recovery (Inferred PEAT).	NR	53	▼		St	61/9	
3.0		PT					S	N/A		
3.5									28/6	
4.0			End of Hole Depth: 3.7 m Termination Condition: Practical refusal							
4.5										
5.0										

Hand auger met practical refusal due to hole collapse at 3.7 m depth.
Dip test showed standing groundwater at 2.3 m bgl.
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

BTS = Buried Topsoil; SAVF = South Auckland Volcanic Field.

LOG OF AUGER HA21

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 18/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2557
Logged By : JCh
Reviewed By : CL/HL
Latitude : -37.2176134
Longitude : 174.9184825

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded
0.0	T	OL	[TOPSOIL]		N/A	134/44
0.5	SOUTH AUCKLAND VOLCANIC FIELD	ML	Sandy SILT with some clay; orange brown. Low plasticity. Sand is fine.		VSt	119/26
1.0				53		134/35
1.5		ML	Clayey SILT with minor sand; light orange brown. Low plasticity. Sand is fine. 1.2 m - Becomes light orange brown with dark orange mottles and hard.		H	200+
2.0			2.0 m - Becomes with some light grey streaks and mottles.	52	VSt	200+
2.5	PM	CH	Silty CLAY; light grey with orange and white mottles. High plasticity.		St	154/55
3.0			End of Hole Depth: 3 m Termination Condition: Target depth	51		140/38
3.5						93/29
4.0						93/19
4.5						63/20
5.0						

Scala Penetrometer
Blows per 100mm
2 4 6 8 10 12

Hand auger met target depth at 3 m.
Standing groundwater was not encountered
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

PM = Pahurehure Member.

GEOTECH HAND AUGER GINT HA01 - 35.GPJ NZ DATA TEMPLATE 2.GDT 5/20/24

LOG OF AUGER HA22

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 13/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 1858
Logged By : HM
Reviewed By : CL/HL
Latitude : -37.2158906
Longitude : 174.9179924

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded
0.0	T	ML	[TOPSOIL]		D	N/A	
	F	ML	[FILL] SILT; brown with light brown and dark brown mottles. Low plasticity.			VSt	127/32
	PAHUREHURE MEMBER	ML	[BURIED TOPSOIL]			N/A	
0.5		ML	Clayey SILT; grey with brown mottles. Low plasticity.	55		St - VSt	174/35
							89/30
1.0		CH	CLAY with some silt; brown with light brown and black streaks. High plasticity.		M	St	86/25
1.5				54			71/29
						F	48/10
2.0		CH	Silty CLAY with trace sand; light brown with white and light brown streaks. High plasticity. Sand is fine to medium.		S	F	25/14
			2.2 - 3.0 m - No Recovery due to saturated soil.				35/13
2.5				53			35/16
3.0			End of Hole Depth: 3 m Termination Condition: Target depth				38/16
3.5							
4.0							
4.5							
5.0							

Scala Penetrometer
Blows per 100mm
2 4 6 8 10 12

Hand auger met target depth at 3 m.
Dip test showed standing groundwater at 2.3 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable; F = Fill

GEOTECH HAND AUGER GINT HA01 - 35.GPJ NZ DATA TEMPLATE 2.GDT 5/20/24

LOG OF AUGER HA23

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 21/03/2024
Hole Depth : 5 m
Hole Diameter : 50 mm

Shear Vane No : 2557
Logged By : JCh
Reviewed By : CL/HL
Latitude : -37.2172947
Longitude : 174.9226907

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0	T	OL	[TOPSOIL]		D	N/A		
0.5	FILL	OL	[FILL] Organic SILT with minor clay, trace sand and trace gravel; dark brown. Low plasticity. Sand is fine to coarse; gravel is fine, sub-angular, greywacke.			N/A	UTP UTP	
1.0	HOBSONVILLE MEMBER	ML	SILT with some clay and minor fine sand; light orange with occasional dark orange mottles. Low plasticity.	55	M	F	25/9 43/8	
1.5							29/10 28/8	
2.0		ML	Clayey SILT with trace sand; light grey with light orange streaks and mottles, occasional black mottles. Low plasticity. Sand is fine.	54		VS - S	20/5 11/6	
2.5							8/4	
3.0	RUNCIMAN MEMBER	CH	Silty CLAY with trace sand and organics; dark grey with occasional black mottles. High plasticity. Sand is fine; organics are partially decomposed wood fragments (5 - 10 mm).	53	W	VS	5/3 9/7	
3.5							10/5	
4.0			Fibrous PEAT with some silt; black. Organics are partially decomposed wood fragments (5 - 100 mm). 3.6 - 5.0 m - Poor recovery due to saturated soil.	52	S	N/A		
4.5								
5.0			End of Hole Depth: 5 m Termination Condition: Target depth	51				

Hand auger met target depth at 5 m.
Dip test showed standing groundwater at 2.9 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable; UTP = Unable to Penetrate

LOG OF AUGER HA24

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 14/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2180753
Longitude : 174.9200524

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0	FILL	SP	[FILL] Fine SAND; black. Poorly graded.					N/A		
0.5	FILL	SW	[FILL] Fine to coarse SAND with minor silt and trace gravel; dark brownish grey. Well graded. Gravel is fine, rounded, greywacke.					N/A		
1.0	BTS	OL	[BURIED TOPSOIL]		54			N/A	106/35	
1.5	SAVF	ML	Sandy SILT; orange brown with light greyish brown streaks. Low plasticity; sand is fine to coarse.				D	VSt H	90/55 200+	
2.0	PAHUREHURE MEMBER	ML	Sandy SILT with trace clay; dark brownish grey. Sand is fine to coarse.		53			H	200+ 200+	
2.5	PAHUREHURE MEMBER	ML	Sandy SILT with some clay; black with light grey streaks. Low plasticity.					VSt	112/68 52/22	
3.0	PAHUREHURE MEMBER	ML	Clayey SILT with minor sand; bluish grey and light grey intermixed. Low plasticity. Sand is fine to medium.		52		M	St	30/20	
			End of Hole Depth: 3 m Termination Condition: Target depth							
3.5										
4.0										
4.5										
5.0										

Hand auger met target depth at 3 m.
Standing groundwater was not encountered post drilling.
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable; BTS = Buried Topsoil

SAVF = South Auckland Volcanic Field.

GEOTECH HAND AUGER GINT HA01 - 35.GPJ NZ DATA TEMPLATE 2.GDT 5/20/24

LOG OF AUGER HA25

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 15/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2180402
Longitude : 174.9148517

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0	T	ML	[TOPSOIL]					N/A		
0.5	SOUTH AUCKLAND VOLCANIC FIELD	ML	Sandy SILT with some clay; greyish brown with occasional red mottles and black carbonaceous inclusions. Low plasticity; sand is fine to medium.					VSt - H	195+ / 184/53	
1.0		CH	Silty CLAY; light grey, red and orange intermixed. High plasticity; sand is fine to medium.		65			H	UTP	
		ML	Sandy SILT; orange brown with red and black mottles. Low plasticity; sand is fine to coarse.					H	UTP	
1.5		ML	Clayey SILT with trace sand; orange brown. High plasticity. Sand is fine.				M	VSt	179/92 / 190/91 / 142/84 / 145/95	
2.0					64					
2.5			2.8 m - With minor fine to medium sand.					St	70/35	
3.0			End of Hole Depth: 3 m Termination Condition: Target depth		63				UTP	
3.5										
4.0										
4.5										
5.0										

Hand auger met target depth at 3 m.
Standing groundwater was not encountered post drilling.
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable; UTP = Unable to Penetrate

LOG OF AUGER HA26

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 20/03/2024
Hole Depth : 5 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2157802
Longitude : 174.9190886

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	T	ML	[TOPSOIL]					N/A		
	PAHUREHURE MEMBER	ML	SILT with some clay and sand; light brown with orange streaks. Low plasticity. Sand is fine to coarse.				D	St - VSt	185/43	
0.5		ML	Clayey SILT with trace sand; orange brown with dark brown mottles and brown orange streaks. Low plasticity. Sand is fine.		55				78/14	
1.0							M	St - VSt	185/32	
									139/29	
1.5		CH	Silty CLAY with trace sand; light brown with orange brown streaks. High plasticity. Sand is fine.		54			St	69/12	
2.0						▼			69/9	
			2.1 - 5.0 m - No Recovery (inferred as above).				W		43/12	
2.5					53					
3.0									29/9	
3.5		CL		NR	52		S	N/A		
4.0									61/6	
4.5					51					
5.0			End of Hole Depth: 5 m Termination Condition: Target depth							

Hand auger met target depth at 5 m.
Dip test showed standing groundwater at 2.1 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

LOG OF AUGER HA27

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 19/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2188888
Longitude : 174.9235489

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm (2 4 6 8 10 12)
	T	ML	[TOPSOIL]				D	N/A		
0.5	FILL		[FILL] Sandy SILT with trace gravel; greyish brown. Low plasticity. Sand is fine to coarse; gravel is fine, sub-angular to angular, greywacke.		55			H	UTP	
1.0								VSt	131/50	
	PAHUREHURE MEMBER	ML	Sandy SILT with some clay; orange brown with orange specks and greyish brown mottles. Low plasticity. Sand is fine to coarse. 1.3 m - Becomes greyish brown with occasional dark brown mottles.		54		M	VSt	114/53	
1.5								St	95/36	
2.0			Clayey SILT with trace sand; greyish brown with occasional orange and black mottles. Low plasticity. Sand is fine.					St	70/31	
		ML	2.4 m - Becomes wet.		53	▼	W		73/42	
2.5			2.6 m - With minor fine to coarse sand and becomes saturated.				S		67/17	
3.0			End of Hole Depth: 3 m Termination Condition: Target depth						61/11	
									67/39	
3.5										
4.0										
4.5										
5.0										

Hand auger met target depth at 3 m.
Dip test showed standing groundwater at 2.4 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable; UTP = Unable to Penetrate

LOG OF AUGER HA28

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 19/03/2024
Hole Depth : 5 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2198905
Longitude : 174.9238831

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	T	ML	[TOPSOIL]			N/A		
0.5	SAVF	ML	Sandy SILT; orange brown. Low plasticity; sand is fine to coarse.	55		H	UTP 195+ 195+	
1.0	PAHUREHURE MEMBER	ML	Sandy SILT with trace clay; greyish brown with occasional dark grey mottles. Low plasticity; sand is fine to coarse.	54		St - VSt	112/56 89/56	
1.5								
2.0		ML	Clayey SILT with some sand; greyish brown with orange specks. Low plasticity. Sand is fine to coarse.	53	M	VSt	126/73 101/70	
2.5			2.2 m - Becomes orange brown with greyish brown streaks and black mottles. 2.5 m - Becomes greyish brown and orange intermixed.				137/56 114/64	
3.0	HOBSONVILLE MEMBER	ML	Sandy SILT; light grey. Low plasticity. Sand is fine to coarse and pumiceous; dilatant.	52		St	81/22 61/27	
3.5							28/17	
4.0		ML	4.0 m - Becomes wet.	51	W	F	31/22 36/21	
4.5			4.5 - 5.0 m - Poor recovery due to groundwater suction and saturated soil.		S		45/21 45/20	
5.0			End of Hole Depth: 5 m Termination Condition: Target depth					

Hand auger met target depth at 5 m.
Dip test showed standing groundwater at 4.0 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable; UTP = Unable to Penetrate

SAVF = South Auckland Volcanic Field.

LOG OF AUGER HA29

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 13/03/2024
Hole Depth : 5 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2174252
Longitude : 174.9211641

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded
0.0	T	ML	[TOPSOIL]		M	N/A	
	PAHUREHURE MEMBER	ML	SILT with minor clay; light brown. Low plasticity.			VSt	124/32
0.5		ML	Clayey SILT with trace sand; light brown with orange mottles. Low plasticity. Sand is fine.	55		VSt	145/61
1.0							119/43
						St	72/32
1.5		CH	Silty CLAY with trace sand; light brown. High plasticity. Sand is fine. 1.5 m - Becomes light grey with pale brown streaks.	54		St	84/23
							61/12
2.0			2.0 m - Becomes wet.		W		78/32
						St	75/41
2.5				53		VSt	104/46
3.0						St	72/35
		ML	2.0 - 5.0 m - No Recovery (Inferred Sandy SILT; light brown with light grey streaks and dark brown mottles. Low plasticity.)		S		52/41
3.5				52			67/41
4.0			NR			St	64/41
							78/75
4.5				51			75/58
						VSt	101/75
5.0			End of Hole Depth: 5 m Termination Condition: Target depth				

Scala Penetrometer
Blows per 100mm
2 4 6 8 10 12

Hand auger met target depth at 5 m.
Dip test showed standing groundwater at 2.0 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

GEOTECH HAND AUGER GINT HA01 - 35.GPJ NZ DATA TEMPLATE 2.GDT 5/20/24

LOG OF AUGER HA30

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 20/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2557
Logged By : JCh
Reviewed By : CL/HL
Latitude : -37.2192069
Longitude : 174.9215315

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	FILL	OL	[TOPSOIL]				D	N/A		
		OL	[FILL] Organic SILT with some clay; dark brown with some white inclusions. Low plasticity; organics are rootlets.					VSt - H	99/28 200+	
1.0		ML	[FILL] Clayey SILT with minor sand; intermixed orange, black and brown. Low plasticity. Sand is fine to coarse.		56					
		ML	[FILL] SILT with minor clay and sand; dark brown. Low plasticity. Sand is fine to coarse.				M	St VSt	54/17 114/54	
2.0	HM	ML	SILT with some clay and minor sand; intermixed light orange and white. Low plasticity. Sand is fine to coarse.		55			H	200+	
		ML	Clayey SILT with minor sand; intermixed light orange and light grey. Low plasticity. Sand is fine to medium.					H	200+	
2.5		CH	Silty CLAY with trace sand; light grey. High plasticity. Sand is fine to medium.					H VSt	200+ 137/68	
3.0			End of Hole Depth: 3 m Termination Condition: Target depth		54					
3.5										
4.0										
4.5										
5.0										

Hand auger met target depth at 3 m.
Standing groundwater was not encountered post drilling.
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

HM = Hobsonville Member.
HA30 was drilled atop a 2 m stockpile.

LOG OF AUGER HA31

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 19/03/2024
Hole Depth : 3.4 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2189984
Longitude : 174.9199139

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	T	ML	[TOPSOIL]					N/A		
	FILL	SW	[FILL] Silty fine to coarse SAND; dark orange brown. Well graded.		54			N/A		
0.5			[FILL] SILT with some sand, trace clay and trace gravel; dark orange brown with orange, light grey and black streaks and black mottles. Low plasticity. Sand is fine to coarse; gravel is fine, sub-angular to angular, greywacke.					H	UTP	
1.0									UTP	
					53		D		195+	
1.5								VSt - H	117/47	
									98/31	
2.0									195+	
					52					
2.0	RUNCIMAN MEMBER	CH	Silty CLAY with minor sand. High plasticity; sand is fine to coarse, pumiceous.					St	84/42	
2.5			Organic Silty CLAY with trace sand; black. High plasticity. Amorphous; sand is fine.					St	81/59	
		OH					M			
3.0								VSt	126/50	
					51				109/34	
3.5			End of Hole Depth: 3.4 m Termination Condition: Practical refusal							
4.0										
4.5										
5.0										

Hand auger met practical refusal due to hole collapse at 3.4 m depth.
Standing groundwater was not encountered post drilling.
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable; UTP = Unable to Penetrate

LOG OF AUGER HA32

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 20/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2185956
Longitude : 174.9180025

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded
0	T	ML	[TOPSOIL]			N/A	
0.5	FILL	ML	[FILL] Sandy SILT with trace clay; dark brown with black and orange mottles with black carbonaceous inclusions. Low plasticity; sand is fine to coarse.			VSt - H	190/56 195+
1.0	SAVF	ML	SILT with some clay and minor sand; orange brown with occasional black mottles. Low plasticity. Sand is fine to coarse.	52	M	VSt - H	195+ 145/49
1.5	PAHUREHURE MEMBER	ML	SILT with trace sand and trace clay; dark blackish brown. Low plasticity. Sand is fine.		W	St	56/17
2.0		ML	SILT with some sand; dark blackish brown. Low plasticity. Sand is fine to coarse	51	S	F - St	47/28 53/14
2.5							50/17
3.0			End of Hole Depth: 3 m Termination Condition: Target depth	50			

Scala Penetrometer
Blows per 100mm
2 4 6 8 10 12

Hand auger met target depth at 3 m.
Dip test showed standing groundwater at 1.5 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

SAVF = South Auckland Volcanic Field.

GEOTECH HAND AUGER GINT HA01 - 35.GPJ NZ DATA TEMPLATE 2.GDT 5/20/24

LOG OF AUGER HA33

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 21/03/2024
Hole Depth : 3 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.215291
Longitude : 174.9164627

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded
0.0	T	OL	[TOPSOIL].			N/A	
0.5	PAHUREHURE MEMBER	ML	Sandy SILT; dark greyish brown. Low plasticity; sand is fine to coarse.			VSt	112/34 105/21
1.0		ML	Clayey SILT with minor sand; dark brown with occasional black and dark orange mottles. Low plasticity. Sand is fine to medium.	53	M	VSt	151/38
1.5							101/21
2.0		CH	Silty CLAY; dark brown. High plasticity.	52	W	St	77/17
2.5		ML	2.0 - 3.0 m - Poor recovery due to groundwater suction; recovered as dark brown SILT.		S	S - F	42/14 17/11
3.0			End of Hole Depth: 3 m Termination Condition: Target depth	51			31/14
3.5							
4.0							
4.5							
5.0							

Scala Penetrometer
Blows per 100mm
2 4 6 8 10 12

Hand auger met target depth at 3 m.
Dip test showed standing groundwater at 1.8 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

GEOTECH HAND AUGER GINT HA01 - 35.GPJ NZ DATA TEMPLATE 2.GDT 5/20/24

LOG OF AUGER HA34

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 21/03/2024
Hole Depth : 4.5 m
Hole Diameter : 50 mm

Shear Vane No : 2524
Logged By : JM
Reviewed By : CL/HL
Latitude : -37.2172317
Longitude : 174.9169055

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Elevation (mRL)	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded
0.0	TS	ML	[TOPSOIL]		D	N/A	
	FILL	SW	[FILL] Silty fine to coarse SAND; dark orange brown. Well graded.			N/A	
0.5		ML	[FILL] SILT with some sand, trace clay and trace gravel; dark orange brown with occasional black and light grey streaks. Low plasticity. Sand is fine to coarse; gravel is fine, sub-angular to angular, greywacke.			H	UTP
1.0				52		VSt	134/42
1.5						St	67/22
2.0		ML	Clayey SILT with trace sand; dark orange brown. Low plasticity. Sand is fine.	51		F - St	59/28 49/28
2.5	PAHUREHURE MEMBER	CH	Silty CLAY; dark grey. High plasticity. 2.8 - 3.0 m - Poor recovery.		M	S - F	21/17 39/25
3.0		OL	Organic SILT with some sand and trace clay; black. Low plasticity. Sand is fine to coarse.	50	W	N/A	
		SW	Silty fine to coarse SAND; light grey. Well graded. Sand is pumiceous.			MD	
3.5		ML	Sandy SILT; orange with occasional red mottles. Low plasticity; sand is fine to coarse; dilatant.		S	St - VSt	67/31 109/70
4.0				49			98/53
4.5			End of Hole Depth: 4.5 m Termination Condition: Practical refusal				
5.0							

Scala Penetrometer
Blows per 100mm
2 4 6 8 10 12

Hand auger met practical refusal due to hole collapse at 4.5 m depth.
Dip test showed standing groundwater at 3.1 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable; UTP = Unable to Penetrate

LOG OF AUGER HA35

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road
25208.000.001

Client :
Client Ref. : 25208.000.001
Date : 21/03/2024
Hole Depth : 4.5 m
Hole Diameter : 50 mm

Shear Vane No : 2557
Logged By : JCh
Reviewed By : CL/HL
Latitude : -37.2142942
Longitude : 174.9155119

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer Blows per 100mm
0.0	T	OL	[TOPSOIL]				D	N/A		
	SAVF	ML	SILT with minor clay and minor sand; light brown. Low plasticity. Sand is fine to coarse.					St	90/20	
0.5		ML	Clayey SILT with minor sand; orange brown with dark orange streaks and mottles. Low plasticity. Sand is fine.				M	St	73/19	
1.0		CH	Silty CLAY with minor sand and trace organics; orange brown with light to dark orange streaks and mottles, some black mottles. High plasticity. Sand is fine; organics are partially decomposed wood fragments (5 - 10mm).		52			St	61/1 89/15	
1.5	PAHUREHURE MEMBER	ML	Clayey SILT with trace sand and organics; dark grey with occasional light orange streaks. Low plasticity. Sand is fine; organics are partially decomposed wood fragments (5 - 30 mm).					F St	29/10 52/13	
2.0			1.9 - 2.9 m - No Recovery.	NR	51			St	57/17	
2.5							M	F	36/20 47/23	
3.0		SM	Silty fine SAND with minor organics; dark grey. Poorly graded. Organics are partially decomposed wood fragments (1 - 5 mm).		50			St	51/17	
3.5			3.0 - 4.0 m - No Recovery.	NR				F - St	58/23 47/29	
4.0		ML	Clayey SILT with minor sand; bluish greenish grey. Low plasticity. sand is fine.		49			VSt VSt	122/35 144/70	
4.5			End of Hole Depth: 4.5 m Termination Condition: Practical refusal							
5.0										

Hand auger met practical refusal on hard material at 4.5 m depth.
Dip test showed standing groundwater at 0.9 m bgl
Coordinates and Elevation estimated using Auckland Council GeoMaps.
T = Topsoil; N/A = Not Applicable

SAVF = South Auckland Volcanic Field.

APPENDIX 3:

Machine Borehole Logs

BOREHOLE LOG MBH01

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2133026
Longitude : 174.9131121

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
TS	[TOPSOIL]		F								D		
	0.2 - 0.4 m - No Recovery.	NR	N/A										
PAHUREHURE MEMBER	Clayey SILT with trace sand and trace organics; light brown with occasional dark orange mottles. Low plasticity. Organics are rootlets and partially decomposed wood fragments. 0.9 m - With minor fine to medium sand and some white specks.		VSt	1	52						M		
	Clayey SILT with some sand and trace organics; intermixed red, light to dark orange and black. Low plasticity. Sand is fine; organics are partially decomposed wood fragments (5 - 10 mm). 1.73 m - Becomes brownish grey with occasional black carbonaceous mottles.		F	2	51	22/6 kPa 0/0//0/0/0/0 N=0							
ARDMORE MEMBER	PEAT with some silt and trace fibrous organics; black. Organics are partially decomposed wood fragments (5 - 10 mm).		N/A F	3	50	33/7 kPa 0/1//0/0/0/0 N=0					W		
	Organic clayey SILT; dark grey with some black streaks. Low plasticity. Organics are partially decomposed wood fragments (5 - 10 mm).												
	Fibrous PEAT with some silt; black. Organics are partially decomposed wood fragments (5 - 60 mm). 3.81 m - 4.06 m - Encountered wood; dark brown and black outer layers, light brown inner layers. 4.06 - 4.95 m - No Recovery. Wood blocked the drill bit. Inferred as above.		N/A N/A N/A	4	49	96/25 kPa 0/0//0/0/0/0 N=0							
				5	48								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 1.2 m 12 hours after first day of drilling.

TS = Topsoil; N/A = Not Applicable.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH01

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2133026
Longitude : 174.9131121

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
ARDMORE MEMBER	Organic Silty CLAY; dark grey with occasional black mottles. High plasticity. Amorphous.		F										
	Clayey SILT with some sand; light bluish grey. Low plasticity. Sand is fine to coarse.		St										
	Sandy SILT with minor clay and some organics; orange. Low plasticity. Sand is fine to coarse; organics are partially decomposed wood fragments (5 - 10 mm). 6.23 m - With trace partially decomposed wood fragments (5 - 15 mm). Becomes intermixed red and orange with some white grains.		St	6	47	10/3 kPa 2/1//1/1/2/2 N=6							
	Clayey SILT with some sand and minor gravel; orange brown with mottles and white flecks. Low plasticity. Sand is fine to coarse; gravel is fine, angular, scoria.		St										
	Sandy SILT with minor gravel; orange brown with red mottles and white flecks. Low plasticity. Sand is fine to coarse; gravel is fine, angular, scoria. 7.2 m - Becomes dark orange with red and light orange mottles. 7.4 m - Becomes dark grey with white flecks.		St	7	46	47/20 kPa					W		
	Silty fine to coarse SAND with some gravel; greyish brown with some white flecks and occasional dark orange mottles. Well graded. Gravel is fine, angular, scoria. 7.5 - 8.0 m - Pushtube sample recovered.		MD	8	45	2/1//2/3/3/3 N=11							
PAHUREHURE MEMBER	Sandy SILT with trace gravel; dark brown. Low plasticity. Sand is fine to coarse; gravel is fine, angular, scoria.		St	9	44	25/9 kPa 1/1//0/2/1/0 N=3							
				10	43								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 1.2 m 12 hours after first day of drilling.

TS = Topsoil; N/A = Not Applicable.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH01

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2133026
Longitude : 174.9131121

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Sandy SILT with trace gravel; dark brown. Low plasticity. Sand is fine to coarse; gravel is fine, angular, scoria.					16/3 kPa 1/1//1/1/2/2 N=6							
				11	42								
			St	12	41	28/4 kPa 1/1//3/2/2/3 N=10					W		
	12.9 m - With minor fine to medium gravel.			13	40								
						UTP kPa 5/4//4/5/6/9 N=24							
PAHUREHURE MEMBER	Extremely weak UNWELDED TUFF recovered as: Silty fine to coarse SAND; dark brown. Well graded.		VD	14	39								
	Silty fine to coarse SAND with some gravel; dark brown. Well graded. Gravel is fine to medium, angular to sub-angular, scoria.		VD										
	Extremely weak UNWELDED TUFF recovered as: Silty fine to coarse SAND; greyish brown. Well graded.		VD										
	14.85 - 15 m - No Recovery; inferred as	NR	N/A	15	38								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 1.2 m 12 hours after first day of drilling.

TS = Topsoil; N/A = Not Applicable.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH01

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2133026
Longitude : 174.9131121

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	above.												
	Extremely weak WELDED TUFF recovered as: Silty fine to coarse SAND with some gravel; dark brownish grey. Well graded. Gravel is fine to medium, angular, basalt.		VD			7/10//12/14/22/ N=50+ for 3 mm							
	15.68 - 16.5 m - No Recovery.	NR	N/A	16	37								
	Extremely weak WELDED TUFF recovered as: Silty fine to coarse SAND with some gravel; dark brownish grey. Well graded. Gravel is fine to medium, angular, basalt.		VD VD VD VD			4/10//17/28/5 N=50+ for 18 mm							
PAHUREHURE MEMBER	Fine to medium GRAVEL; black. Poorly graded. Gravel is angular, basalt.		VD	17	36								
	Extremely weak WELDED TUFF recovered as: Silty fine to coarse SAND with some gravel; dark brownish grey. Well graded. Gravel is fine to medium, angular, basalt.		VD								W		
	Silty fine to coarse SAND with some gravel; dark grey. Well graded. Gravel is fine to medium, angular, basalt.												
	Extremely weak WELDED TUFF recovered as: Silty fine to coarse SAND with some gravel; dark brownish grey. Well graded. Gravel is fine to medium, angular, basalt.			18	35	14/36 N=50+ for 75 mm							
	Fine to coarse SAND with minor gravel; dark grey. Well graded. Gravel is fine to medium, angular, basalt.												
	Slightly weathered; brownish grey; massive; WELDED TUFF; moderately strong.		MS										
	18.95 - 19.5 m - No Recovery.	NR	N/A	19	34								
	Silty fine to medium SAND; dark grey. Well graded.		MD			2/2//2/3/3/3 N=11					S		
				20	33								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 1.2 m 12 hours after first day of drilling.

TS = Topsoil; N/A = Not Applicable.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH01

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2133026
Longitude : 174.9131121

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Silty fine to medium SAND with some gravel; brownish red. Poorly graded. Gravel is fine, angular, scoria and subangular to subrounded lapilli.		MD										
	Sandy SILT with trace gravel; brownish red with dark orange mottles. Low plasticity. Sand is fine to coarse; gravel is fine, angular, scoria.		VSt	21	32	98/20 kPa							
	Fine to coarse SAND with trace gravel; dark brown. Well graded. Gravel is fine, angular, scoria.		L			2/3//3/2/2/2 N=9							
	Clayey SILT with trace sand; dark brown. Low plasticity.		St										
	Clayey SILT with minor sand; light bluish grey with some light red staining. Low plasticity. Sand is fine to coarse.		St - VSt	22	31								
	Carbonaceous PEAT; black.		N/A										
PAHUREHURE MEMBER	Organic Silty CLAY; greyish brown with minor black mottles. High plasticity. Amorphous.		St	23	30	UTP kPa 1/2//2/2/2/2 N=8					W		
	Clayey SILT with trace sand; greyish brown with dark grey mottles. Low plasticity. Sand is fine to coarse. 23.72 m - With minor sand. Becomes bluish grey with dark grey mottles.		VSt	24	29	UTP kPa 3/4//3/3/6/8 N=20							
				25	28								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 1.2 m 12 hours after first day of drilling.

TS = Topsoil; N/A = Not Applicable.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH01

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2133026
Longitude : 174.9131121

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
			VSt										
	Clayey SILT with some sand; bluish grey with dark grey mottles. Low plasticity. Sand is fine to coarse.		St										
	Silty fine to coarse SAND; bluish grey with dark grey mottles. Well graded.		L	26	27	1/2//1/1/2/2 N=6							
	Clayey SILT with minor sand; bluish grey with dark grey mottles. Low plasticity. Sand is fine.		St										
	Silty CLAY with minor sand; bluish grey with dark grey mottles. High plasticity. Sand is fine.		St - VSt										
PAHUREHURE MEMBER	Clayey SILT with some sand; light greyish blue. Low plasticity. Sand is fine to coarse.		St - VSt	27	26	122/20 kPa 1/1//1/3/3/3 N=10					W		
	Silty CLAY with trace sand; light greyish blue. High plasticity.		St - VSt	28	25	UTP kPa							
	Clayey SILT with some sand; bluish grey with dark grey mottles. Low plasticity. Sand is fine to coarse.		St - Vst	29	24	1/2//1/1/2/2 N=6							
				30	23								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 1.2 m 12 hours after first day of drilling.

TS = Topsoil; N/A = Not Applicable.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH01

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2133026
Longitude : 174.9131121

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL) / Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	Clayey SILT with some sand; bluish grey with dark grey mottles. Low plasticity. Sand is fine to coarse.		St - Vst		36/6 kPa 0/0//0/4/3/2 N=9					W		

End of Hole Depth: 30.45 m
Termination:

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 1.2 m 12 hours after first day of drilling.

TS = Topsoil; N/A = Not Applicable.

BOREHOLE LOG MBH02

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 15/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2115268
Longitude : 174.915893

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
F	[FILL] Fine to coarse GRAVEL with some cobbles; grey. Well graded. Gravel and cobbles are angular, greywacke; cobbles are up to 80mm.		N/A								N/A		
	[BURIED TOPSOIL]		N/A								M		
	0.22 - 0.6 m - No Recovery.	NR	N/A		54						N/A		
RUNCIMAN MEMBER	Organic SILT with some sand; dark brown. Low plasticity. Amorphous; sand is fine to coarse.		F										
	Organic CLAY with some silt; dark blackish brown brown with occasional black mottles. High plasticity. Organics are amorphous and fibrous		F	1	1						M		
	1.35 - 1.5 m - No Recovery.	NR	N/A		53						N/A		
	Organic SILT; blackish dark brown. Low plasticity. Organics fibrous and amorphous and partially decomposed wood fragments.		S			17/6 kPa					M		
	1.55 - 1.95 m - No Recovery.	NR	N/A			0/0//0/0/0/0 N=0					N/A		
	Organic SILT; dark greenish brown with black and dark brown mottles. Low plasticity. Organics are partially decomposed fibrous wood fragments.		VS - S	2 / 3	52	0/0//0/0/0/0 N=0					S		
	Organic SILT; dark brown with black mottles. Low plasticity. Organics are fibrous partially decomposed wood fragments (5 - 30 mm diameter).		S	4	51								
	Clayey SILT with minor fibrous organic inclusions; dark greyish brown with light greyish brown and black mottles. Low plasticity. Organics are decomposed roots and charcoal.										W		
	4.5 - 5.0 m - Push tube recovered.		S	5	50								

Machine Borehole met target depth at 30.45 m bgl.
F = Fill; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

BOREHOLE LOG MBH02

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 15/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2115268
Longitude : 174.915893

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
RUNCIMAN MEMBER	Silty fine to coarse SAND with trace orgnics; dark greyish brown with occasional black mottles. Well graded. Organics are carbonaceous inclusions.		VL			0/1//0/0/0/0 N=0					W		
	CORE LOSS	NR	N/A		49						N/A		
	Sandy SILT; dark greyish brown. Low plasticity. Sand is fine to coarse.		F	6	6	0/0//0/0/0/0 N=0					W		
	6.23 - 6.45 m - No Recovery.	NR	N/A								N/A		
	Organic CLAY with some silt; dark brown with black mottles. High plasticity. Organics are amorphous and partially decomposed fibrous wood fragments (2 -5 mm thick).		F - St		48								
	Sandy SILT with minor organics; light greyish brown with black mottles. Low plasticity. Organics are partially decomposed fibrous wood fragments (2-6 mm thick); sand is fine to medium.		F - St	7									
ARDMORE MEMBER	Silty fine to medium SAND with trace organics; dark greyish brown. Poorly graded; organics are partially decomposed fibrous wood fragments (2 - 6 mm thick).		VL		47	0/0//0/0/0/0 N=0							
	Fibrous PEAT with some silt; black. Organics are partially decomposed wood fragments (5 - 50 mm thick).		N/A	8	46						M		
	8.75 - 9.0 m - Major wood fragments.												
	9.05 - 9.45 m - No Recovery.	NR	N/A	9		1/1//1/0/1/0 N=2							
	Fibrous PEAT with some silt; black. Organics are partially decomposed wood fragments (5 - 50 mm thick).		N/A		45						W		
				10									

Machine Borehole met target depth at 30.45 m bgl.
F = Fill; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH02

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 15/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2115268
Longitude : 174.915893

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
ARDMORE MEMBER	Fibrous PEAT with some silt; black. Organics are partially decomposed wood fragments (5 - 50 mm thick).		N/A	11	44	26/13 kPa 0/0//0/0/0/0 N=0					W		
	Silty fine to coarse SAND; dark grey. Well graded.		VL - L	12	43	39/11 kPa 0/0//0/0/0/0 N=0							
	Clayey SILT with minor sand; dark grey. Low plasticity. Sand is fine.		F	13	42								
	Fibrous PEAT; black.		N/A										
PAHUREHURE MEMBER	Silty CLAY with trace sand; dark greyish green. High plasticity. Sand is fine. 13.5 - 14.0 m - Push tube sample recovered.		N/A	14	41	28/14 kPa					M		
			S	15	40	0/0//0/0/0/0 N=0							

Machine Borehole met target depth at 30.45 m bgl.
F = Fill; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH02

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 15/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2115268
Longitude : 174.915893

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Silty CLAY with trace sand; dark greyish green. High plasticity. Sand is fine.			16	39	0/0//0/0/0/0 N=0							
	15.67 m - With trace gravel; gravel is coarse, angular, sandstone.			17	38	0/0//0/0/0/0 N=0					M		
			S F F	18	37								
			F	19	36	0/0//0/0/0/0 N=0							
	19.0 m - With minor fine to medium sand.			20	35								
	19.25 - 19.5 m - No Recovery.	NR	N/A								N/A		
	Silty CLAY with minor sand; dark greyish green. High plasticity. Sand is fine to medium.		St			0/0//0/0/0/0 N=0					M		

Machine Borehole met target depth at 30.45 m bgl.
F = Fill; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH02

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 15/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2115268
Longitude : 174.915893

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Silty CLAY with minor sand; dark greyish green. High plasticity. Sand is fine to medium.		St	21	34	0/0//0/0/0/0 N=0		25 50 75	25 50 75		M		
	Clayey SILT with minor sand; dark greyish green. Low plasticity. Sand is fine to medium.		St	22	33								
	Silty fine to coarse SAND; bluish grey. Well graded.		VL	23	32	0/0//0/0/0/0 N=0							
	Clayey SILT with minor sand; dark greyish green. Low plasticity. Sand is fine to medium.		St	24	31								
				25	30	0/0//0/0/0/0 N=0							

Machine Borehole met target depth at 30.45 m bgl.
F = Fill; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH02

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 15/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2115268
Longitude : 174.915893

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL) / Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Clayey SILT with minor sand; dark greyish green. Low plasticity. Sand is fine to medium.		St	29	0/0//0/0/0/0 N=0					M		
	27.0 m - With some fine to coarse sand.			28	0/0//0/0/0/0 N=0							
				27								
				26	0/0//0/0/0/0 N=0							
				25								

Machine Borehole met target depth at 30.45 m bgl.
F = Fill; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH02

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 15/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd
Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2115268
Longitude : 174.915893

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL) / Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	Clayey SILT with minor sand; dark greyish green. Low plasticity. Sand is fine to medium.		St		0/0//0/0/0/0 N=0					M		

End of Hole Depth: 30.45 m
Termination: Target depth

Machine Borehole met target depth at 30.45 m bgl.
F = Fill; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

BOREHOLE LOG MBH03

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 12/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2136734
Longitude : 174.9176659

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
T	[TOPSOIL]		N/A								D		
FILL	Clayey SILT with trace gravel, trace sand and trace organics; dark brown with black and orange mottles. Low plasticity. Gravel is fine, rounded, sandstone; sand is fine to coarse, organics are rootlets.		F										
	Clayey SILT with trace sand and organics; dark orange brown with black streaks. Low plasticity. Sand is fine; organics are rootlets and partially decomposed wood fragments.		F	1	54						M		
	1.12 m - With minor fibrous organics.												
	Silty CLAY with minor organics; dark brown with light orange brown and black mottles. High plasticity. Organics are fibrous partially decomposed wood fragments.		F	2	53	0/0//0/0/0/0 N=0							
RUNCIMAN MEMBER	Silty CLAY with trace fibrous organics; dark blackish brown with occasional dark orange brown mottles. High plasticity. Organics are decomposed wood fragments and roots.		F	3	52	0/0//0/0/0/0 N=0					W	▼	
	4.40 - 4.85 m - Major decomposing wood fragments (5 - 40 mm diameter).		N/A	4	51	0/0//0/0/0/0 N=0					S		
			S	5	50						W		

Machine Borehole met target depth at 30.45 m bgl.
T = Topsoil; N/A = Not Applicable
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH03

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 12/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2136734
Longitude : 174.9176659

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
ARDMORE MEMBER	Organic Silty CLAY; dark blackish brown with occasional dark orange brown mottles. High plasticity. Amorphous.		S										
	Clayey SILT with minor organics; dark greyish brown with black mottles. Low plasticity. Organics are fibrous.		S										
	Fibrous PEAT with some silt and trace sand; black. Organics are partially decomposed wood fragments; sand is fine.		N/A										
	Silty fine to coarse SAND with trace clay and trace organics; dark grey. Well graded.		VL	6	49	0/0//0/0/0/0 N=0							
	Silty CLAY with trace sand; greenish grey with occasional dark bluish grey mottles. High plasticity. Sand is fine.		S										
PAHUREHURE MEMBER	Sandy SILT with trace clay; dark greenish grey. Low plasticity. Sand is fine to coarse; dilatant.		S - F	7	48	20/06 kPa 0/0//0/0/0/0 N=0					W		
	Silty fine to coarse SAND with trace gravel; dark bluish grey. Well graded. Gravel is fine, rounded, sandstone clasts.		MD	8	47								
	9.45 - 10.4 m - No Recovery.	NR	N/A	9	46	0/1//2/4/5/4 N=15					N/A		
				10	45								

Machine Borehole met target depth at 30.45 m bgl.
T = Topsoil; N/A = Not Applicable
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH03

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 12/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2136734
Longitude : 174.9176659

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	9.45 - 10.4 m - No Recovery.	NR	N/A								N/A		
	Fine to coarse GRAVEL; grey. Well graded. Gravel is sub-rounded to sub-angular, sandstone clasts.		D								M		
	Silty fine to medium SAND with trace fine gravel; dark grey. Poorly graded. Gravel is sub-rounded to sub-angular, sandstone.		D			3/6//6/8/9/10 N=33							
	10.78 - 10.95 m - No Recovery.	NR	N/A								N/A		
	Silty fine to coarse SAND; black. Well graded.		D	11	11 44						M		
	11.46 - 12.0 m - No Recovery.	NR	N/A								N/A		
PAHUREHURE MEMBER	Silty fine to coarse SAND; black. Well graded.		L - MD	12	12 43								
	Clayey SILT with trace sand and trace carbonaceous organics; dark grey with occasional black motttles. Low plasticity. Sand is fine. 12.58 m - With minor fine to medium sand.		St - VSt			2/3//2/4/3/3 N=10					M		
	Silty fine to medium SAND; dark greyish green with black horizontal layers. Well graded. 13.03 m - Sand becomes fine to coarse.		L- MD	13	13 42								
	13.38 - 13.5 m - No Recovery.	NR	N/A								N/A		
	Clayey SILT with trace sand; dark grey with occasional black organic mottles. Low plasticity. Sand is fine. 13.95 m - With minor fine to medium sand.		St	14	14 41	0/1//0/1/2/2 N=5					M		
	Silty fine to medium SAND with trace gravel; black. Poorly graded. Gravel is fine, sub-angular, sandstone clasts.		L										
	Clayey SILT with minor sand; dark grey. Low plasticity. Sand is fine to medium.		St	15	15 40								

Machine Borehole met target depth at 30.45 m bgl.
T = Topsoil; N/A = Not Applicable
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

BOREHOLE LOG MBH03

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 12/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2136734
Longitude : 174.9176659

Material	DESCRIPTION	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Defect Description	Moisture	Water Level
	Silty CLAY with trace sand; dark greyish green. High plasticity. Sand is fine.	St - VSt			0/1//1/1/1/1 N=4			
	Sandy SILT with some clay; dark grey. Low plasticity. Sand is fine to coarse.	VSt						
	Clayey SILT with some sand; bluish green with dark brown mottles. Low plasticity. Sand is fine to coarse.	VSt	16	39				
	16.72 m - With some gravel and trace organics; gravel is fine, sub-angular, sandstone; organics are carbonaceous.				0/2//2/1/2/2 N=7			
PAHUREHURE MEMBER	Sandy SILT with trace clay and trace organics; bluish green. Low plasticity. Sand is fine to coarse; organics are fibrous. 17.15 - 18.08 m - Encountered very thin sub-horizontal dark grey layers.		17	38			M	
	18.22 m - With some clay.	VSt	18	37	1/2//3/8/3/4 N=18			
	18.85 m - With very thin sub-horizontal to gently inclined dark grey layers.		19	36				
	Clayey SILT with some sand; bluish green. Low plasticity. Sand is fine to medium.	St						
	19.85 m - Becomes light brownish grey.		20	35	1/1//1/1/0/0 N=2			

Machine Borehole met target depth at 30.45 m bgl.
T = Topsoil; N/A = Not Applicable
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH03

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 12/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2136734
Longitude : 174.9176659

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	PEAT with some silt; black. Organics are amorphous and partially decomposed roots and wood fragments.		N/A										
	Clayey SILT with minor sand; dark greyish brown. Low plasticity. Sand is fine to medium.		St										
	20.92 - 21.00 m - No Recovery.	NR	N/A	21	34	59/14 kPa							
	Sandy SILT with trace organics; green with light greyish brown streaks and black mottles. Low plasticity. Sand is fine to coarse; organics are carbonaceous inclusions.		St / VSt			0/1//0/0/0/0 N=1							
	Silty CLAY with trace organics; light grey with green specks. High plasticity. Organics are carbonaceous inclusions.		VSt										
	Clayey SILT with trace sand; light greyish brown with green specks. Low plasticity. Sand is fine.		VSt										
	21.55 m - Becomes bluish green with dark bluish grey mottles.			22	33								
PAHUREHURE MEMBER	Sandy SILT; bluish green with occasional dark bluish grey mottles. Low plasticity. Sand is fine to coarse.		VSt								M		
	Silty fine to coarse SAND; bluish grey. Well graded.		VL			0/0//1/0/0/0 N=1							
	Clayey SILT with trace sand; light grey with green streaks and specks. Low plasticity. Sand is fine.		VSt	23	32								
	Sandy SILT; bluish green. Low plasticity. Sand is fine to coarse.		VSt										
	Clayey SILT with some sand; bluish green with occasional dark grey bands and orange mottles. Low plasticity. Sand is fine to medium.		VSt	24	31	2/2//2/3/3/4 N=12							
				25	30								

Machine Borehole met target depth at 30.45 m bgl.
T = Topsoil; N/A = Not Applicable
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH03

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 12/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2136734
Longitude : 174.9176659

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
			VSt										
PAHUREHURE MEMBER	Sandy SILT with trace clay; bluish green. Low plasticity. Sand is fine to coarse.		VSt			0/1//0/0/1/3 N=4							
	Clayey SILT with minor sand; bluish green. Low plasticity. Sand is fine to medium. Interbedded (10-30 mm thick beds) with Sandy SILT; bluish green. Low plasticity. Sand is fine to coarse. 26.78 m - With some fine to coarse sand.		VSt	26	29								
	Sandy SILT; bluish green. Low plasticity. Sand is fine to coarse.		VSt	27	28	0/0//0/0/0/1 N=1					M		
	Clayey SILT with minor sand; bluish green. Low plasticity. Sand is fine.		VSt	28	27	0/0//1/0/0/1 N=2							
	Sandy SILT; bluish grey with occasional white specks. Low plasticity. Sand is fine to coarse.		VSt	29	26								
	Clayey SILT with minor sand; bluish grey with occasional dark bluish grey mottles. Low plasticity. Sand is fine.		VSt	30	25								

Machine Borehole met target depth at 30.45 m bgl.
T = Topsoil; N/A = Not Applicable
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

BOREHOLE LOG MBH03

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 12/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2136734
Longitude : 174.9176659

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL) / Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	Clayey SILT with minor sand; bluish grey with occasional dark bluish grey mottles. Low plasticity. Sand is fine.		VSt		0/0//1/0/0/0 N=1					M		

End of Hole Depth: 30.45 m
Termination: Target depth

Machine Borehole met target depth at 30.45 m bgl.
T = Topsoil; N/A = Not Applicable
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

BOREHOLE LOG MBH04

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2152927
Longitude : 174.9154151

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
T	[TOPSOIL]		N/A										
FILL	[FILL] Clayey SILT with minor organics and trace fine sand, fine to coarse gravel; black with light orange brown streaks. Low plasticity. Sand is fine; organics are rootlets; gravel is fine to coarse, angular, greywacke.		H								M		
			F - St		53								
	[FILL] Sandy SILT; orange brown with black mottles. Low plasticity. Sand is fine to coarse.												
	0.54 - 1.50 m - No Recovery.	NR	N/A	1							N/A		
HOBSONVILLE MEMBER	Silty CLAY with trace sand; light greyish brown with occasional orange and dark brown mottles. High plasticity. Sand is fine.				52	122/59 kPa 0/1//1/1/0/1 N=3							
	2.32 m - Becomes light bluish grey with occasional dark grey mottles.		S - F	2	51							▼	
	2.82 m - With some fine to coarse pumieceous sand and becomes light grey with black specks.			3		0/0//0/0/0/0 N=0					M		
	3.45 m - Becomes greyish brown.				50								
RUNCIMAN MEMBER	Organic CLAY; black. High plasticity. Amorphous.		S - F	4									
	4.09 m - Becomes intermixed black and dark brown.												
	Silty CLAY with trace organics; greyish brown with black mottles. High plasticity. Organics are fibrous partially decomposed wood fragments.				49								
	4.5 m - With trace fine sand and becomes light greyish brown with black specks.		S - F	5		0/0//0/0/0/0 N=0							

Machine Borehole met target depth at 30.45 m bgl.
T = Topsoil; F = Fill; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH04

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2152927
Longitude : 174.9154151

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
RUNCIMAN MEMBER	5.02 m - Becomes intermixed dark greyish brown and dark brown.		S - F										
	Sandy SILT with some clay; dark greyish brown with orange mottles. Low plasticity. Sand is fine to coarse.		S - F										
	Organic SILT; black. Low plasticity. Organics are partially decomposed fibrous wood fragments.		F		48								
				6		34/7 kPa 0/0//0/0/0/0 N=0							
	Silty CLAY with minor sand; dark grey. High plasticity. Sand is fine to meidum.		S - F		47								
	Organic SILT; black. Low plasticity. Organics are fibrous partially decomposed roots (2-5 mm).		S - F										
	Sandy SILT with trace clay; dark greenish grey with black streaks. Low plasticity. Sand is fine to coarse.		S - F	7									
	Silty CLAY with trace organics; dark greenish grey with occasional black mottles. High plasticity. Organics are decomposed fibrous wood fragments. 7.5 - 8.0 m - Push tube sample recovered.		S		46	21/12 kPa					M		
				8		0/0//0/0/0/0 N=0							
	Silty CLAY with trace sand; dark greyish brown. High plasticity. Sand is fine. 8.7 m - Sand ceases.		S - F		45								
	Silty CLAY; orange with dark orange layers. High plasticity.		F	9		39/12 kPa 0/0//0/0/0/0 N=0							
	Sandy SILT with trace clay; light orange brown with dark orange streaks and black mottles. Low plasticity. Sand is fine to coarse.		F		44								
	Silty fine to coarse SAND with trace gravel; greyish brown. Well graded.		VL	10									

Machine Borehole met target depth at 30.45 m bgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

T = Topsoil; F = Fill; N/A = Not Applicable.

BOREHOLE LOG MBH04

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2152927
Longitude : 174.9154151

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
SOUTH AUCKLAND VOLCANIC FIELD	Silty fine to coarse SAND with trace gravel; greyish brown. Well graded.		VL	11	43	0/0//0/1/0/0 N=1					M		
			L	12	42	1/0//1/3/1/2 N=7							
	Sandy SILT with trace gravel; greyish brown. Low plasticity. Gravel is fine, sub-angular, sandstone clasts.			13	41								
	Interbedded (200 - 800 mm thick beds) with: Silty fine to coarse SAND with trace gravel; greyish brown. Well graded. Gravel is fine, sub-angular		L / F		40	0/1//2/3/1/1 N=7					N/A		
	13.29 m - Becomes intermixed orange brown and greyish brown.			14									
	13.80 - 13.95 m - No Recovery.				39						M		
	Silty CLAY; light greyish brown with dark red stained horizontal layers. High plasticity.		St										
			L	15									

Machine Borehole met target depth at 30.45 m bgl.
T = Topsoil; F = Fill; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH04

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2152927
Longitude : 174.9154151

Material	DESCRIPTION	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Defect Description	Moisture	Water Level
	Silty fine to medium SAND; dark grey. Well graded.	L			0/1//1/2/1/1 N=5			
	Silty CLAY; dark greenish grey. High plasticity.	St		38				
	Clayey SILT with trace sand; dark greyish green with orange mottles. Low plasticity. Sand is fine.	St	16					
	16.22 -16.28 m - With trace fibrous organics (decomposed roots).			37	67/6 kPa			
	16.54 m - With minor fine to medium sand and becomes dark greyish green with occasional greenish brown mottles.				0/2//2/1/3/3 N=8			
PAHUREHURE MEMBER	Sandy SILT with some clay; dark greyish green with occasional black mottles. Low plasticity. Sand is fine to medium.	F - St	17	36			M	
	17.77 m - With trace black fibrous organics and orange mottles.		18					
	18.12 m - Sand becomes fine to coarse.				0/0//0/0/0/0 N=0			
	Clayey SILT with some sand; dark greyish green with orange mottles, white specks and orange brown horizontal layers (20-30 mm thick). Low plasticity. Sand is fine to medium.	S - F		35				
	18.85 m - Becomes dark green with orange mottles.		19					
	Silty CLAY with trace organics; dark greyish brown. High plasticity. Organics are carbonaceous inclusions.	S - F						
	Sandy SILT; dark grey with occasional black mottles. Low plasticity. Sand is fine to coarse.	St		34	67/6 kPa			
			20		0/0//0/0/0/0 N=0			

Machine Borehole met target depth at 30.45 m bgl.
T = Topsoil; F = Fill; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH04

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2152927
Longitude : 174.9154151

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
			St										
PAHUREHURE MEMBER	Silty CLAY with trace sand; dark greenish grey. High plasticity. Sand is fine. 20.35 m - Becomes light grey.		S - F		33								
	Sandy SILT; dark greyish green with occasional black mottles. Low plasticity. Sand is fine to medium.		VSt										
	Gravelly SILT with minor sand; dark greenish grey. Low plasticity. Gravel is fine, sub-rounded to sub-angular, sandstone; sand is fine to coarse.		F	21	21	104/8 kPa 0/0//2/1/2/2 N=7							
	Clayey SILT with some fine to medium sand; greyish green. Low plasticity. Sand is fine to medium. 22.15 m - With dark bluish black mottles and gently inclined bands (5-10 mm thick) and white specks.		F		32 22 31						M		
	Silty CLAY with trace sand; greyish green with black specks. High plasticity. Sand is fine to medium.		F			0/0//1/2/1/2 N=6							
	Silty fine to coarse SAND; greyish green with occasional white specks. Well graded.		VL - L	23	23								
	Sandy SILT; greyish green with occasional black and white specks. Low plasticity. Sand is fine to medium.		S - F		30 24 29	0/0//0/0/0/0 N=0							
	Silty fine to coarse SAND; dark greyish green. Well graded.		VL -	25	25								

Machine Borehole met target depth at 30.45 m bgl.
T = Topsoil; F = Fill; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH04

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2152927
Longitude : 174.9154151

Material	DESCRIPTION	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Silty fine to coarse SAND; dark greyish green. Well graded.	L - VL	26	28	0/0//0/0/0/1 N=1							
	Silty CLAY with some sand; dark greyish green. High plasticity. Sand is fine to medium.	St	27									
	Sandy SILT; dark greyish green. Low plasticity. Sand is fine to coarse.	St										
	Clayey SILT with minor sand; dark greyish green. Low plasticity. Sand is fine to coarse.	St	27	26	0/0//0/0/1/2 N=3					M		
	27.61 m - With some fine to coarse sand.		28									
	Clayey SILT with minor sand; dark grey with occasional greyish green streaks, black specks and orange mottles. Low plasticity. Sand is fine.	St		25	0/0//0/0/0/0 N=0							
	28.65 m - With some fine to coarse sand.		29									
	Sandy SILT; dark greyish green. Low plasticity. Sand is fine to coarse.	St - VSt		24								
	29.35 - 29.50 m - With light greyish green sub-horizontal layers. (2-5mm thick).		30									

Machine Borehole met target depth at 30.45 m bgl.
T = Topsoil; F = Fill; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH04

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 11/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2152927
Longitude : 174.9154151

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL) / Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	Silty fine to coarse SAND; dark greyish green. Well graded.		L		1/0//1/2/3/2 N=8					M		

End of Hole Depth: 30.45 m
Termination: Target depth

Machine Borehole met target depth at 30.45 m bgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.7 m bgl during morning break in drilling.

T = Topsoil; F = Fill; N/A = Not Applicable.

BOREHOLE LOG MBH05

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 13/04/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2168819
Longitude : 174.919984

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
T	[TOPSOIL]		N/A								D		
FILL	[FILL] Sandy SILT; light greyish brown with occasional dark grey and red mottles. Low plasticity.		St										
FILL	[FILL] Clayey SILT with trace sand; light greyish brown with occasional red mottles. Low plasticity. Sand is fine.		St	1	54								
FILL	[FILL] Clayey SILT with minor sand; light orange brown with red streaks. Low plasticity. Sand is fine to medium.		St								M		
FILL	[FILL] Clayey SILT with trace sand; dark greyish brown with red mottles. Low plasticity. Sand is fine.		St	2	53	0/0//0/0/0/0 N=0							
HM	Silty CLAY with some sand; light greyish brown. High plasticity. Sand is fine to coarse.		St								W		
HM	Silty fine to coarse SAND; light greyish brown with white specks. Well graded.		VL / F								W		
RUNCIMAN MEMBER	Silty CLAY; light grey with black specks and dark brown streaks. High plasticity.	NR	N/A	3	52						N/A		
RUNCIMAN MEMBER	2.85 - 3.0 m - No Recovery.												
RUNCIMAN MEMBER	Silty CLAY with some organics; dark brown with black specks. High plasticity. Organics are carbonaceous inclusions.		S			0/0//0/0/0/0 N=0					W		
RUNCIMAN MEMBER	Clayey SILT with trace organics; greyish brown. Low plasticity. Organics are fibrous wood fragments (1-5 mm).		F - St	4	51								
RUNCIMAN MEMBER	Organic Silty CLAY; black. High plasticity. Organics are partially decomposed fibrous wood fragments (5- 20 mm thick).		S										
RUNCIMAN MEMBER	4.33 - 4.5 m - No Recovery.	NR	N/A								N/A		
RUNCIMAN MEMBER			N/A	5	50						W		

Machine Borehole met target depth at 30.45 m bgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.6 m bgl during morning break in drilling.

T = Topsoil; N/A = Not Applicable; HM = Hobsonville Member

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH05

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 13/04/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2168819
Longitude : 174.919984

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
RUNCIMAN MEMBER	Fibrous PEAT with some silt; black. Organics are partialy decomposed wood fragments (5 - 35 mm); beds are 500 mm thick. Interbedded with: Organic Silty CLAY; dark blackish green. High plasticity. Amorphous; beds are 200 mm thick.		N/A	6	49	0/0//0/0/0/0 N=0					W		
	Silty fine to coarse SAND; bluish grey. Well graded.		VL			0/0//0/0/0/0 N=0							
	Organic Silty CLAY; dark blackish brown. High plasticity. Organics are partially decomposed fibrous wood fragments.		S - F										
	Silty fine to medium SAND with minor clay and trace organics; dark greenish grey with black specks. Low plasticity. Organics are carbonaceous inclusions. 6.95 m - Fine to coarse sand.		VL	7	48								
	7.25 - 7.5 m - No Recovery.	NR	N/A								N/A		
PAHUREHURE FORMATION	Silty CLAY; dark greenish grey. High plasticity.		S	8	47	0/0//0/0/0/0 N=0					W		
	Silty fine to coarse SAND; dark bluish grey. Well graded.		VL	9	46								
	Silty CLAY; dark greenish grey. High plasticity.		F			0/0//0/0/0/0 N=0							
				10	45								

Machine Borehole met target depth at 30.45 m bgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.6 m bgl during morning break in drilling.

T = Topsoil; N/A = Not Applicable; HM = Hobsonville Member

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH05

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 13/04/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2168819
Longitude : 174.919984

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE FORMATION	Silty CLAY; dark greenish grey. High plasticity.												
	10.5 - 11.0 m - Recovered push tube sample.		F			30/7 kPa							
				11	44	0/0//0/0/0/0 N=0							
	Silty fine to coarse SAND; dark bluish grey. Well graded.		VL										
	Silty CLAY; dark greenish grey. High plasticity.		S - F										
				12	43	25/6 kPa							
						0/0//0/0/0/0 N=0							
	Silty fine to coarse SAND; dark bluish grey. Well graded.		VL - L								W		
	Clayey SILT with trace sand; dark greenish brown. Low plasticity. Sand is fine.												
				13	42								
			F - St			53/16 kPa							
						0/0//0/0/0/0 N=0							
				14	41								
	14.19 m - With some fine to coarse sand.												
				15	40								

Machine Borehole met target depth at 30.45 m bgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.6 m bgl during morning break in drilling.

T = Topsoil; N/A = Not Applicable; HM = Hobsonville Member

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH05

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 13/04/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2168819
Longitude : 174.919984

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
	Clayey SILT with trace sand; dark greenish brown. Low plasticity. Sand is fine.					28/10 kPa 0/0//0/0/0/0 N=0		25 50 75	25 50 75				
	16.23 m - With trace fine to meduim gravel; gravels are pumiceous sand inclusions, crumbles under pressure.		F - St	16	39	58/25 kPa 0/1//1/2/3/4 N=10							
PAHUREHURE FORMATION	Sandy SILT; black. Low plasticity. Sand is fine.		St	17	38								
	Clayey SILT with trace sand; dark green with white specks. Low plasticity. Sand is fine.		St - VSt								W		
	17.66 m - With some fine to coarse sand.												
	Silty fine SAND; black. Poorly graded.		L - MD	18	37	2/2//1/2/3/5 N=11							
	Fine to medium SAND with some silt; black. Poorly graded.		MD										
	19.0 m - Very dense.		VD	19	36	5/12//12/14/ 16/8 for 35 mm N=50+							
				20	35								

Machine Borehole met target depth at 30.45 m bgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.6 m bgl during morning break in drilling.

T = Topsoil; N/A = Not Applicable; HM = Hobsonville Member

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH05

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 13/04/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2168819
Longitude : 174.919984

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE FORMATION	Fine to medium SAND with some silt; black. Poorly graded.		VD								W		
	20.27 - 21.0 m - No Recovery.	NR	N/A								N/A		
	Sandy SILT; black with dark green mottles. Low plasticity. Sand is fine to coarse.		VSt - H	21	34	0/0//0/0/2/3 N=5							
	Fine to coarse SAND with some silt; black. Well graded. 21.75 - 21.89 m - With gently inclined layers of dark green silt (2 - 10mm thick). 22.24 - 22.26 m - White pumiceous silt clast inclusion (20 mm diameter).		L	22	33						W		
	Clayey SILT with trace sand; dark green. Low plasticity. Sand is fine.		VSt - H	23	32	0/0//0/0/1/1 N=2							
	SILT with some clay and trace sand; greenish grey. Low plasticity. Sand is fine.		VSt - H										
	Silty fine to coarse SAND: dark grey. Well graded.		L - MD								N/A		
	23.63 - 24.00 m - No Recovery.	NR	N/A										
	Clayey SILT with trace sand; dark brownish grey with occasional black and white specks. Low plasticity. Sand is fine.		H	24	31	2/2//3/4/5/5 N=17					W		
	Silty fine to coarse SAND; dark grey. Well graded.		L - MD										
	Sandy SILT with trace clay; dark greyish green. Low plasticity. Sand is fine to coarse.		H										
			H	25	30								

Machine Borehole met target depth at 30.45 m bgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.6 m bgl during morning break in drilling.

T = Topsoil; N/A = Not Applicable; HM = Hobsonville Member

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH05

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 13/04/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2168819
Longitude : 174.919984

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE FORMATION	Clayey SILT with minor sand; bluish grey with occasional dark blue mottles and specks. Low plasticity. Sand is fine to medium.		H	26	29	0/2//1/2/2/2 N=7					W		
	26.73 - 26.81 m - With sub-horizontal dark bluish green and light grey layers (5 - 20 mm thick).			27	28	0/0//1/1/1/2 N=5							
	Silty fine to coarse SAND; bluish grey. Well graded.		L	28	27								
	Sandy SILT; dark greenish grey. Low plasticity. Sand is fine to coarse.		H	29	26	0/0//1/1/2/2 N=6							
	Fine to coarse SAND with some silt; dark grey. Well graded. 29.75 - 30 m - No Recovery.		L - MD	30	25						N/A		

Machine Borehole met target depth at 30.45 m bgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.6 m bgl during morning break in drilling.

T = Topsoil; N/A = Not Applicable; HM = Hobsonville Member

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH05

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 13/04/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2168819
Longitude : 174.919984

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL) / Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	Fine to coarse SAND with some silt; dark grey. Well graded.		L - MD		1/2//3/4/3/3 N=13					W		

End of Hole Depth: 30.45 m
Termination: Target depth

Machine Borehole met target depth at 30.45 m bgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.6 m bgl during morning break in drilling.

T = Topsoil; N/A = Not Applicable; HM = Hobsonville Member

BOREHOLE LOG MBH06

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2142281
Longitude : 174.9210359

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
FILL	ASPHALT		N/A								N/A		
	0.25 - 0.40 m - No Recovery.	NR	N/A										
	[FILL] Fine to coarse GRAVEL; grey. Well graded. Gravel is sub-angular to angular, greywacke.		N/A		57								
	[FILL] Clayey SILT with trace sand and trace gravel; dark orange brown. Low plasticity. Sand is fine. Gravels are angular, coarse siltstone clasts (greywacke).		St - VSt	1									
	[FILL] Sandy SILT; dark orange brown. Low plasticity. Sand is fine to medium.		St - VSt										
RUMCIMAN MEMBER	Clayey SILT with trace sand and organics; dark orange brown with black mottles. Low plasticity. Sand is fine; organics are fibrous partially decomposed roots (1-5 mm thick).				56	0/0//0/0/0/0 N=0					M		
	2.85 m - With some fine to coarse sand.		St - VSt	2	55								
	Silty CLAY with trace organics; dark greenish brown with dark brown mottles and streaks. High plasticity. Organics are carbonaceous inclusions.		S	3		0/0//0/0/0/0 N=0							
	Clayey SILT with trace organics; dark greenish brown with occasional black mottles and streaks. Low plasticity. Organics are carbonaceous inclusions. 3.72 m - With minor fine to medium sand and becomes intermixed dark greenish brown and black.		S		54								
	Silty fine to coarse SAND; black with dark green mottles. Well graded.		VL	4									
	Organic CLAY with some silt; black. High plasticity. Amorphous.		S		53	0/0//0/0/0/0 N=0					W		
	Fibrous PEAT with some silt; black. Organics are partially decomposed fibrous wood fragments and roots.		N/A	5									

Machine Borehole met target depth at 30.45 m bgl.

F = Fill; N/A = Not Applicable

Coordinates and elevation estimated using Auckland Council GeoMaps.

Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

BOREHOLE LOG MBH06

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2142281
Longitude : 174.9210359

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
RUMCIMAN MEMBER	Fibrous PEAT with some silt; black. Organics are partially decomposed fibrous wood fragments and roots.		N/A								W		
	5.45 - 6.00 m - No Recovery.	NR	N/A		52						N/A		
	PEAT with some silt; black. Organics are partially decomposed fibrous wood fragments and roots.		N/A	6		0/0//0/0/0/0 N=0							
	Organic Clayey SILT; black. High plasticity. Amorphous.		S		51								
	Silty CLAY with trace sand; dark green with black mottles. High plasticity. Sand is fine.		F										
	Fibrous PEAT with some silt; black. Organics are partially decomposed wood fragments.		N/A	7									
	Silty CLAY with trace sand; dark green. High plasticity. Sand is fine.		F										
	7.45 m - With minor fine to coarse sand.				50	31/14 kPa							
PAHUREHURE MEMBER	Clayey SILT with some sand; greenish grey. Low plasticity. Sand is fine to medium.		F - St	8		0/0//0/0/0/0 N=0					W		
	Sandy SILT with some clay; dark greenish grey. Low plasticity. Sand is fine to coarse.		F - St	9	49								
	Silty fine to coarse SAND; dark grey. Well graded. Sand is fine to coarse.		VL - L		48	1/0//1/1/1/3 N=6							
				10									

Machine Borehole met target depth at 30.45 m bgl.
F = Fill; N/A = Not Applicable
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH06

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2142281
Longitude : 174.9210359

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Silty fine to coarse SAND; dark grey. Well graded. Sand is fine to coarse. 10.2 m - Becomes black.		VL - L										
	Silty CLAY with trace sand; dark green. High plasticity. Sand is fine.		F - St		47								
	Silty fine to coarse SAND; black. Well graded.		VL - L			0/0//0/0/0/0 N=0							
	Sandy SILT; dark bluish grey. Low plasticity. Sand is fine to coarse.		St	11	46						W		
	Silty CLAY; dark grey. High plasticity.		S										
	SILT with minor sand; dark grey. Low plasticity. Sand is fine to medium. 12.3 m - With some fine to coarse sand.		S	12	45	0/0//0/0/0/0 N=0							
	Sandy SILT; dark grey with occasional black mottles and horizontal bands (2-5 mm thick). Low plasticity. Sand is fine to coarse. 12.8 m - Becomes dark green.		St - VSt										
	Clayey SILT with minor sand; grey with occasional dark grey mottles. Low plasticity. Sand is fine to medium.		VSt	13	44						M		
	Clayey SILT with some sand; dark bluish grey. Low plasticity. Sand is fine to coarse.		VSt			0/0//0/1/5/4 N=10							
	Silty fine to coarse SAND with some clay; light grey. Well graded.		L-MD	14	43								
	Sandy SILT with some clay; light grey. Low plasticity. Sand is fine to coarse. 14.69 m - Becomes bluish grey.		VSt										
	14.83 - 15 m - No Recovery.	NR	N/A	15							N/A		

Machine Borehole met target depth at 30.45 m bgl.
F = Fill; N/A = Not Applicable
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH06

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2142281
Longitude : 174.9210359

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
	Silty fine to coarse SAND; bluish green. Well graded.		L-MD										
	Clayey SILT with minor sand; bluish green. Low plasticity. Sand is fine to medium.		VSt		42	1/2//2/1/3/2 N=8							
	Sandy SILT; bluish grey with occasional dark bluish grey mottles. Low plasticity. Sand is fine to coarse.		VSt - H	16	41	1/2//3/3/4/5 N=15							
PAHUREHURE MEMBER	Clayey SILT with minor sand; dark bluish green with occasional dark bluish grey horizontal layers (2 mm thick) and black mottles. Low plasticity. Sand is fine to medium.		VSt - H	17	40						M		
	Silty CLAY with trace sand; light bluish green with dark bluish grey specks. High plasticity. Sand is fine.		F - St	18		49/12 kPa							
	Sandy SILT with trace clay; bluish green with occasional dark blue specks and mottles. Low plasticity. Sand is fine.		F - St		39	0/0//0/0/1/1 N=2							
	Silty CLAY with trace sand; bluish green with occasional dark bluish grey specks and mottles. High plasticity. Sand is fine.			19									
	19.33 m - With minor fine sand and becomes light bluish green with dark bluish grey specks.		VSt - H		38	0/0//0/0/0/0 N=0							
				20									

Machine Borehole met target depth at 30.45 m bgl.
F = Fill; N/A = Not Applicable
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH06

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2142281
Longitude : 174.9210359

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Clayey SILT with some sand; bluish grey with orange brown mottles. Low plasticity. Sand is fine to medium.		VSt - H										
	Sandy SILT; bluish green. Low plasticity. Sand is fine to coarse.		VSt - H		37								
	20.89 - 21.00 m - No Recovery.	NR	N/A	21									
	Silty fine to coarse SAND; bluish green. Well graded.		VL			47/7 kPa 0/0//0/0/0/0 N=0							
	Clayey SILT with some sand; light bluish green with dark bluish grey specks. Low plasticity. Sand is fine to coarse.		St		36								
	21.68 - 21.74 m - Encountered dark orange brown sub-horizontal bands (5 -15 mm thick and 5 mm spacing).		VSt - H	22									
	Sandy SILT with trace clay; bluish green. Low plasticity. Sand is fine to coarse.												
	Silty fine to coarse SAND; bluish green with white and light orange specks. Well graded.		L										
	Clayey SILT with trace sand; bluish green. Low plasticity. Sand is fine.		H		35						M		
	22.75 - 22.95 m - Encountered dark orange brown mottles and sub-horizontal bands (5-10 mm thick, 10-40 mm spacing).			23		1/0//2/3/6/4 N=15							
	Sandy SILT with trace clay; bluish green. Low plasticity. Sand is fine to coarse.		H										
	Clayey SILT with some sand; bluish green. Low plasticity. Sand is fine to coarse.		H		34								
	Sandy SILT with trace clay; bluish green. Low plasticity. Sand is fine to coarse.		H	24	33	1/1/1/2/4/4 N=11							
				25									

Machine Borehole met target depth at 30.45 m bgl.
F = Fill; N/A = Not Applicable
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH06

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2142281
Longitude : 174.9210359

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Sandy SILT with trace clay; bluish green. Low plasticity. Sand is fine to coarse.		H										
	Silty fine to coarse SAND; bluish green. Well graded.		VL		32	0/0//1/0/0/1 N=2							
	Sandy SILT with trace clay; bluish green. Low plasticity. Sand is fine to coarse.		H	26	31	0/0//1/0/1/0 N=2					M		
				27	30								
				28	29	0/0//0/0/1/0 N=1							
	Silty fine to coarse SAND; bluish green. Well graded.		D	29	28								
	Sandy SILT with trace clay; bluish green. Low plasticity. Sand is fine to medium.		H	30	30								

Machine Borehole met target depth at 30.45 m bgl.
F = Fill; N/A = Not Applicable
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH06

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Machine Borehole
Drilling Contractor : McMillan Drilling Group Ltd
Core Diameter : 83 mm
Energy Transfer Ratio : 97
Logged By/Reviewed By : JM / CL/HL
Latitude : -37.2142281
Longitude : 174.9210359

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL) / Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	Sandy SILT with trace clay; bluish green. Low plasticity. Sand is fine to medium.		H		1/1//2/2/2/2 N=8					M		

End of Hole Depth: 30.45 m
Termination: Target depth

Machine Borehole met target depth at 30.45 m bgl.
F = Fill; N/A = Not Applicable
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing groundwater at 2.8 m bgl during morning break in drilling.

BOREHOLE LOG MBH07

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 19/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.218461
Longitude : 174.9228879

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
TS	[TOPSOIL]		F								D		
FILL	[FILL] SILT with some clay, some sand and trace gravel; orange brown with some white and black specks. Low plasticity. Sand is fine to coarse; gravel is coarse, subangular, greywacke. 0.6 m - With minor fine to medium gravel. Becomes with light orange and white streaks and mottles, occasional black mottles.		St - VSt								M		
	0.9 - 1.5 m - No Recovery.	NR	N/A	1	54						N/A		
	Clayey SILT with trace sand; dark grey with occasional light grey and black mottles. Low plasticity. Sand is fine.		St			UTP kPa 0/0//0/0/0/1 N=1							
	2.45 m - Becomes light brown with dark grey and dark orange streaks and mottles.			2	53								
	2.8 m - With minor fine to coarse sand and white clasts of hard clay/silts.			3	52								
HM	Silty CLAY with some sand; light grey with light orange, white and black carbonaceous mottles. High plasticity. Sand is fine to coarse.		St F			38/1 kPa 0/0//0/0/0/0 N=0					M		
	Sandy SILT; light orange with white specks. Low plasticity. Sand is fine to coarse.												
	Silty CLAY with minor sand; light grey with black mottles and white pumiceous silt clast inclusions (1 - 5 mm). High plasticity. Sand is fine to coarse.		St										
RUNCIMAN MEMBER	Silty CLAY with minor sand, organics and white pumiceous silt clast inclusions (5 - 30 mm); light brown with black and white streaks and mottles. High plasticity. Sand is fine to coarse; organics are partially decomposed wood fragments (5 - 20 mm).		St - VSt	4	51								
	Fibrous PEAT with minor silt; black. Organics are partially decomposed wood (5 - 50 mm).		N/A			N/A kPa 1/0//0/0/0/0 N=0							
	4.60 - 4.95 m - No Recovery (wood obstructed sampler).		N/A										
				5	50								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 7.53 m 30 minutes after drilling.

TS = Topsoil; UTP = Unable to Penetrate; N/A = Not Applicable; HM = Hobsonvill

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH07

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 19/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.218461
Longitude : 174.9228879

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
RUNCIMAN MEMBER	Fibrous PEAT with minor silt; black. Organics are partially decomposed wood (5 - 50 mm).		N/A										
	5.20 - 5.35 m - No Recovery; inferred as above.		N/A										
	Silty fine to coarse SAND with minor clay and organics; dark grey with black carbonaceous mottles. Well graded.		St										
			MD	6	49	32/12 kPa 0/0//0/2/6/6 N=14					M		
				7	48								
PAHUREHURE MEMBER	Clayey SILT with some sand; dark grey. Low plasticity. Sand is fine to coarse.		F - St			15/1 kPa 0/0//0/0/0/0 N=0							
				8	47								
	8.50 m - With minor fine sand.										W		
	Silty CLAY with minor sand and trace organics; dark grey with black mottles. High plasticity. Sand is fine; organics are carbonaceous inclusions. 9.0 - 9.5 m - Push tube sample recovered.		F	9	46	15/3 kPa							
						0/0//0/0/0/0 N=0							
				10	45								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
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GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH07

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 19/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.218461
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Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	9.95 m - Organics and black mottles cease. Silty CLAY with minor sand and trace organics; dark grey with black mottles. High plasticity. Sand is fine; organics are carbonaceous inclusions.		F	11	44	25/3 kPa 0/0//0/0/0/0 N=0							
PAHUREHURE MEMBER	Clayey SILT with minor sand; dark grey with black mottles. Low plasticity. Sand is fine.		St - VSt	12	43	22/3 kPa 0/0//0/0/0/1 N=1							
	12.45 m - With trace sand.										W		
	12.95 m - With some sand.			13	42								
	Silty fine SAND with trace clay; dark grey. Poorly graded.		MD	14	41	2/2//3/6/7/5 N=21							
	Clayey SILT with minor sand; dark grey with occasional black mottles. Low plasticity. Sand is fine. 14.40 m - Pumiceous silt clasts encountered; white, oxidised to blue. 14.85 m - Pumiceous silt clasts encountered; white, oxidised to blue.		VSt	15	40								

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GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH07

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
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Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.218461
Longitude : 174.9228879

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Clayey SILT with minor sand; dark grey with occasional black mottles. Low plasticity. Sand is fine.		VSt			3/3//5/5/6/5 N=21							
	Sandy SILT with minor clay; dark grey. Low plasticity. Sand is fine.		VSt										
	Silty fine SAND; dark grey. Poorly graded.		MD										
	15.90 m - Pumiceous silt clasts encountered; white, oxidised to blue.			16	16 39								
	Clayey SILT with minor sand; dark grey. Low plasticity. Sand is fine to coarse.		VSt			UTP kPa					W		
	Sandy SILT; dark grey. Poorly graded. Sand is fine to coarse.		VSt			0/2//4/4/4/5 N=17							
	Clayey SILT with some sand; dark grey. Low plasticity. Sand is fine to coarse.		VSt	17	17 38								
	17.3 - 18.0 m - No Recovery.	NR	N/A								N/A		
	18.05 m - 30 mm fine to medium GRAVEL layer; gravel is subrounded, sandstone.			18	18 37	39/1 kPa 0/0//1/1/2/2 N=6							
	18.45 m - With minor fine to coarse sand.		VSt	19	19 36						W		
	19.75 m - Becomes bluish grey with occasional black mottles.			20	20 35	32/1 kPa 0/0//1/2/2/3 N=8							

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 7.53 m 30 minutes after drilling.

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GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH07

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 19/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.218461
Longitude : 174.9228879

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Clayey SILT with some sand; dark grey. Low plasticity. Sand is fine to coarse.												
	20.80 m - Becomes bluish grey with some dark grey streaks and mottles and occasional black mottles. 20.90 m - 50 mm fine GRAVEL layer; gravel is subrounded, sandstone.		VSt	21	34	96/10 kPa 0/1//1/2/1/3 N=7							
				22	33								
RUNCIMAN MEMBER	Organic SILT; blackish brown. Low plasticity. Organics are fibrous and carbonaceous.		St - VSt	23	32	108/15 kPa 1/1//2/1/1/2 N=6					W		
				24	31	0/1//2/1/1/1 N=5							
				25	30								

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GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH07

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 19/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.218461
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Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	Organic SILT; blackish brown. Low plasticity. Organics are fibrous and carbonaceous.		St - VSt										
	Clayey SILT with some organics and trace sand; dark grey with black inclusions (5 - 40 mm). Low plasticity. Organics are carbonaceous inclusions; sand is fine.					80/17 kPa 1/1//2/1/2/2 N=7							
	26.55 m - Organics cease.		VSt	26	29								
PAHUREHURE MEMBER	27.45 m - With some fine to coarse sand.			27	28	UTP kPa 1/1//1/2/3/3 N=9					W		
	Silty fine to coarse SAND; dark grey. Well graded.		L	28	27	UTP kPa 1/1//2/2/2/2 N=8							
	Sandy SILT; dark grey. Low plasticity. Sand is fine to coarse.		VSt	29	26								
	Silty fine to coarse SAND with minor clay; dark grey. Well graded.		L										
	Clayey SILT with minor sand and trace organics; dark grey with black inclusions (1 - 5 mm). Low plasticity. Sand is fine to coarse; organics are carbonaceous inclusions.		VSt										
	Fine to coarse SAND with trace silt; dark		MD	30	25								

Machine borehole met target depth at 30.45 mbgl.
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BOREHOLE LOG MBH07

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 19/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 95.6%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.218461
Longitude : 174.9228879

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL) / Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	grey. Well graded. Fine to coarse SAND with trace silt; dark grey. Well graded.		MD		2/2//2/6/5/7 N=20					W		

End of Hole Depth: 30.45 m
Termination:

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 7.53 m 30 minutes after drilling.

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BOREHOLE LOG MBH08

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 13/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2168367
Longitude : 174.9139725

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
TS	[TOPSOIL]		F								D		
FILL	0.15 - 0.50 m - No Recovery (Silty topsoil washed out).	NR	N/A										
FILL	Clayey SILT with trace organics; dark brown with black mottles. Low plasticity. Organics are rootlets.		VSt										
SOUTH AUCKLAND VOLCANIC FIELD	Clayey SILT with minor sand and minor gravel; intermixed light grey and orange red. Low plasticity. Sand is fine to coarse; gravel is fine, angular, basalt.		St	1	63								
SOUTH AUCKLAND VOLCANIC FIELD	Clayey SILT; light orange. Low plasticity.					87/52 kPa 1/1//1/1/3/3 N=8							
SOUTH AUCKLAND VOLCANIC FIELD	2.55 - 2.85 m - With trace fine sand. 2.60 m - Becomes reddish orange.			2	62						M		
SOUTH AUCKLAND VOLCANIC FIELD			St - VSt	3	61	UTP kPa 2/1//3/3/4/4 N=14							
SOUTH AUCKLAND VOLCANIC FIELD	4.20 m - With some black mottles.			4	60								
SOUTH AUCKLAND VOLCANIC FIELD						147/55 kPa 0/0//0/1/1/0 N=2							
				5	59								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 10.35 m 30 minutes after drilling.

TS = Topsoil; N/A = Not Applicable.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH08

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 13/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2168367
Longitude : 174.9139725

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
SOUTH AUCKLAND VOLCANIC FIELD	4.95 m - With some fine to coarse sand and becomes reddish orange with occasional black mottles. Clayey SILT; light orange. Low plasticity. 5.17 m - Black carbonaceous layer (30 mm). 5.80 m - Black carbonaceous layer (30 mm). 5.9 m - Becomes reddish orange with some light grey streaks and occasional black mottles.		St - VSt	6	58	33/3 kPa 0/0//0/0/0/1 N=1							
	Sandy SILT with minor clay; reddish orange with some dark grey streaks and occasional black mottles. Low plasticity. Sand is fine to coarse.		F	7	57	20/3 kPa 1/0//0/1/1/1 N=3					M		
	Clayey SILT with some sand; reddish orange with some dark grey streaks and occasional black mottles. Low plasticity. Sand is fine to coarse.		F - St	8	56								
	Sandy SILT with minor clay; reddish orange with some dark grey streaks and occasional black mottles. Low plasticity. Sand is fine to coarse.		St	9	55	23/3 kPa 0/1//1/0/1/1 N=3							
				10	54								

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BOREHOLE LOG MBH08

Geotechnical Investigation
Pukekohe Park
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25208.000.001

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Material	DESCRIPTION	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Defect Description	Moisture	Water Level
SOUTH AUCKLAND VOLCANIC FIELD	Clayey SILT with some sand; orange brown with some black mottles. Low plasticity. Sand is fine to coarse.	St						
	10.50 - 11.00 m - Push tube sample recovered.	St			73/16 kPa			
			11	53	0/0//0/0/1/1 N=2		M	
	Fine to medium GRAVEL with minor silt and clay; dark brown. Poorly graded. Gravel is angular, scoria.	VL						
	Clayey SILT with some sand and trace gravel; light brown with some dark grey streaks and mottles. Low plasticity. Sand is fine to coarse; gravel is fine, angular, scoria.	St	12	52	36/6 kPa			
	Sandy SILT with minor clay; light brown. Low plasticity. Sand is fine to coarse.				0/2//1/1/2/2 N=6			
		F - St	13	51	7/1 kPa		W	
					1/0//0/2/1/1 N=4			
			14	50				
	Fine to medium GRAVEL; dark red. Poorly graded. Gravel is angular, scoria.	MD						
	Sandy SILT with minor gravel and trace clay; intermixed grey, red and orange. Low plasticity. Sand is fine to coarse; gravel is fine to medium, angular, scoria.	VSt						
		VSt	15	49				

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BOREHOLE LOG MBH08

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Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	14.60 m - Encountered 50 mm thick fine to medium GRAVEL band; gravel is angular, scoria.					29/7 kPa 0/1//0/1/0/1 N=2							
	Clayey SILT with minor sand; light orange with dark orange streaks and mottles and black mottles. Low plasticity. Sand is fine to coarse. 14.80 - 14.90 m - 15 mm sub-vertical fine to medium gravel layer; gravel is angular, scoria.												
	Sandy SILT with minor clay and gravel; orange brown with some light to dark orange streaks and mottles. Low plasticity. Sand is fine to coarse. Gravel is fine, angular scoria.		St - VSt	16	48								
	16.40 m - Becomes brownish orange with grey streaks and black mottles. 16.50 m - Becomes brownish orange and with grey streaks and black mottles.					32/6 kPa 1/0//0/1/0/1 N=2							
SOUTH AUCKLAND VOLCANIC FIELD	Clayey SILT with some sand and minor gravel; brownish orange with grey streaks and mottles and occasional black mottles. Low plasticity. Sand is fine to coarse; gravel is fine to medium, angular, scoria.			17	47						W		
			VSt - H	18	46	111/23 kPa 0/0//0/2/3/4 N=9							
				19	45	144/16 kPa 0/0//0/3/2/2 N=7							
				20	44								

Machine borehole met target depth at 30.45 mbgl.
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BOREHOLE LOG MBH08

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25208.000.001

Client :
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Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
SOUTH AUCKLAND VOLCANIC FIELD	Sandy SILT with minor clay and trace gravel; greyish brown with grey streaks and mottles. Low plasticity. Sand is fine to coarse; gravel is fine to medium, angular, scoria.		St	21	43	UTP kPa 0/0//0/0/0/0 N=0							
	Clayey SILT with minor sand; light brown with some light to dark orange streaks and mottles. Low plasticity. Sand is fine.		St										
	21.90 m - 30 mm fine to medium gravel layer; gravel is angular, scoria.		St - VSt	22	42								
	22.10 m - 30 mm fine to medium gravel band; gravel is angular, scoria.												
	22.40 m - 100 mm fine to medium gravel band; gravel is angular, scoria.					89/20 kPa					W		
	Silty CLAY with trace sand; light grey with light to dark orange and black streaks and mottles. High plasticity. Sand is fine.			23	41	0/0//2/2/2/3 N=9							
			VSt										
	24.00 m - With minor fine to medium sand and becomes brownish orange with light grey streaks and mottles.			24	40	87/23 kPa 0/0//0/0/2/2 N=4							
				25	39								

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Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%)	RQD (%)	Defect Description	Moisture	Water Level	Piezometer Construction
	Silty CLAY with trace sand; light grey with light to dark orange and black streaks and mottles. High plasticity. Sand is fine.		VSt			93/12 kPa 0/0//1/2/3/3 N=9		25 50 75	25 50 75				
	25.95 m - With trace fine gravel; gravel is angular, scoria for 20 mm.			26	26 38								
	26.15 m - Gravel ceases.												
	26.25 m - Becomes light grey with orange streaks and mottles and occasional black mottles.												
	Clayey SILT with some sand; intermixed light to dark orange and light grey. Low plasticity. Sand is fine to coarse.		VSt										
HOBSONVILLE ??	Sandy SILT with minor clay; light grey with occasional light orange streaks and mottles. Low plasticity. Sand is fine.		H	27	27 37	UTP kPa 5/4//6/9/13/21 N=49					W		
	Silty fine to medium SAND; light grey. Well graded. Sand is Pumiceous.		D	28	28 36								
PAHUREHURE MEMBER	Extremely weak WELDED TUFF recovered as: Sandy SILT; intermixed light to dark orange and red. Low plasticity. Sand is fine.		VSt			UTP kPa							
	Clayey SILT with minor sand; light orange with light grey streaks and mottles and occasional black mottles. Low plasticity. Sand is fine to medium.		H	29	29 35	4/5//7/7/8/8 N=30							
	Sandy SILT with some clay; light blue with some light orange streaks and mottles. Low plasticity. Sand is fine to coarse.		VSt										
			VSt	30	30 34								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 10.35 m 30 minutes after drilling.

TS = Topsoil; N/A = Not Applicable.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH08

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 13/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2168367
Longitude : 174.9139725

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL) / Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	Clayey SILT with some sand; brown orange with some white specks and occasional blue mottles. Low plasticity. Sand is fine to coarse.		VSt		UTP kPa 10/13//13/11/10/8 N=42					W		

End of Hole Depth: 30.45 m
Termination:

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 10.35 m 30 minutes after drilling.

TS = Topsoil; N/A = Not Applicable.

BOREHOLE LOG MBH09

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 14/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2184328
Longitude : 174.9168977

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
FILL	[TOPSOIL]		F								D		
	0.20 - 0.45 m - No Recovery (silty topsoil washed out).	NR	N/A										
	[FILL] Clayey SILT with trace sand and minor organics; dark brown with black mottles. Low plasticity. Sand is fine; organics are rootlets.		VSt										
SOUTH AUCKLAND VOLCANIC FIELD	Clayey SILT with minor sand and minor organics; brownish orange with black mottles. Low plasticity. Sand is fine; organics are partially decomposed wood fragments (5 - 30 mm). 1.15 m - Becomes light orange with dark orange streaks and mottles and black mottles.			1	61	UTP kPa 1/1//1/1/2/3 N=7							
	2.55 m - With some organics and trace sand. Becomes brownish red with black inclusions; organics are carbonaceous inclusions (1 - 5 mm).		St - VSt	2 3	60 59	UTP kPa 2/1//2/2/4/3 N=11					M		
				4	58	122/31 kPa 0/0//0/0/0/1 N=1							
				5	57								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 5.81 m 30 minutes after drilling.

TS = Topsoil; N/A = Not Applicable.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH09

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 14/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2184328
Longitude : 174.9168977

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
SOUTH AUCKLAND VOLCANIC FIELD			St - VSt								M		
	Sandy SILT with minor clay and trace gravel; red orange with orange streaks and mottles, some black carbonaceous mottles (5 - 30 mm). Low plasticity. Sand is fine to coarse; gravel is fine, angular, scoria.		F - St										
	5.90 m - With minor gravel.			6	56	35/1 kPa							
	SILT with some sand, minor clay and trace gravel; reddish orange with black inclusions (5 - 30 mm). Low plasticity. Sand is fine; gravel is fine to coarse, angular, scoria.		F			0//1/0/1/0/0 N=2							
	Clayey SILT with some sand, minor clay and trace gravel; reddish orange with black inclusions. Low plasticity. Sand is fine to coarse; gravel is fine to coarse, dense silt clasts, crumble under pressure.			7	55								
						28/3 kPa							
						0/0//0/0/0/0 N=0							
			F	8	54						W		
	9.00 m - With some fine gravel.			9	53	47/3 kPa							
						0/0//0/0/0/2 N=2							
	9.90 m - 50mm fine to medium gravel layer;			10	52								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 5.81 m 30 minutes after drilling.

TS = Topsoil; N/A = Not Applicable.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH09

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 14/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2184328
Longitude : 174.9168977

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
SOUTH AUCKLAND VOLCANIC FIELD	gravel is angular, scoria. 9.95 m - Becomes light orange with some dark orange and grey streaks and black mottles.		F										
	SILT with some sand, minor clay and minor gravel; brownish red with some black mottles. Low plasticity. Sand is fine to coarse; gravel is fine, angular, scoria.		F			UTP kPa							
	Clayey SILT with some sand and some gravel; orange brown with some black mottles. Low plasticity. Sand is fine to coarse; gravel is fine, angular, scoria.		F - St	11	51	0/1//0/1/0/0 N=1							
	Silty fine to coarse SAND with minor clay and minor gravel; orange brown with reddish black mottles and white specks. Well graded. Gravel is fine, angular, scoria.		N/A										
RUNCIMAN MEMBER	Silty CLAY with minor sand and trace gravel; brownish orange with dark red and orange streaks and mottles and black mottles. High plasticity. Sand is fine to coarse. Gravel is fine, angular, scoria. 11.90 m - 100 mm thick fine to medium scoria layer. 12.40 m - With trace sand; gravel ceases.		F	12	50	71/10 kPa 0/0//0/1/1/1 N=3					W		
	13.0 m - Becomes stiff.		St	13	49	70/13 kPa 0/2//1/3/3/4 N=11							
	Silty CLAY with minor sand; orange brown with dark orange streaks and mottles, minor black mottles. High plasticity. Sand is fine.		VSt	14	48								
				15	47								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 5.81 m 30 minutes after drilling.

TS = Topsoil; N/A = Not Applicable.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH09

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 14/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2184328
Longitude : 174.9168977

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	Clayey SILT with some sand; grey with orange streaks and mottles and some black mottles. Low plasticity. Sand is fine to coarse. 15.25 m - With some fine to medium gravel; gravel is angular, scoria.		F			UTP kPa 0/0//0/1/2/1 N=4							
	Sandy SILT with minor clay and some gravel; light brown with orange streaks and mottles and some black mottles. Low plasticity. Sand is fine to coarse; gravel is fine to medium, angular, scoria.		F										
16	Clayey SILT with minor sand and trace gravel; dark grey with orange streaks and mottles and some black mottles. Low plasticity. Sand is fine; gravel is fine, angular, basalt.		F	16	46								
	Clayey SILT with some gravel and minor sand; brownish orange with black mottles. Low plasticity. Gravel is fine to medium, angular scoria; sand is fine.		F			29/3 kPa 0/0//0/0/0/1 N=1							
17	Silty CLAY with minor sand and trace gravel; brownish orange with light to dark orange streaks and black mottles. High plasticity. Sand is fine to coarse; gravel is fine, angular, basalt. 17.50 m - With some fine to medium gravel.		F - St	17	45						W		
18				18	44	103/31 kPa 0/2//1/2/2/2 N=7							
19				19	43								
	Clayey SILT with minor sand and minor gravel; orange brown with orange streaks and mottles. Low plasticity. Sand is fine to coarse; gravel is fine to medium, angular, scoria.		F - St			73/20 kPa 0/0//0/0/0/0 N=0							
20				20	42								

RUNCIMAN MEMBER

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 5.81 m 30 minutes after drilling.

TS = Topsoil; N/A = Not Applicable.

BOREHOLE LOG MBH09

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 14/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2184328
Longitude : 174.9168977

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
RUNCIMAN MEMBER	Clayey SILT with minor sand and minor gravel; orange brown with orange streaks and mottles. Low plasticity. Sand is fine to coarse; gravel is fine to medium, angular, scoria. 20.25 m - Becomes brown with orange streaks and mottles and black mottles. Gravel ceases.		F - St										
HOBSONVILLE MEMBER?	Sandy SILT with minor clay and minor gravel; dark brown with grey streaks and black mottles. Low plasticity. Sand is fine to coarse; gravel is fine, angular, scoria.		F	21	41								
	Silty fine to coarse SAND with some organics; light to dark brownish grey. Well graded. Organics are carbonaceous inclusions.		L			0/0//0/0/2/1 N=3							
	Silty CLAY with minor sand; light grey with black mottles. High plasticity. Sand is fine to coarse.		F	22	40								
	Silty fine SAND; white with black mottles. Poorly graded. Sand is pumiceous. Dilatant. 22.40 m - Becomes dark grey with black mottles.		D			UTP kPa 5/5//8/9/10/9 N=36					W		
	Sandy SILT; dark orange, black and yellow layers. Low plasticity. Sand is fine to coarse.		St	23	39								
	Silty CLAY with trace sand; dark grey. High plasticity. Sand is fine.		St										
SOUTH AUCKLAND VOLCANIC FIELD	Fine to medium GRAVEL; dark red. Poorly graded. Gravel is angular, scoria.		N/A										
	Clayey SILT with trace sand; brownish orange with dark orange streaks and mottles and black mottles. Low plasticity. Sand is fine. 23.65 m - With minor sand. 23.85 m - With some fine to coarse sand and some fine gravel; gravel is angular, scoria.		VSt	24	38	UTP kPa 5/10//10/15/16/9 N=50+ for 26 mm							
				25	37								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 5.81 m 30 minutes after drilling.

TS = Topsoil; N/A = Not Applicable.

BOREHOLE LOG MBH09

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 14/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2184328
Longitude : 174.9168977

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Clayey SILT with trace sand; brownish orange with dark orange streaks and mottles and black mottles. Low plasticity. Sand is fine. 25.25 m - 50 mm thick fine to medium volcanic gravel layer; gravel is angular, scoria. 25.45 m - 10 mm thick fine to medium volcanic gravel layer; gravel is angular, scoria.					UTP kPa 3/2//3/4/4/5 N=16							
	Clayey SILT with trace sand; brownish orange with some light grey streaks and mottles. Low plasticity. Sand is fine. 25.95 m - Gravel ceases.		VSt	26	36								
	Clayey SILT with some sand and some gravel; orange brown. Low plasticity. Sand is fine to coarse; gravel is fine, angular, scoria.			27	35	UTP kPa 1/2//1/1/1/1 N=4					W		
	28.25 m - 200 mm fine to medium gravel layer; gravel is angular, scoria.		St	28	34	66/4 kPa 1/0//0/0/0/0 N=0							
	Sandy SILT with minor clay; brownish orange. Low plasticity. Sand is fine to coarse.		St	29	33								
				30	32								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 5.81 m 30 minutes after drilling.

TS = Topsoil; N/A = Not Applicable.

BOREHOLE LOG MBH09

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 14/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2184328
Longitude : 174.9168977

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL) / Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	Sandy SILT with minor clay; brownish orange. Low plasticity. Sand is fine to coarse.		St		UTP kPa 2/3//3/4/5/4 N=16					W		

End of Hole Depth: 30.45 m
Termination:

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 5.81 m 30 minutes after drilling.

TS = Topsoil; N/A = Not Applicable.

BOREHOLE LOG MBH10

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2198411
Longitude : 174.9222551

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
TS	[TOPSOIL]		N/A								D		
FILL	[FILL] SILT with minor clay and minor sand; brown orange. Low plasticity. Sand is fine.		St										
FILL	0.7 - 1.5 m - No Recovery.	NR	N/A	1	53								
FILL	[FILL] Clayey SILT with trace sand; brown orange with some light grey streaks and mottles. Low plasticity.		St			UTP kPa 1/0//1/1/1/1 N=4							
HOBSONVILLE MEMBER	Clayey SILT with minor sand; light grey. Low plasticity. Sand is fine to coarse. 2.10 m - With trace sand and becomes greyish white.		St	2	52						M		
HOBSONVILLE MEMBER	Silty CLAY with minor sand; dark grey with some orange streaks. High plasticity. Sand is fine.		St										
HOBSONVILLE MEMBER			L										
HOBSONVILLE MEMBER	Silty fine to coarse SAND with minor clay; intermixed light to dark orange with some light grey streaks. Well graded.		St L	3	51	50/6 kPa							
HOBSONVILLE MEMBER	Clayey SILT with minor sand; light orange with some grey streaks and mottles. Low plasticity. Sand is fine.		F			1/0//0/0/0/0 N=0							
HOBSONVILLE MEMBER	Silty fine to medium SAND with minor clay; light grey with orange mottles. Poorly graded.												
PAHUREHURE MEMBER	Clayey SILT with some sand and some gravel; intermixed light and dark orange. Low plasticity. Sand is fine to coarse; gravel is fine to medium, subangular, silt clasts.		F	4	50								
PAHUREHURE MEMBER	Organic silty CLAY; dark greyish black with black mottles. High plasticity. Amorphous.												
PAHUREHURE MEMBER	Silty CLAY with minor organics; bluish dark grey. High plasticity. Organics are partially decomposed wood fragments and roots (5 - 30 mm).		F										
PAHUREHURE MEMBER	Silty fine to coarse SAND with minor organics; dark grey with black mottles. Well graded. Organics are carbonaceous inclusions.		VL			31/7 kPa 0/0//0/0/0/0 N=0							
PAHUREHURE MEMBER			F	5	49								

Machine borehole met target depth at 30.45 mbgl.
TS = Topsoil; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 7.19 m 12 hours after first day of drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH10

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2198411
Longitude : 174.9222551

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	Sandy SILT with minor clay; bluish dark grey. Low plasticity. Sand is fine.												
	Silty fine SAND with trace clay; dark greyish blue. Poorly graded.		VL	6	48	0/1//0/1/1/0 N=2					M		
PAHUREHURE MEMBER	Silty CLAY; dark grey. High plasticity.			7	47								
	7.5 m - 7.95 m - With trace sand; sand is fine. Becomes dark grey with some black streaks and mottles.		F	8	46	17/4 kPa 0/0//0/0/0/0 N=0					W		
	Clayey SILT with trace sand; dark grey. Low plasticity. Sand is fine.		F - St	9	45	29/4 kPa 0/0//0/0/0/0 N=0							
				10	44								

Machine borehole met target depth at 30.45 mbgl.
TS = Topsoil; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 7.19 m 12 hours after first day of drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH10

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2198411
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Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Clayey SILT with trace sand; dark grey. Low plasticity. Sand is fine.		F - St	11 12 13 14 15	11 43 12 42 13 41 14 40 15 39	28/4 kPa 0/0//0/0/0/1 N=1 35/13 kPa 0/0//0/1/0/0 N=1 29/6 kPa 0/0//1/0/0/0 N=1					W		

Machine borehole met target depth at 30.45 mbgl.
TS = Topsoil; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 7.19 m 12 hours after first day of drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH10

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
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Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Clayey SILT with trace sand; dark grey. Low plasticity. Sand is fine.		F - St	16	38	50/16 kPa 1/1//2/2/2/2 N=8							
	16.2 m - With minor sand.												
	Silty fine SAND; dark grey. Poorly graded.		MD			UTP kPa							
	Clayey SILT with trace sand; dark grey. Low plasticity. Sand is fine.		VSt	17	37	5/9//8/6/7/7 N=28					W		
	Sandy SILT with minor clay; dark grey. Low plasticity. Sand is fine.		H	18	36	8/5//7/12/13/18 N=50+ for 75 mm							
				19	35	5/5//7/8/9/14 N=38							
				20	34								

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 7.19 m 12 hours after first day of drilling.

TS = Topsoil; N/A = Not Applicable.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH10

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2198411
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Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Sandy SILT with minor clay; dark grey. Low plasticity. Sand is fine.		H										
	Clayey SILT with minor sand; dark grey. Low plasticity. Sand is fine.		VSt - H	21	33	3/3//2/5/7/9 N=23							
	Sandy SILT; dark brownish grey. Dilatant, non plastic. Sand is fine.		St - VSt	22	32	4/5//6/6/7/8 N=27					W		
	Clayey SILT with some sand; dark grey. Low plasticity. Sand is fine.		St - VSt	23	31								
	24.45 m - With trace sand.		VSt	24	30	2/2//2/3/3/4 N=12							
				25	29								

Machine borehole met target depth at 30.45 mbgl.
TS = Topsoil; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 7.19 m 12 hours after first day of drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH10

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2198411
Longitude : 174.9222551

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL)	Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
PAHUREHURE MEMBER	Clayey SILT with some sand; dark grey. Low plasticity. Sand is fine.					2/4//4/6/8/9 N=27							
	26.90 m - With minor sand.					3/4//6/7/10/8 N=31							
	27.50 m - Becomes bluish grey.		VSt								W		
	27.80 m - Becomes bluish grey with some light grey mottles.					3/3//5/6/5/7 N=23							
	28.95 m - With trace sand.												
	29.15 m - With minor sand.												

26 27 28 29 30

Depth (m BGL): 26 28 | 27 27 | 28 26 | 29 25 | 30 24

Machine borehole met target depth at 30.45 mbgl.
TS = Topsoil; N/A = Not Applicable.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 7.19 m 12 hours after first day of drilling.

GEOTECH MACHINE BOREHOLE - ROCK MBH01-10.GPJ NZ DATA TEMPLATE 2.GDT 5/23/24

BOREHOLE LOG MBH10

Geotechnical Investigation
Pukekohe Park
222-250 Manukau Road, Pukekohe
25208.000.001

Client :
Date : 18/03/2024
Hole Depth : 30.45 m
Drilling Method : Mud Rotary
Drilling Contractor : McMillan Drilling Group Ltd

Core Diameter : 83 mm
Energy Transfer Ratio : 86.4%
Logged By/Reviewed By : JCh / CL/HL
Latitude : -37.2198411
Longitude : 174.9222551

Material	DESCRIPTION	Log Symbol	Strength	Depth (m BGL) / Elevation (mRL)	SPT N-Value / Vane Shear Strength	Sample Type	TCR (%) 25 50 75	RQD (%) 25 50 75	Defect Description	Moisture	Water Level	Piezometer Construction
	Clayey SILT with some sand; dark grey. Low plasticity. Sand is fine.		VSt		4/4//5/5/7/7 N=29					W		

End of Hole Depth: 30.45 m
Termination:

Machine borehole met target depth at 30.45 mbgl.
Coordinates and elevation estimated using Auckland Council GeoMaps.
Dip test showed standing water at 7.19 m 12 hours after first day of drilling.

TS = Topsoil; N/A = Not Applicable.

APPENDIX 4:

McMillan Drilling CPT, sCPT and DMT Logs

CONE PENETRATION TEST (CPT) REPORT

McMILLAN Drilling

Client: ENGEO

Location: Pukekohe Park
222-250 Manukau Road,
Pukekohe

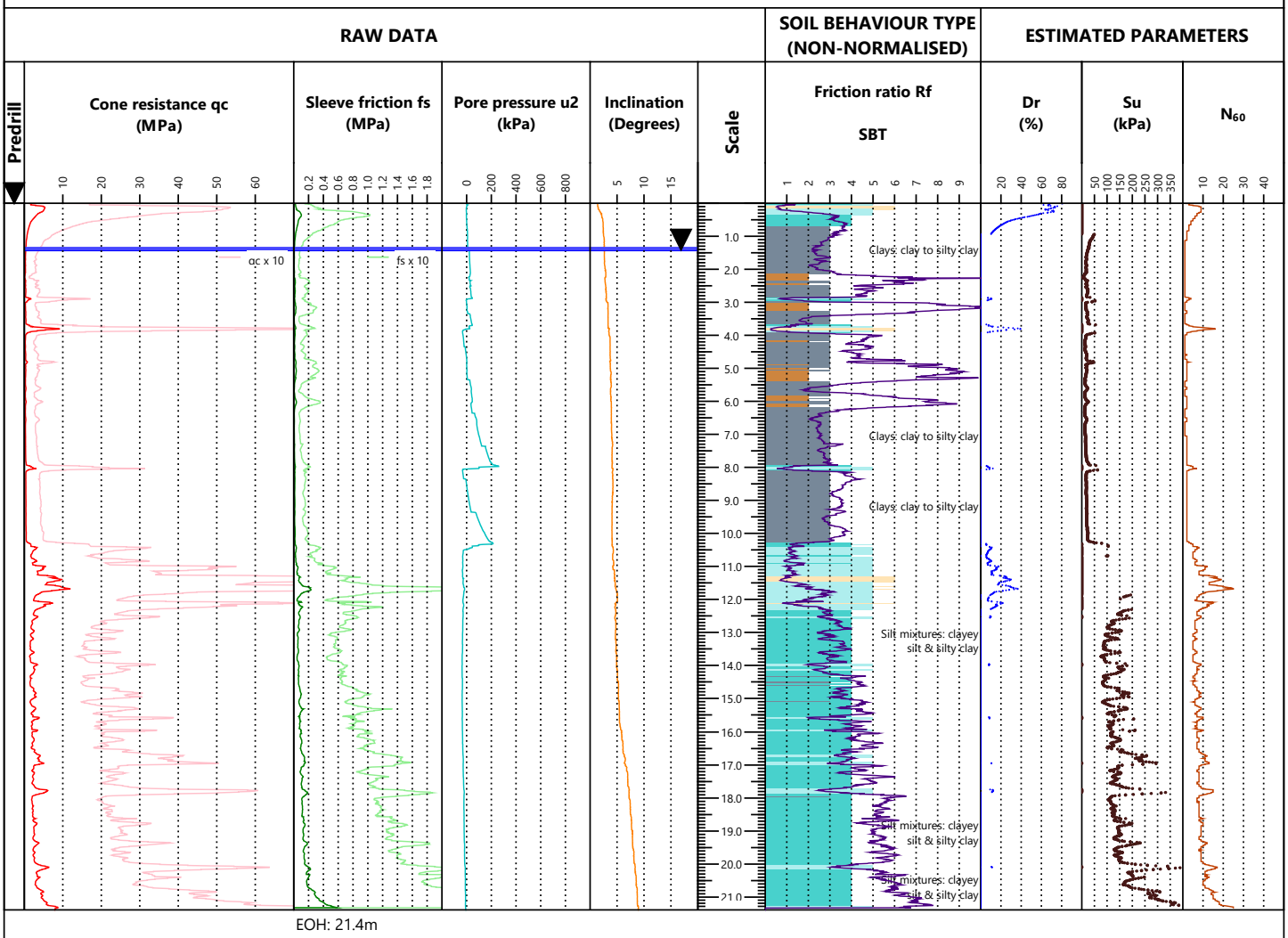
Printed: 11/04/2024

McMILLAN Drilling	Client: ENGEO	Bore No.: CPTu001
	Project: Pukekohe Park	Job No.: 302219

Site Location: 222-250 Manukau Road, Pukekohe **Date:** 13/3/2024

Grid Reference: 1769717.51m E, 5879752.69m N (NZTM) - Handheld GPS **Rig Operator:** R. Negi

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 21.4m

Cone Type: GeotechAB Piezocone - Compression **Predrill:** -

Cone Reference: 5872 **Water Level:** 1.40m

Cone Area Ratio: 0.83 **Collapse:** 19.40m

Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.6245	10.6785
Local Friction	0.3518	0.3509
Pore Pressure	0.5959	0.5963

Termination

Target Depth ☐

Effective Refusal

Tip ☐

Gauge ☐

Inclinometer ☐

Other: Anchor ☑

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L Cabal, Guide to Cone Penetration Testing for Geotechnical Engineering. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

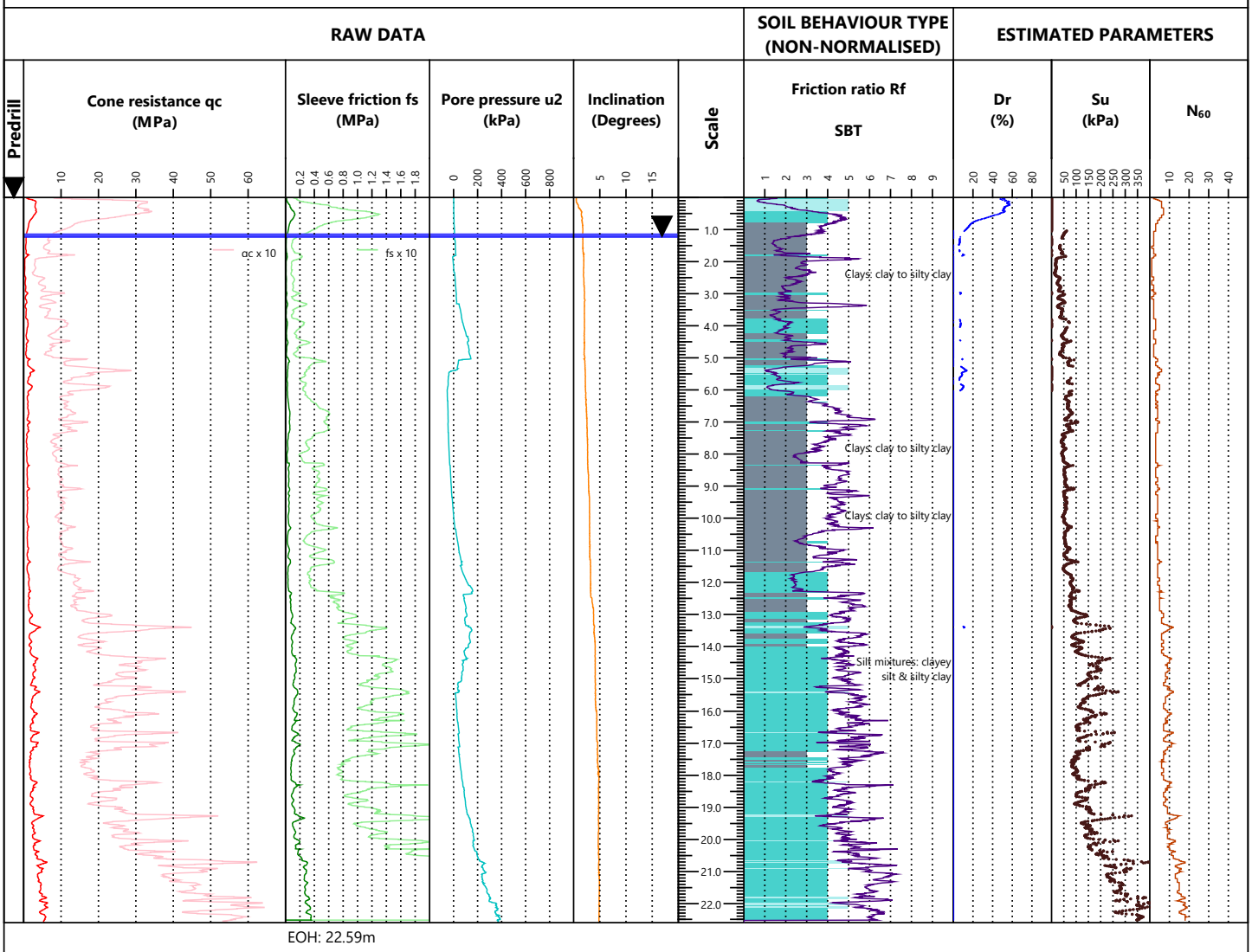
Remarks

McMILLAN Drilling	Client: ENGEO	Bore No.: CPTu002
	Project: Pukekohe Park	Job No.: 302219

Site Location: 222-250 Manukau Road, Pukekohe **Date:** 13/3/2024

Grid Reference: 1769676.89m E, 5879606.18m N (NZTM) - Handheld GPS **Rig Operator:** R. Negi

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 22.59m

Cone Type: GeotechAB Piezocone - Compression **Predrill:** -

Cone Reference: 5872 **Water Level:** 1.20m

Cone Area Ratio: 0.83 **Collapse:** 13.80m

Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.6637	10.6802
Local Friction	0.3503	0.3510
Pore Pressure	0.5959	0.5964

Termination

Target Depth ☐

Effective Refusal

Tip ☐

Gauge ☐

Inclinometer ☐

Other: Anchor ☑

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

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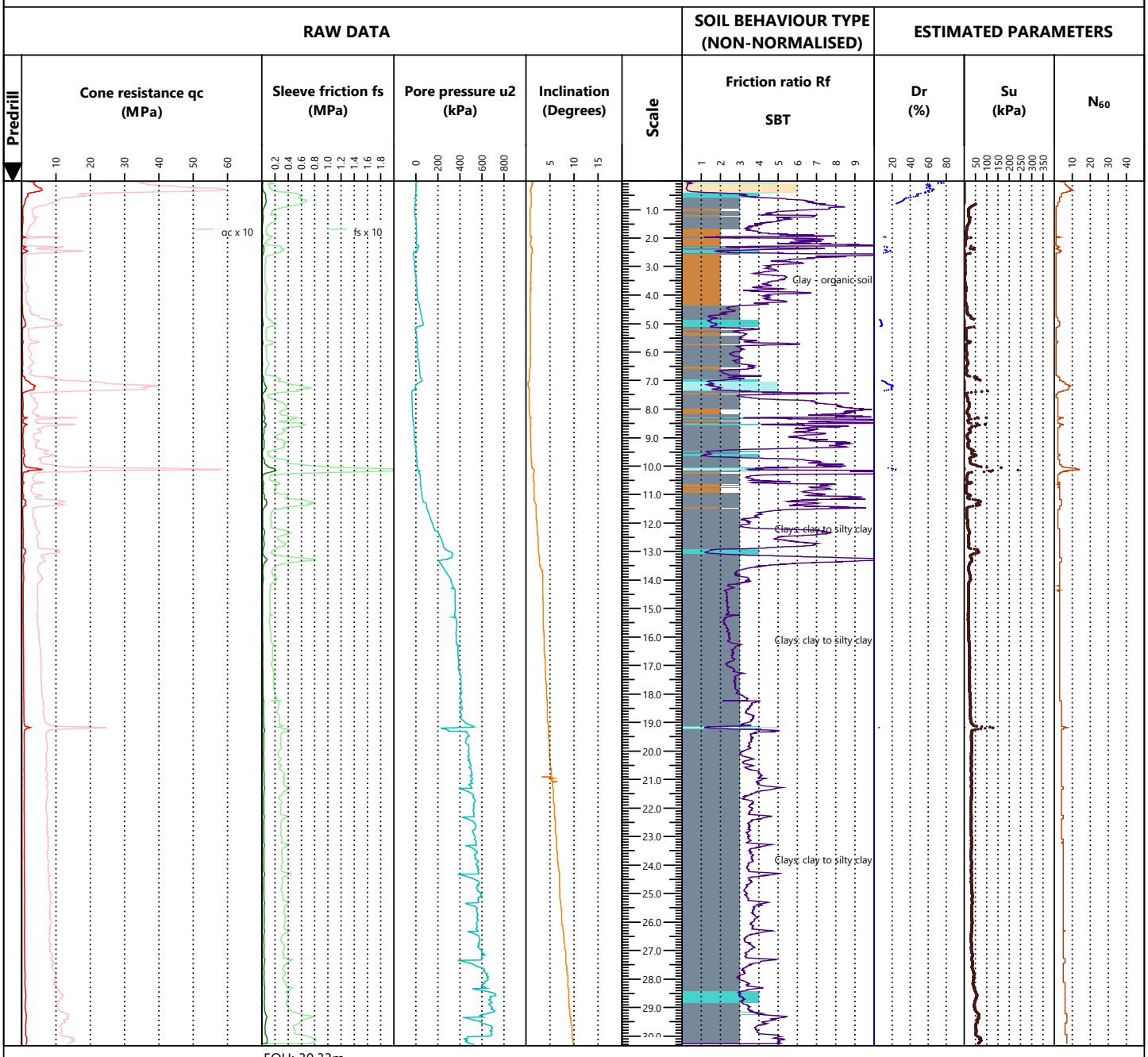
Remarks

McMILLAN Drilling

Client: ENGEO	**Bore No.:** CPTu003
Project: Pukekohe Park	**Job No.:** 302219

Site Location: 222-250 Manukau Road, Pukekohe
Date: 13/3/2024
Grid Reference: 1769991.86m E, 5879933.71m N (NZTM) - Handheld GPS
Rig Operator: R. Negi
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



EOH: 30.33m

Cone Type: GeotechAB Piezocone - Compression
Predrill: -
Cone Reference: 5872
Water Level: -
Cone Area Ratio: 0.83
Collapse: 2.60m
Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.6524	10.6323
Local Friction	0.3507	0.3506
Pore Pressure	0.5955	0.5977

Termination

Target Depth ✓

Effective Refusal

- Tip
- Gauge
- Inclinometer
- Other

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L Cabal, Guide to Cone Penetration Testing for Geotechnical Engineering. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

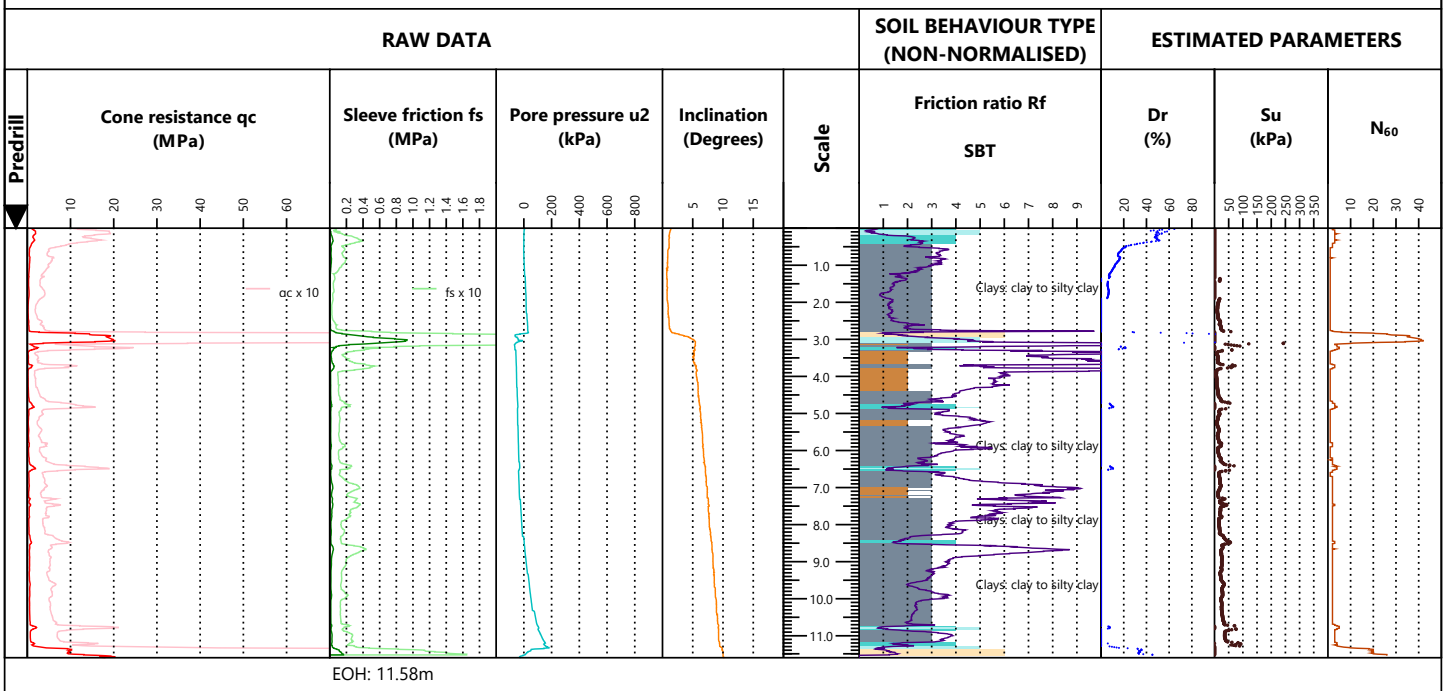
Remarks

McMILLAN Drilling	Client: ENGEO	Bore No.: CPTu005
	Project: Pukekohe Park	Job No.: 302219

Site Location: 222-250 Manukau Road, Pukekohe **Date:** 15/3/2024

Grid Reference: 1770328.03m E, 5879799.01m N (NZTM) - Handheld GPS **Rig Operator:** R. Negi

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 11.58m

Cone Type: GeotechAB Piezocone - Compression **Predrill:** -

Cone Reference: 5872 **Water Level:** -

Cone Area Ratio: 0.83 **Collapse:** 1.90m

Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.5775	10.6010
Local Friction	0.3504	0.3523
Pore Pressure	0.5947	0.5944

Termination

Target Depth ☐

Effective Refusal

Tip ☐

Gauge ☐

Inclinometer ☐

Other: Anchor ☑

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

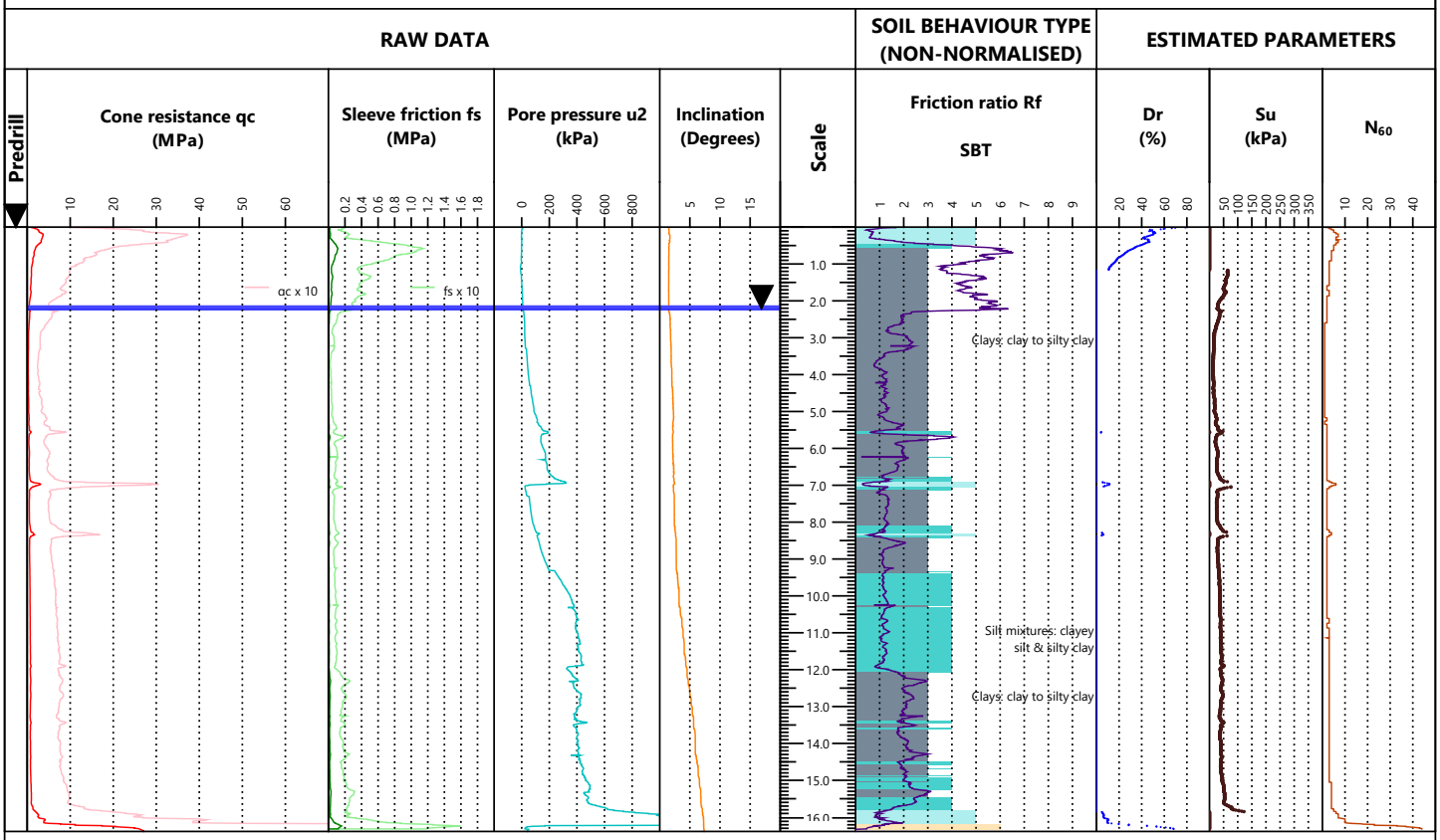
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L Cabal, Guide to Cone Penetration Testing for Geotechnical Engineering. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

McMILLAN Drilling

Client: ENGEO		**Bore No.:** CPTu006
Project: Pukekohe Park		**Job No.:** 302219

Site Location: 222-250 Manukau Road, Pukekohe
Date: 14/3/2024
Grid Reference: 1770287.92m E, 5879295.57m N (NZTM) - Handheld GPS
Rig Operator: R. Negi
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



EOH: 16.38m

Cone Type: GeotechAB Piezocone - Compression
Predrill: -
Cone Reference: 7550
Water Level: 2.20m
Cone Area Ratio: 0.85
Collapse: 3.90m
Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.8546	10.8256
Local Friction	0.3480	0.3496
Pore Pressure	0.6266	0.6256

Termination

Target Depth	☐
Effective Refusal	
Tip	☐
Gauge	☐
Inclinometer	☐
Other: Anchor	✓

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

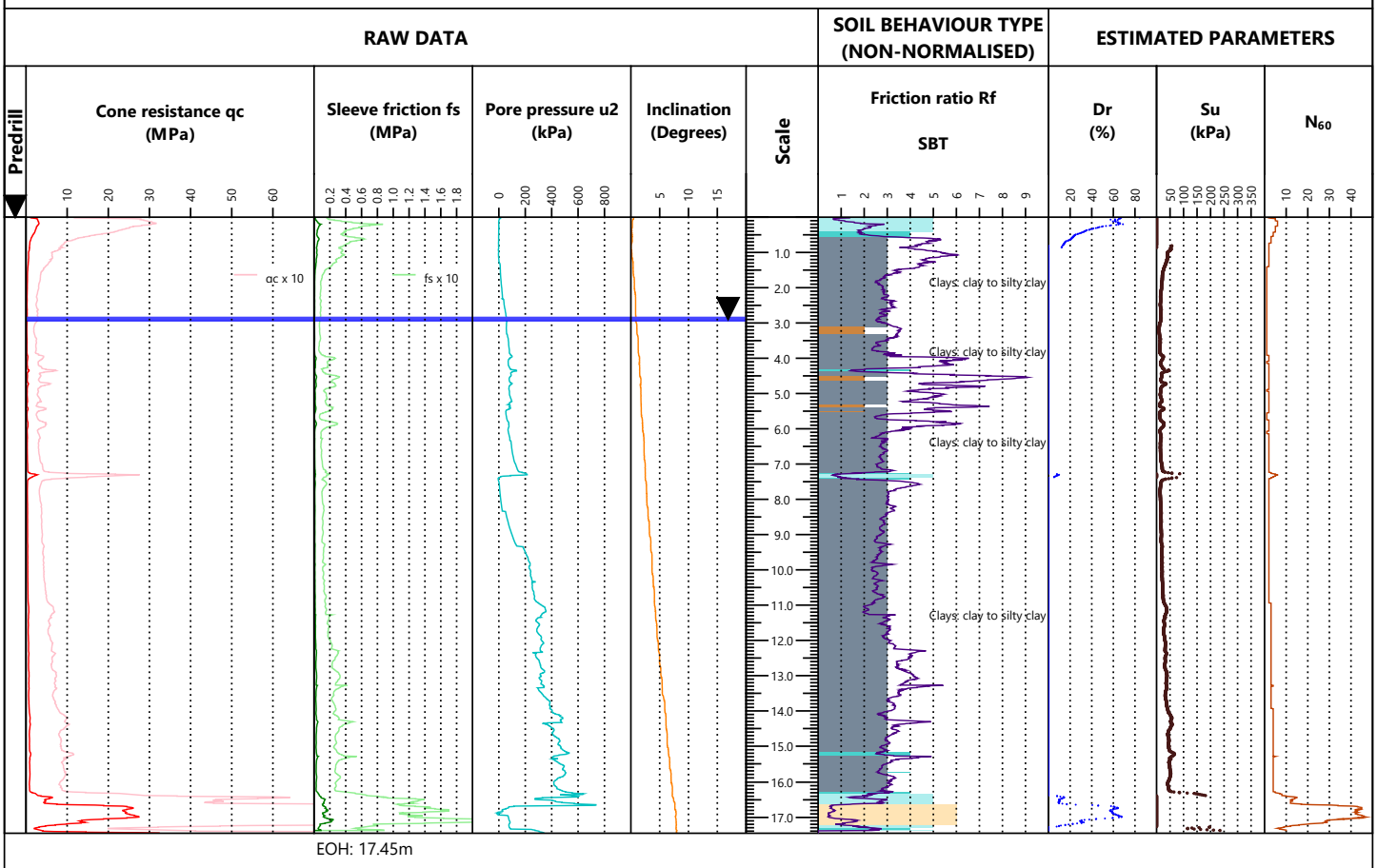
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L Cabal, Guide to Cone Penetration Testing for Geotechnical Engineering. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

McMILLAN Drilling

Client: ENGEO		**Bore No.:** CPTu007
Project: Pukekohe Park		**Job No.:** 302219

Site Location: 222-250 Manukau Road, Pukekohe
Date: 15/3/2024
Grid Reference: 1770105.55m E, 5879414.2m N (NZTM) - Handheld GPS
Rig Operator: R. Negi
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



EOH: 17.45m

Cone Type: GeotechAB Piezocone - Compression
Predrill: -
Cone Reference: 7550
Water Level: 2.90m
Cone Area Ratio: 0.85
Collapse: 11.20m
Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.8960	10.9788
Local Friction	0.3463	0.3427
Pore Pressure	0.6265	0.6282

Termination

Target Depth ☐

Effective Refusal

Tip ☐
Gauge ☐
Inclinometer ☐
Other: Anchor ☑

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

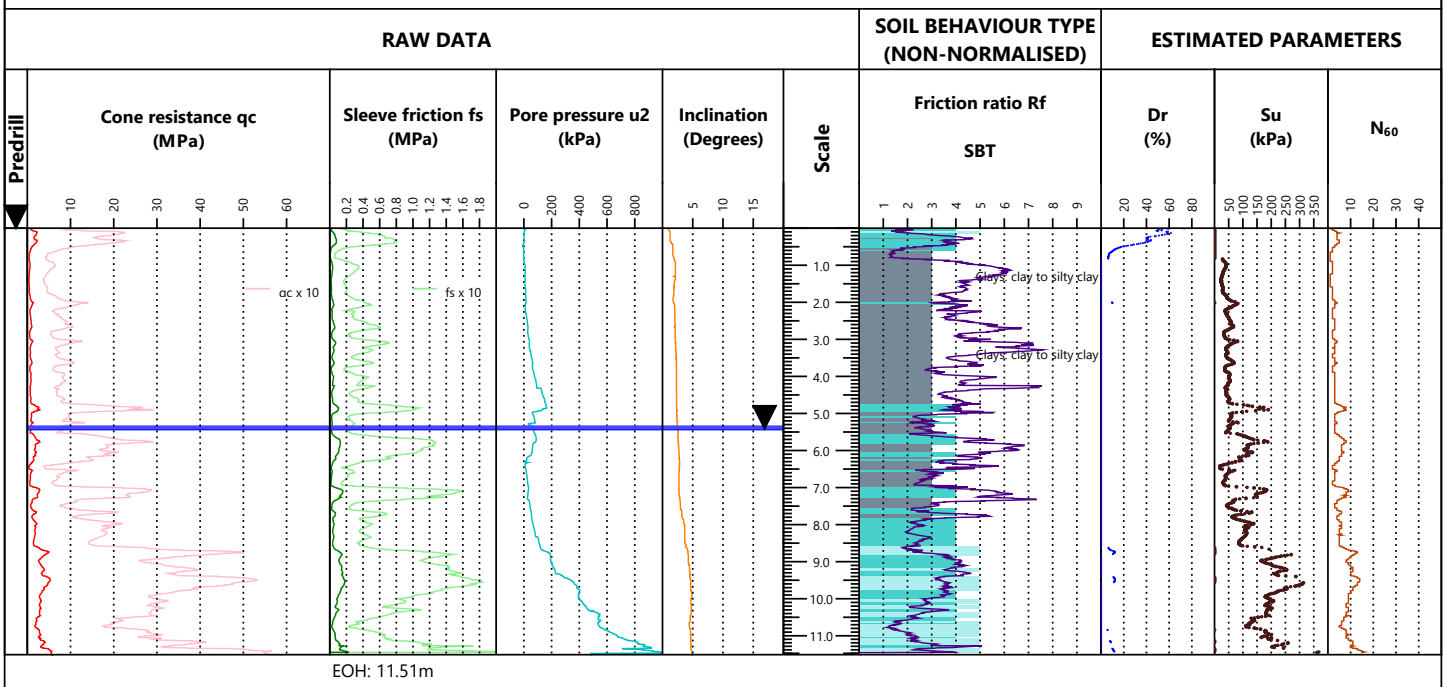
Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L Cabal, Guide to Cone Penetration Testing for Geotechnical Engineering. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

McMILLAN Drilling	Client: ENGEO	Bore No.: CPTu008
	Project: Pukekohe Park	Job No.: 302219

Site Location: 222-250 Manukau Road, Pukekohe
Date: 14/3/2024
Grid Reference: 1769992.41m E, 5879352.96m N (NZTM) - Handheld GPS
Rig Operator: R. Negi
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



Cone Type: GeotechAB Piezocone - Compression
Predrill: -
Cone Reference: 7550
Water Level: 5.40m
Cone Area Ratio: 0.85
Collapse: 6.80m
Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.8581	10.8722
Local Friction	0.3512	0.3492
Pore Pressure	0.6266	0.6276

Termination

Target Depth ☐

Effective Refusal

Tip ☐
Gauge ☐
Inclinometer ☐
Other: Anchor ☑

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

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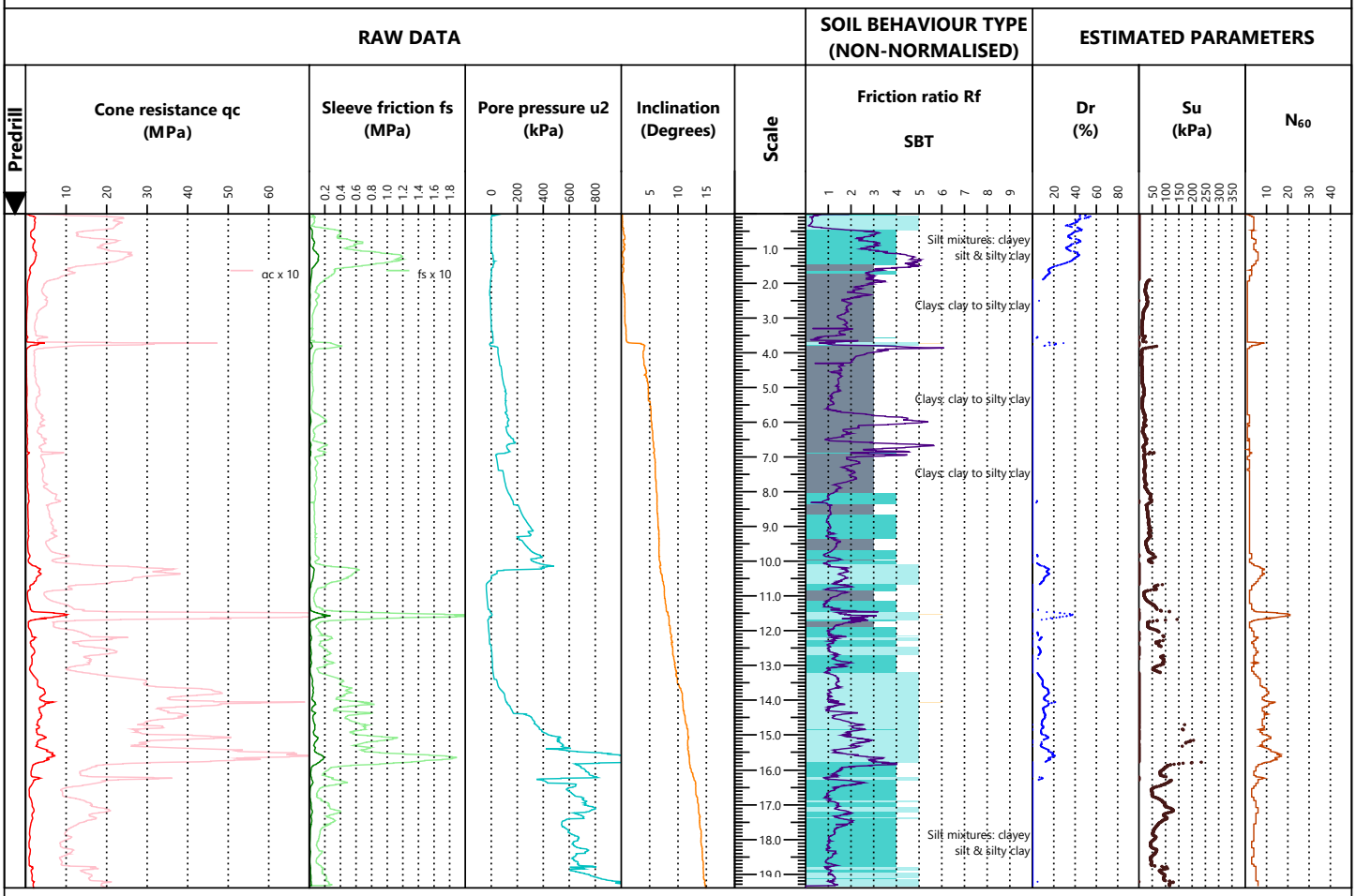
Remarks

McMILLAN Drilling

Client: ENGEO		**Bore No.:** CPTu009
Project: Pukekohe Park		**Job No.:** 302219

Site Location: 222-250 Manukau Road, Pukekohe
Date: 14/3/2024
Grid Reference: 1770356.81m E, 5879498.07m N (NZTM) - Handheld GPS
Rig Operator: R. Negi
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



EOH: 19.4m

Cone Type: GeotechAB Piezocone - Compression
Predrill: -
Cone Reference: 5872
Water Level: -
Cone Area Ratio: 0.83
Collapse: 1.90m
Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.5749	10.5793
Local Friction	0.3504	0.3523
Pore Pressure	0.5957	0.5950

Termination

Target Depth	☐
Effective Refusal	
Tip	☐
Gauge	☐
Inclinometer	☑
Other	☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

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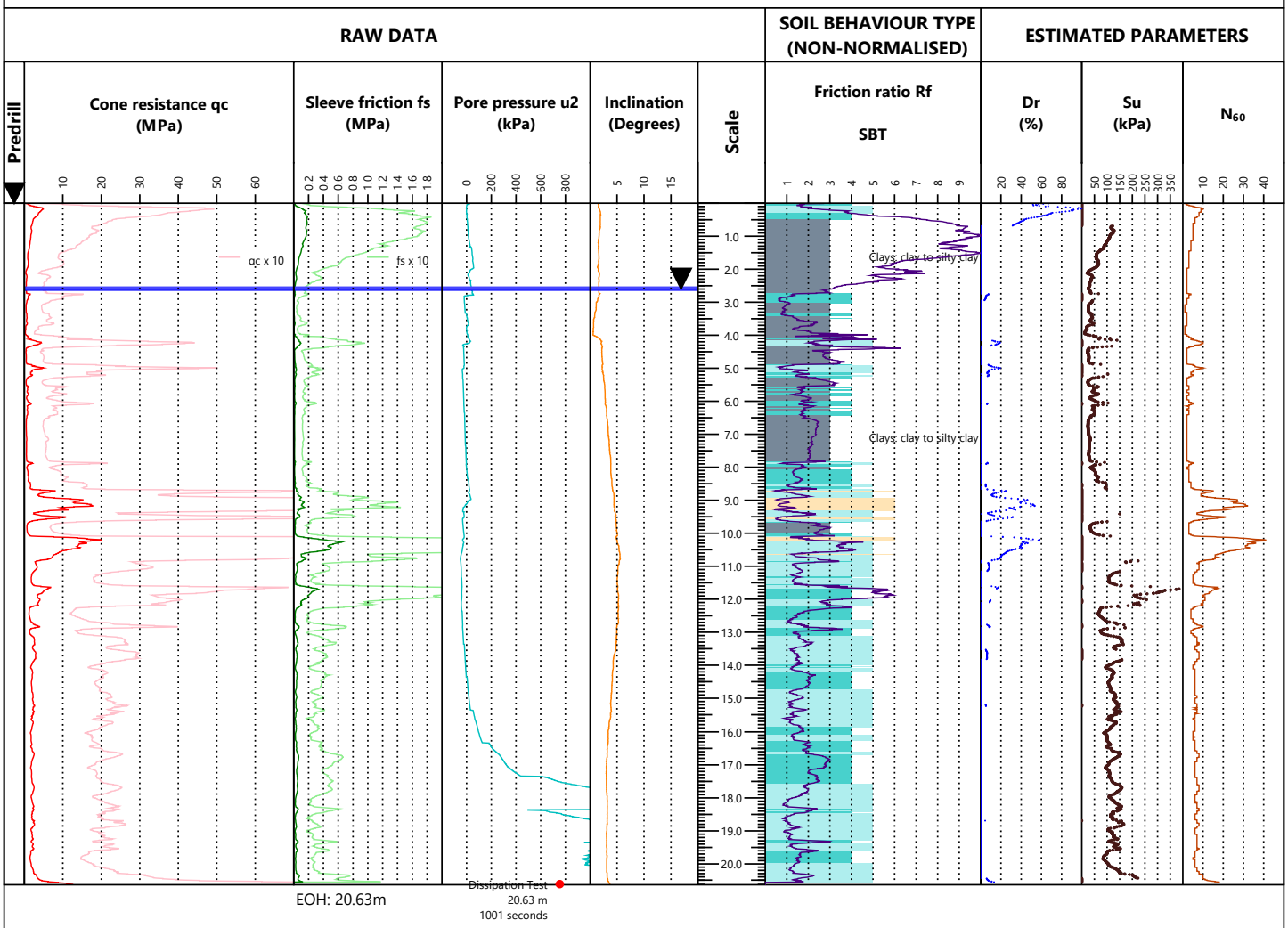
Remarks

McMILLAN Drilling	Client: ENGEO	Bore No.: CPTu010
	Project: Pukekohe Park	Job No.: 302219

Site Location: 222-250 Manukau Road, Pukekohe **Date:** 14/3/2024

Grid Reference: 1770593.92m E, 5879104.95m N (NZTM) - Handheld GPS **Rig Operator:** R. Negi

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: GeotechAB Piezocone - Compression **Predrill:** -

Cone Reference: 7550 **Water Level:** 2.60m

Cone Area Ratio: 0.85 **Collapse:** 3.20m

Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.8485	10.8326
Local Friction	0.3498	0.3510
Pore Pressure	0.6268	0.6274

Termination

Target Depth ☐

Effective Refusal

Tip ☐

Gauge ☐

Inclinometer ☐

Other: Pore pressure ☑

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

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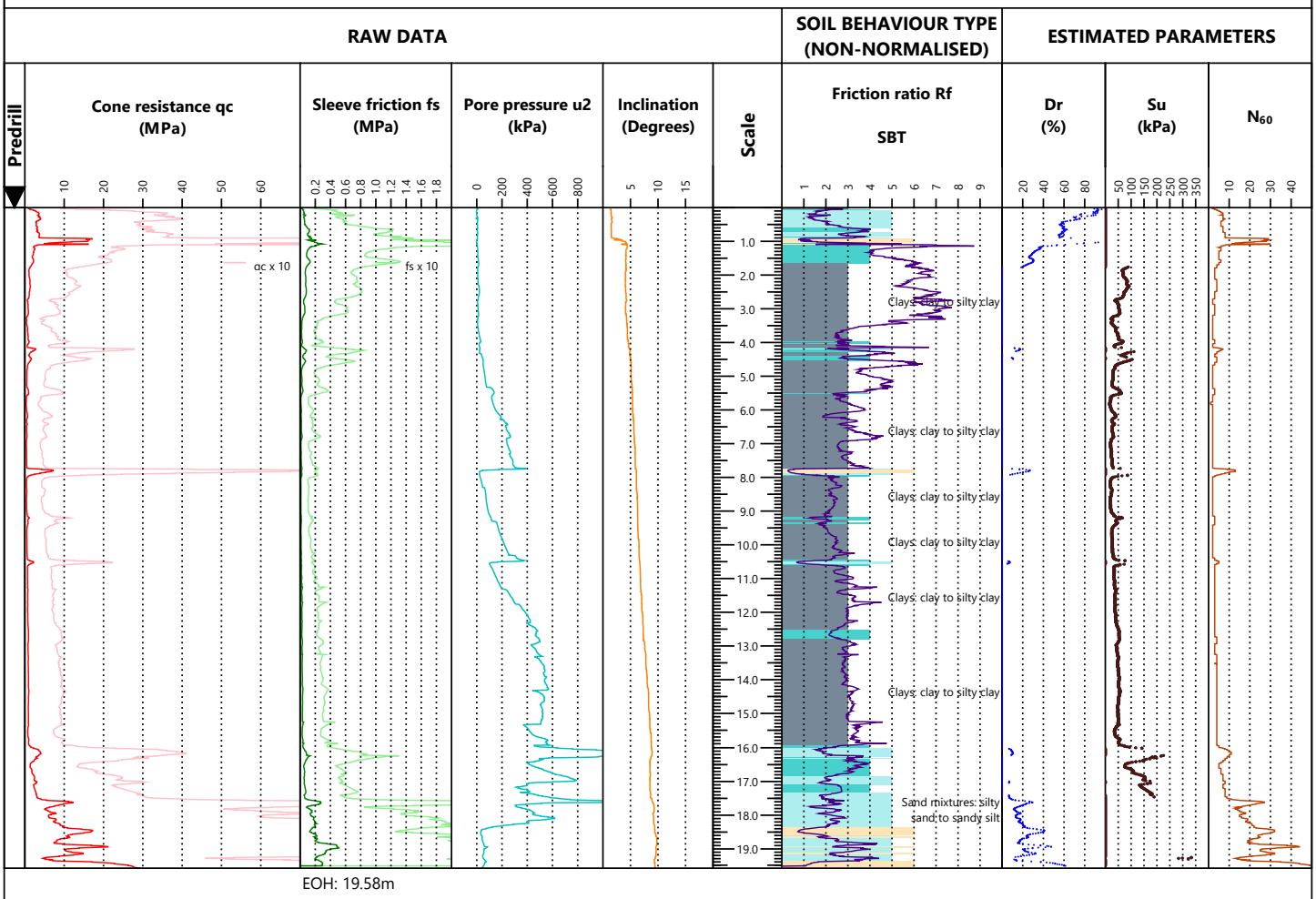
Remarks

McMILLAN Drilling

Client: ENGEO	**Bore No.:** CPTu011
Project: Pukekohe Park	**Job No.:** 302219

Site Location: 222-250 Manukau Road, Pukekohe
Date: 14/3/2024
Grid Reference: 1770650.39m E, 5878940.83m N (NZTM) - Handheld GPS
Rig Operator: R. Negi
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



EOH: 19.58m

Cone Type: GeotechAB Piezocone - Compression
Predrill: -
Cone Reference: 5872
Water Level: -
Cone Area Ratio: 0.83
Collapse: 1.40m
Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.6149	10.5714
Local Friction	0.3528	0.3528
Pore Pressure	0.5959	0.5967

Termination
Target Depth ☐

Effective Refusal
Tip ☐
Gauge ☐
Inclinometer ☐
Other: Anchor ☑

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L Cabal, Guide to Cone Penetration Testing for Geotechnical Engineering. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

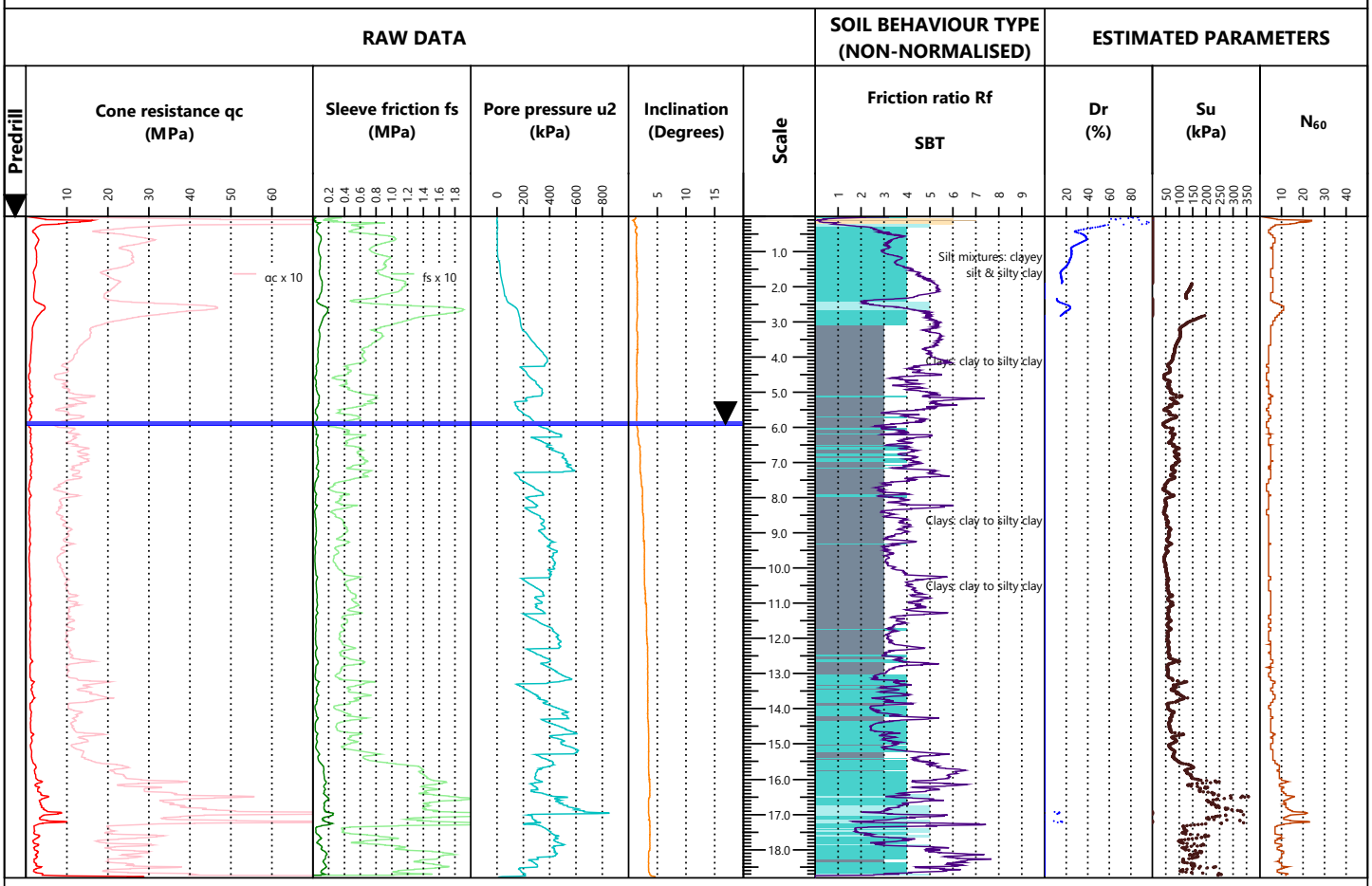
Remarks

McMILLAN Drilling	Client: ENGEO	Bore No.: CPTu012
	Project: Pukekohe Park	Job No.: 302219

Site Location: 222-250 Manukau Road, Pukekohe **Date:** 13/3/2024

Grid Reference: 1769862.26m E, 5879537.54m N (NZTM) - Handheld GPS **Rig Operator:** R. Negi

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 18.8m

Cone Type: GeotechAB Piezocone - Compression **Predrill:** -

Cone Reference: 5872 **Water Level:** 5.90m

Cone Area Ratio: 0.83 **Collapse:** 10.40m

Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.6210	10.5871
Local Friction	0.3521	0.3520
Pore Pressure	0.5948	0.5962

Termination

Target Depth ☐

Effective Refusal

Tip ☐

Gauge ☐

Inclinometer ☐

Other: Anchor ☑

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

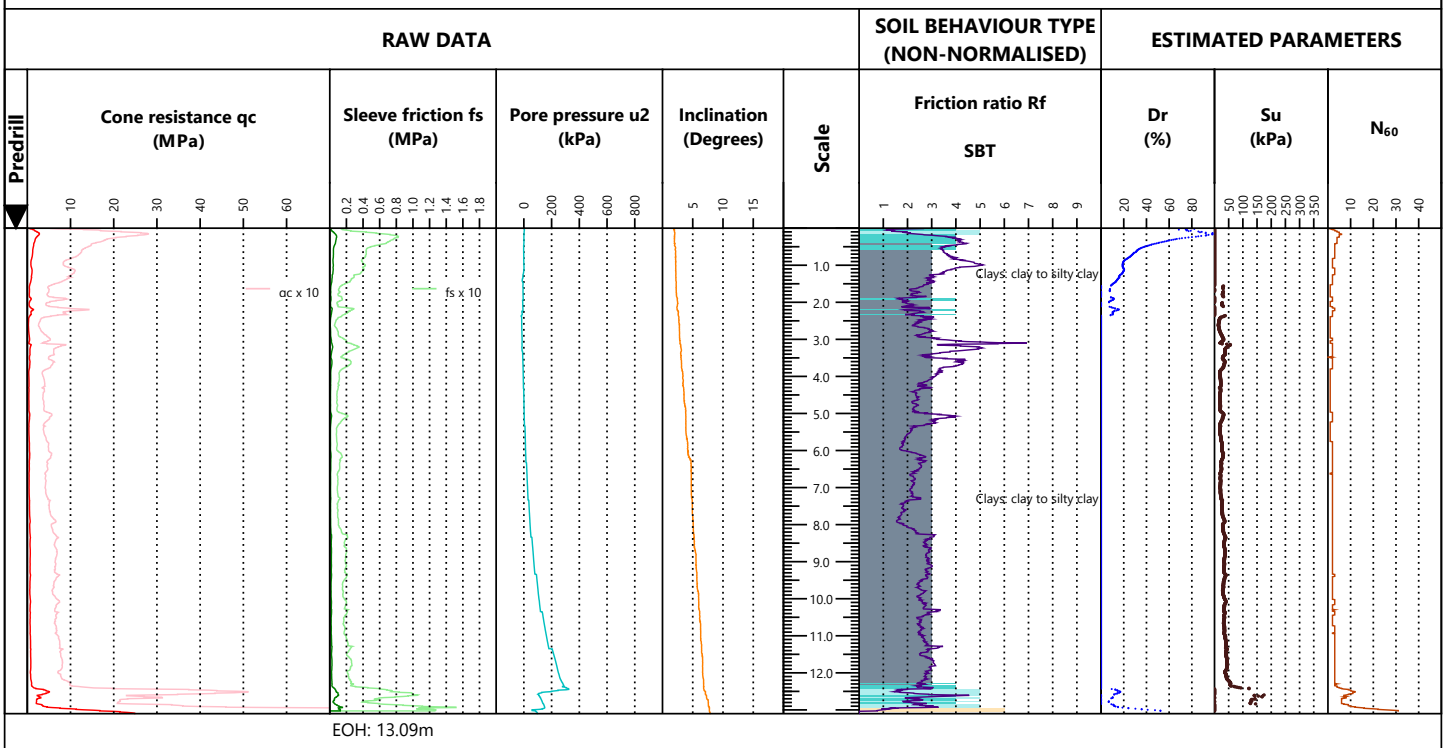
Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L Cabal, Guide to Cone Penetration Testing for Geotechnical Engineering. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

McMILLAN Drilling	Client: ENGEO	Bore No.: sCPTu014
	Project: Pukekohe Park	Job No.: 302219

Site Location: 222-250 Manukau Road, Pukekohe
Date: 20/3/2024
Grid Reference: 1770264.32m E, 5879171.27m N (NZTM) - Handheld GPS
Rig Operator: R. Negi
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



Cone Type: GeotechAB Piezocone - Compression
Predrill: -
Cone Reference: 5872
Water Level: -
Cone Area Ratio: 0.83
Collapse: 4.10m
Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.6036	10.5793
Local Friction	0.3510	0.3501
Pore Pressure	0.5984	0.5983

Termination

Target Depth ☐

Effective Refusal

Tip ☐
Gauge ☐
Inclinometer ☐
Other: Anchor ☑

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

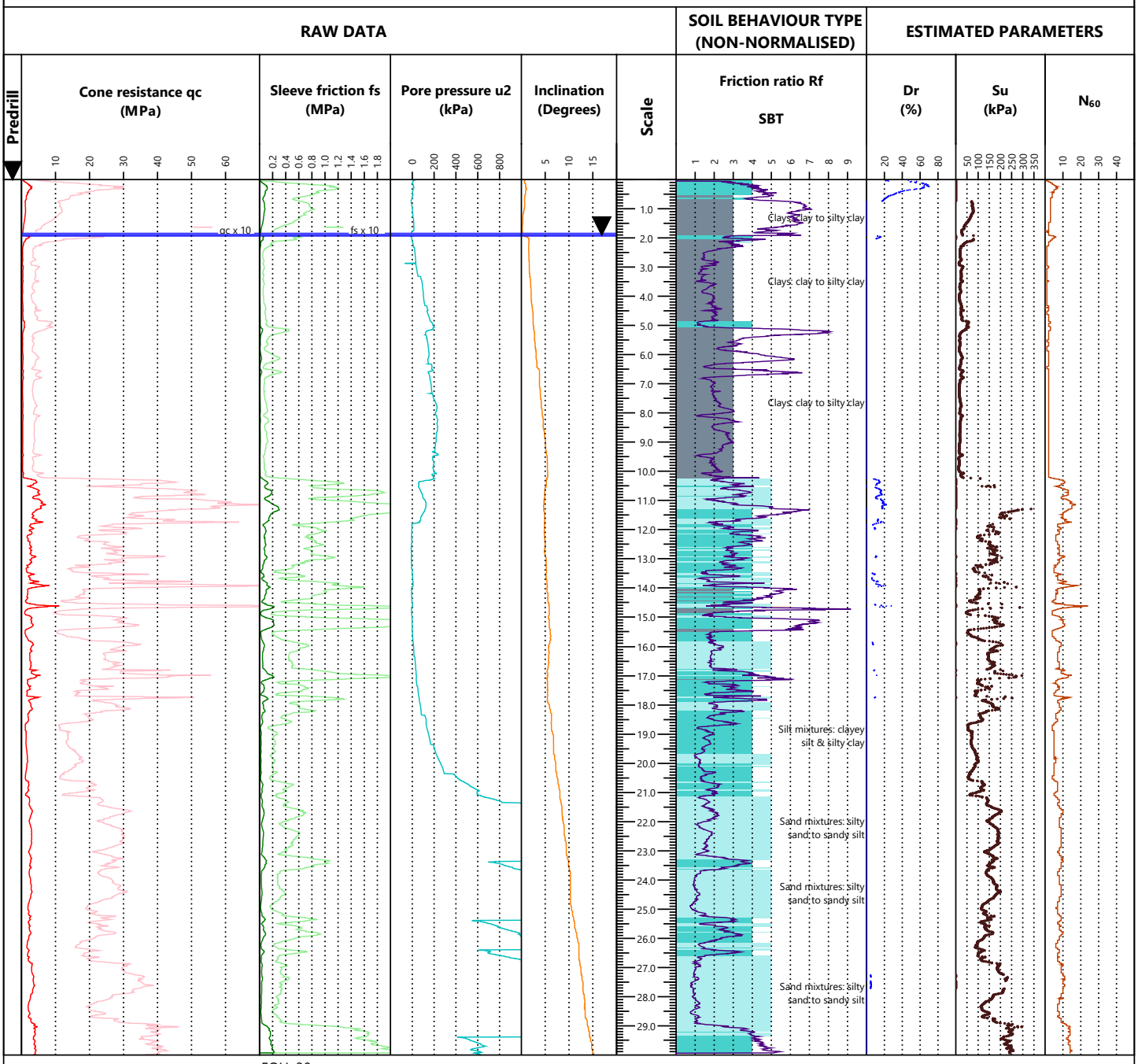
Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L Cabal, Guide to Cone Penetration Testing for Geotechnical Engineering. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

McMILLAN Drilling	**Client:** ENGEO	**Bore No.:** sCPTu015
	Project: Pukekohe Park	**Job No.:** 302219

Site Location: 222-250 Manukau Road, Pukekohe
Date: 18/3/2024
Grid Reference: 1769955.04m E, 5879522.56m N (NZTM) - Handheld GPS
Rig Operator: R. Negi
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



EOH: 30m

Cone Type: GeotechAB Piezocone - Compression
Predrill: -
Cone Reference: 5872
Water Level: 1.90m
Cone Area Ratio: 0.83
Collapse: 10.20m
Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.5714	10.6088
Local Friction	0.3505	0.3513
Pore Pressure	0.5974	0.5987

Termination

Target Depth ✓

Effective Refusal

Tip	
Gauge	
Inclinometer	
Other	

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

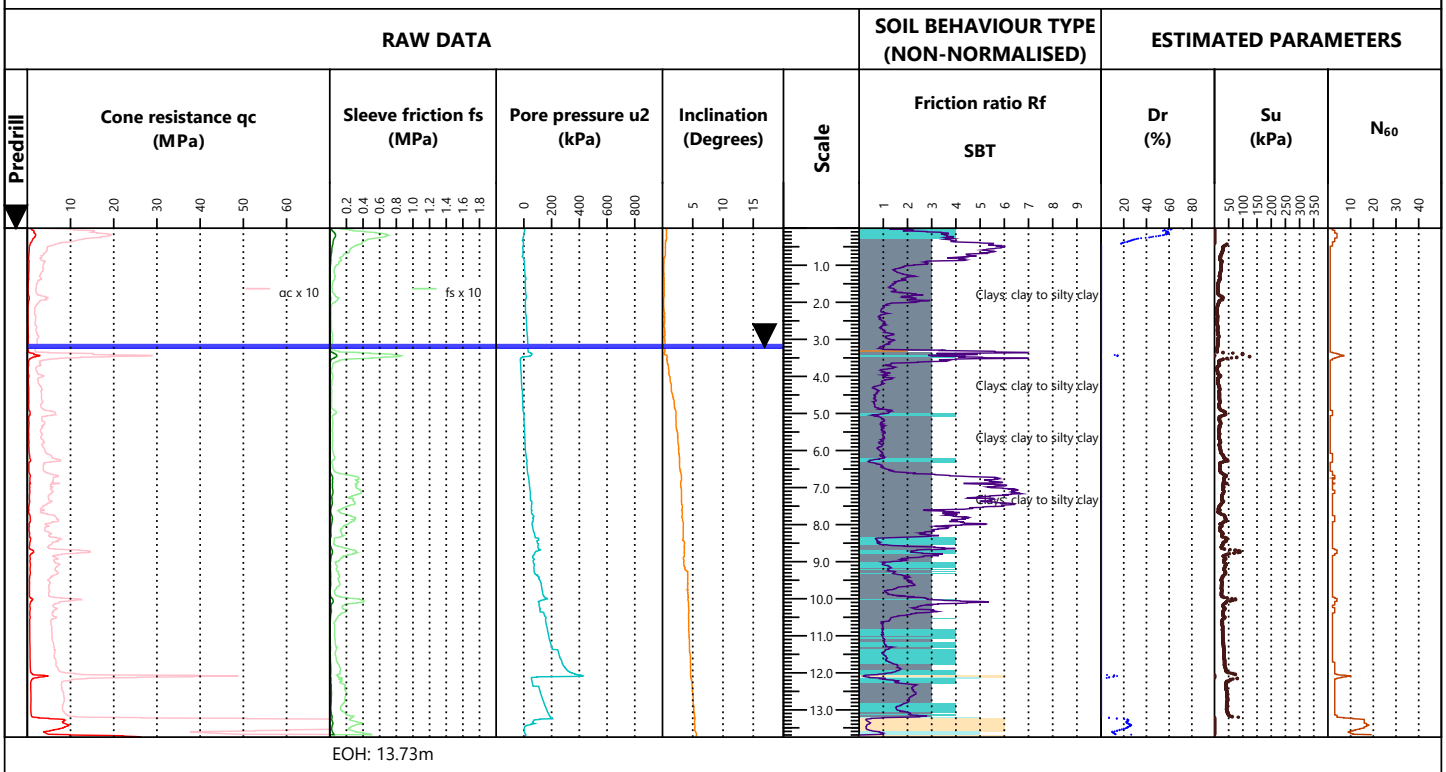
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L Cabal, Guide to Cone Penetration Testing for Geotechnical Engineering. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

McMILLAN Drilling

Client: ENGEO		**Bore No.:** sCPTu016
Project: Pukekohe Park		**Job No.:** 302219

Site Location: 222-250 Manukau Road, Pukekohe
Date: 26/3/2024
Grid Reference: 1770184.51m E, 5879982m N (NZTM) - Handheld GPS
Rig Operator: R. Negi
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



Cone Type: GeotechAB Piezocone - Compression
Predrill: -
Cone Reference: 5872
Water Level: 3.20m
Cone Area Ratio: 0.83
Collapse: 7.90m
Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.5627	10.5923
Local Friction	0.3516	0.3510
Pore Pressure	0.5957	0.5956

Termination
Target Depth ☐
Effective Refusal
Tip ☐
Gauge ☐
Inclinometer ☐
Other ☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

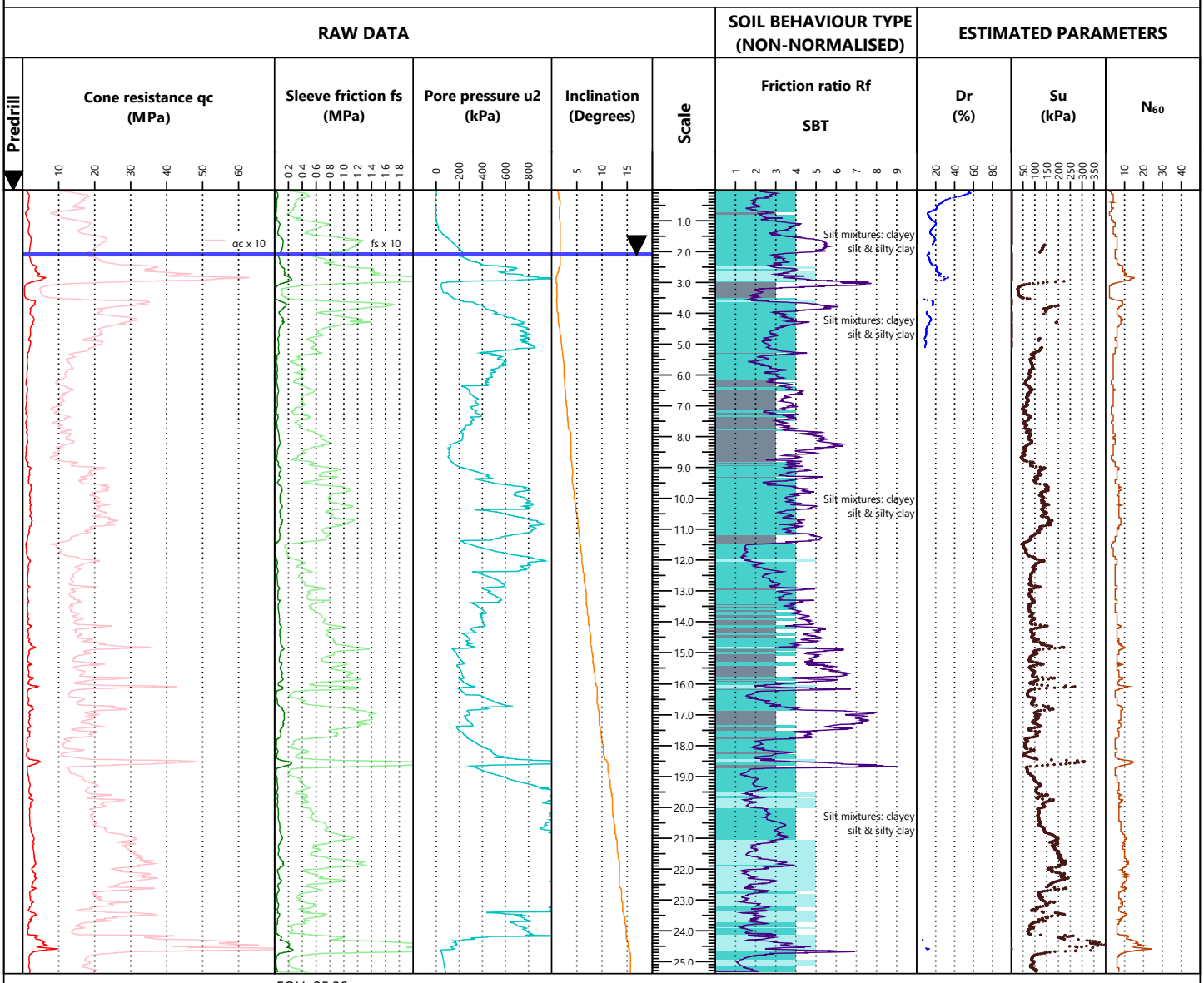
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L Cabal, Guide to Cone Penetration Testing for Geotechnical Engineering. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

McMILLAN Drilling

Client: ENGEO	**Bore No.:** sCPTu017
Project: Pukekohe Park	**Job No.:** 302219

Site Location: 222-250 Manukau Road, Pukekohe
Date: 20/3/2024
Grid Reference: 1769745.81m E, 5879351.89m N (NZTM) - Handheld GPS
Rig Operator: R. Negi
Elevation: 0.00m **Datum:** Ground
Equipment: Pagani TG63-150



EOH: 25.39m

Cone Type: GeotechAB Piezocone - Compression
Predrill: -
Cone Reference: 5872
Water Level: 2.10m
Cone Area Ratio: 0.83
Collapse: 2.90m
Standards: ISO 22476-1:2012 - Application Class 2

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.5888	10.5932
Local Friction	0.3514	0.3538
Pore Pressure	0.5976	0.5967

Termination

Target Depth	☐
Effective Refusal	
Tip	☐
Gauge	☐
Inclinometer	✓
Other	☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L Cabal, Guide to Cone Penetration Testing for Geotechnical Engineering. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

TEST DETAIL

PointID: CPTu001
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 5872
Cone Area Ratio: 0.83

Date: 13/3/2024
Predrill: 0.00m
Water Level: 1.40m
Collapse: 19.40m

Termination

Target Depth ☐

Effective Refusal
Tip ☐
Gauge ☐
Inclinometer ☐
Other: Anchor ☑

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.6245	10.6785
Local Friction	0.3518	0.3509
Pore Pressure	0.5959	0.5963

PointID: CPTu002
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 5872
Cone Area Ratio: 0.83

Date: 13/3/2024
Predrill: 0.00m
Water Level: 1.20m
Collapse: 13.80m

Termination

Target Depth ☐

Effective Refusal
Tip ☐
Gauge ☐
Inclinometer ☐
Other: Anchor ☑

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.6637	10.6802
Local Friction	0.3503	0.3510
Pore Pressure	0.5959	0.5964

PointID: CPTu003
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 5872
Cone Area Ratio: 0.83

Date: 13/3/2024
Predrill: 0.00m
Water Level: -
Collapse: 2.60m

Termination

Target Depth ☑

Effective Refusal
Tip ☐
Gauge ☐
Inclinometer ☐
Other ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.6524	10.6323
Local Friction	0.3507	0.3506
Pore Pressure	0.5955	0.5977

PointID: CPTu005
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 5872
Cone Area Ratio: 0.83

Date: 15/3/2024
Predrill: 0.00m
Water Level: -
Collapse: 1.90m

Termination

Target Depth ☐

Effective Refusal
Tip ☐
Gauge ☐
Inclinometer ☐
Other: Anchor ☑

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.5775	10.6010
Local Friction	0.3504	0.3523
Pore Pressure	0.5947	0.5944

PointID: CPTu006
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 7550
Cone Area Ratio: 0.85

Date: 14/3/2024
Predrill: 0.00m
Water Level: 2.20m
Collapse: 3.90m

Termination

Target Depth ☐

Effective Refusal
Tip ☐
Gauge ☐
Inclinometer ☐
Other: Anchor ☑

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.8546	10.8256
Local Friction	0.3480	0.3496
Pore Pressure	0.6266	0.6256

TEST DETAIL

PointID: CPTu007
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 7550
Cone Area Ratio: 0.85

Date: 15/3/2024
Predrill: 0.00m
Water Level: 2.90m
Collapse: 11.20m

Termination

Target Depth ☐

Effective Refusal

Tip	☐
Gauge	☐
Inclinometer	☐
Other: Anchor	☑

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.8960	10.9788
Local Friction	0.3463	0.3427
Pore Pressure	0.6265	0.6282

PointID: CPTu008
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 7550
Cone Area Ratio: 0.85

Date: 14/3/2024
Predrill: 0.00m
Water Level: 5.40m
Collapse: 6.80m

Termination

Target Depth ☐

Effective Refusal

Tip	☐
Gauge	☐
Inclinometer	☐
Other: Anchor	☑

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.8581	10.8722
Local Friction	0.3512	0.3492
Pore Pressure	0.6266	0.6276

PointID: CPTu009
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 5872
Cone Area Ratio: 0.83

Date: 14/3/2024
Predrill: 0.00m
Water Level: -
Collapse: 1.90m

Termination

Target Depth ☐

Effective Refusal

Tip	☐
Gauge	☐
Inclinometer	☑
Other	☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.5749	10.5793
Local Friction	0.3504	0.3523
Pore Pressure	0.5957	0.5950

PointID: CPTu010
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 7550
Cone Area Ratio: 0.85

Date: 14/3/2024
Predrill: 0.00m
Water Level: 2.60m
Collapse: 3.20m

Termination

Target Depth ☐

Effective Refusal

Tip	☐
Gauge	☐
Inclinometer	☐
Other: Pore pressure	☑

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.8485	10.8326
Local Friction	0.3498	0.3510
Pore Pressure	0.6268	0.6274

PointID: CPTu011
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 5872
Cone Area Ratio: 0.83

Date: 14/3/2024
Predrill: 0.00m
Water Level: -
Collapse: 1.40m

Termination

Target Depth ☐

Effective Refusal

Tip	☐
Gauge	☐
Inclinometer	☐
Other: Anchor	☑

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.6149	10.5714
Local Friction	0.3528	0.3528
Pore Pressure	0.5959	0.5967

TEST DETAIL

PointID: CPTu012
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 5872
Cone Area Ratio: 0.83

Date: 13/3/2024
Predrill: 0.00m
Water Level: 5.90m
Collapse: 10.40m

Termination

Target Depth ☐

Effective Refusal
Tip ☐
Gauge ☐
Inclinometer ☐
Other: Anchor ☑

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.6210	10.5871
Local Friction	0.3521	0.3520
Pore Pressure	0.5948	0.5962

PointID: sCPTu014
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 5872
Cone Area Ratio: 0.83

Date: 20/3/2024
Predrill: 0.00m
Water Level: -
Collapse: 4.10m

Termination

Target Depth ☐

Effective Refusal
Tip ☐
Gauge ☐
Inclinometer ☐
Other: Anchor ☑

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.6036	10.5793
Local Friction	0.3510	0.3501
Pore Pressure	0.5984	0.5983

PointID: sCPTu015
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 5872
Cone Area Ratio: 0.83

Date: 18/3/2024
Predrill: 0.00m
Water Level: 1.90m
Collapse: 10.20m

Termination

Target Depth ☑

Effective Refusal
Tip ☐
Gauge ☐
Inclinometer ☐
Other ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.5714	10.6088
Local Friction	0.3505	0.3513
Pore Pressure	0.5974	0.5987

PointID: sCPTu016
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 5872
Cone Area Ratio: 0.83

Date: 26/3/2024
Predrill: 0.00m
Water Level: 3.20m
Collapse: 7.90m

Termination

Target Depth ☐

Effective Refusal
Tip ☐
Gauge ☐
Inclinometer ☐
Other ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.5627	10.5923
Local Friction	0.3516	0.3510
Pore Pressure	0.5957	0.5956

PointID: sCPTu017
Sounding: 1

Operator: R. Negi
Cone Type: GeotechAB Piezocone - Compression
Cone Reference: 5872
Cone Area Ratio: 0.83

Date: 20/3/2024
Predrill: 0.00m
Water Level: 2.10m
Collapse: 2.90m

Termination

Target Depth ☐

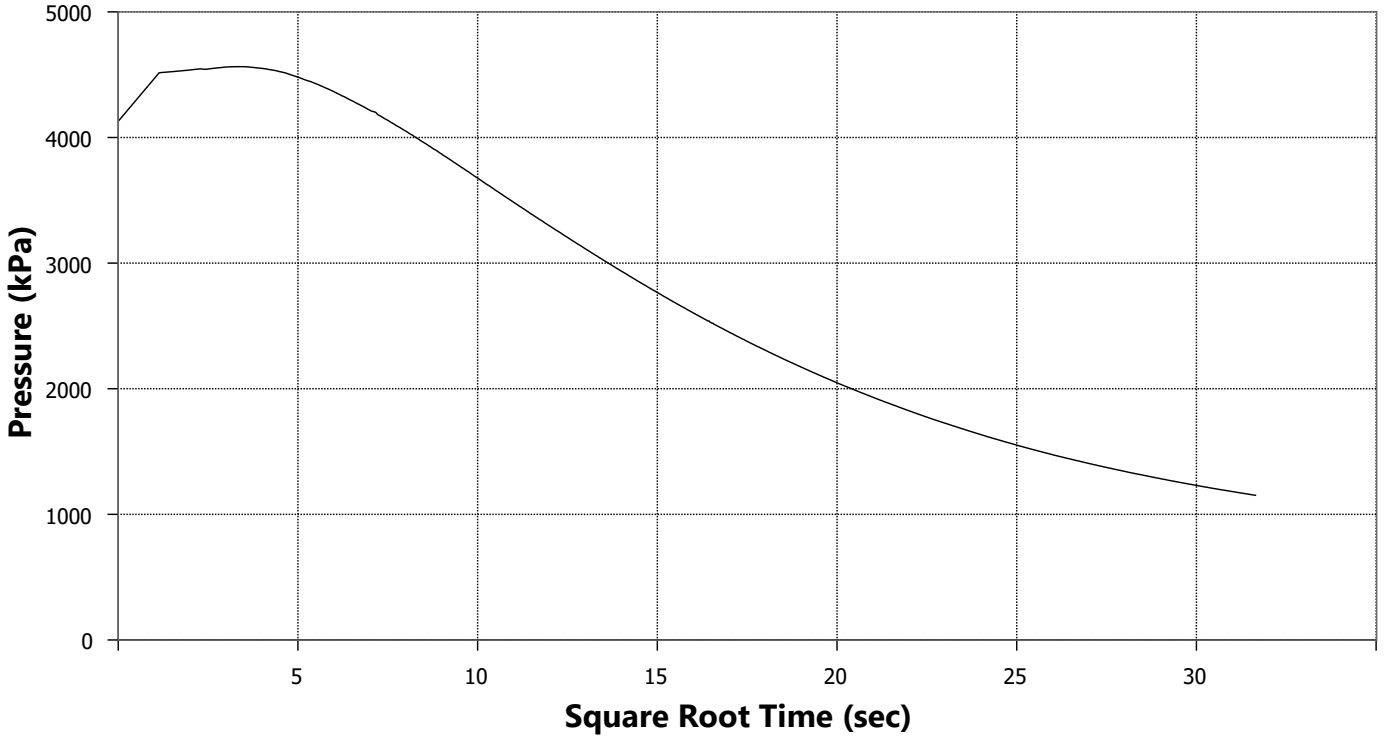
Effective Refusal
Tip ☐
Gauge ☐
Inclinometer ☑
Other ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	10.5888	10.5932
Local Friction	0.3514	0.3538
Pore Pressure	0.5976	0.5967

DISSIPATION TESTS

PointID: CPTu010

Test Depth: 20.63 **Duration:** 1001 seconds



CPT CALIBRATION AND TECHNICAL NOTES

These notes describe the technical specifications and associated calibration references pertaining to the GeotechAB piezocone types measuring cone resistance, sleeve friction, inclination and pore pressure (piezocone, 10cm^2)

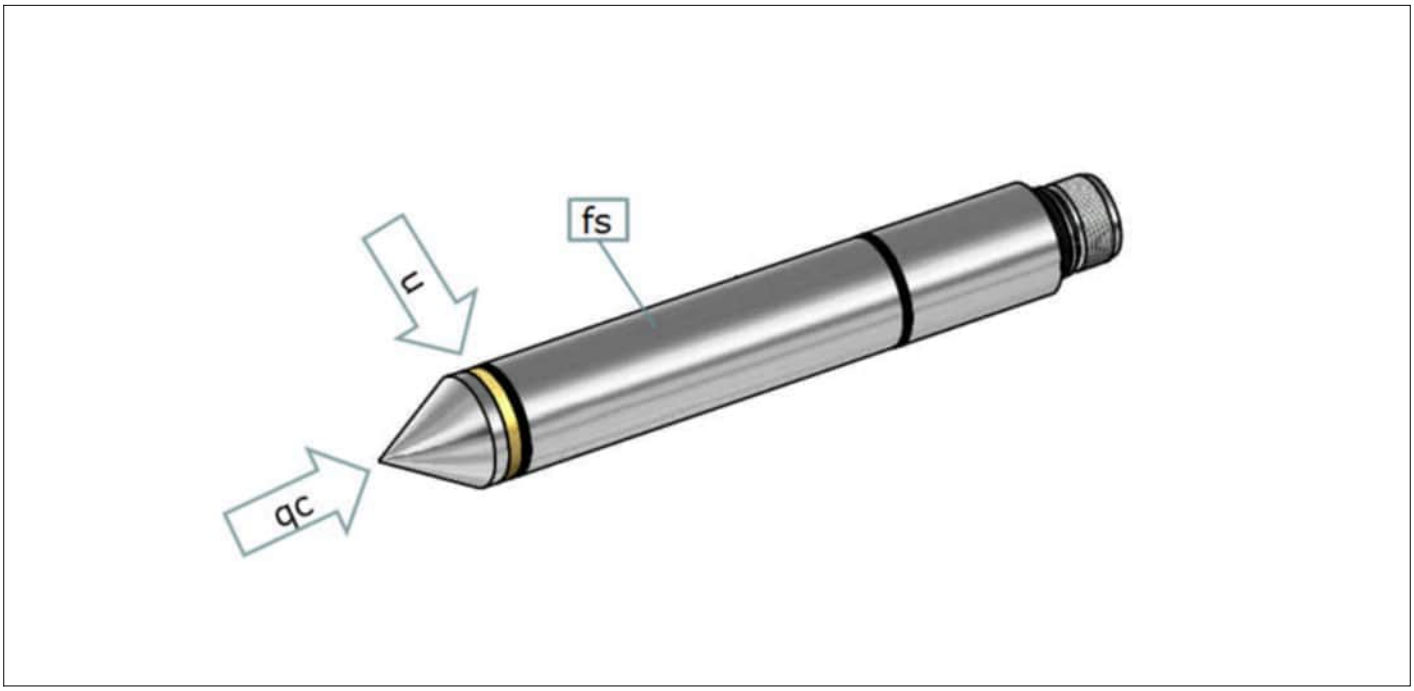
Dimensions

Dimensional specifications are detailed below. All tolerances are routinely checked prior to testing and measurements taken are electronically recorded. All records are kept on file and available on request.

Technical specifications

	Tip	Friction	Pore Pressure	Inclination
Maximum Measuring Range:	50 - 100 MPa	0.5 - 2.0 MPa	1.0 - 5.0 MPa	0° - 40°
Resolution:	18 bit	18 bit	18 bit	18 bit

Length (including transmitter):	710 mm	**Weight:**	1.3 kg
Diameter:	35.8 mm	**Opening angle of bit:**	60°
Cone base area:	10 cm^2	**Side sleeve surfaces:**	150 cm^2
Cone area ratio:	Varies - refer to cone certificate	**Tip and Local Friction sensor displacement:**	70 mm



McMILLAN Drilling

Göteborg:2022-11-04

CALIBRATION CERTIFICATE FOR CPT PROBE 5872

Probe No	5872
Date of Calibration	2022-11-04
Calibrated by	Joakim Tingström
Run No	2412
Test Class:	ISO 1

Point Resistance	**Tip Area 10cm²**	
Maximum Load	100	MPa
Range	100	MPa
Scaling Factor	**876**	
Resolution	0,8709	kPa
Area factor (a)	0,83	
Zero	10,683 MPa	

ERRORS

Max. Temperature effect when not loaded 16,538 kPa
Temperature range 5 –40 deg. Celsius.

Local Friction	**Sleeve Area 150cm²**	
Maximum Load	3	MPa
Range	3	MPa
Scaling Factor	**1323**	
Resolution	0,0288	kPa
Area factor (b)	0,001	
Zero	358,99 kPa	

ERRORS

Max. Temperature effect when not loaded 0,461 kPa
Temperature range 5 –40 deg. Celsius.

Pore Pressure		
Maximum Load	5	MPa
Range	5	MPa
Scaling Factor	**1552**	
Resolution	0,0492	kPa
Zero	610,77 kPa	

ERRORS

Max. Temperature effect when not loaded 0,884 kPa
Temperature range 5 –40 deg. Celsius.

Tilt Angle		
Scaling Factor	**0,94**	
Range	0 - 40	Deg.

Backup memory

Ingenjörsfirman Geotech AB +46 (0)31-28 99 20 www.geotech.se
Datavägen 53 +46 (0)31-68 16 39 VAT No.

Göteborg:2024-02-08

CALIBRATION CERTIFICATE FOR CPT PROBE 7550

Probe No	7550
Date of Calibration	2024-02-08
Calibrated by	Joakim Tingström.....
Run No	3302
Test Class:	ISO 1

Point Resistance	**Tip Area 10cm²**	
Maximum Load	100	MPa
Range	100	MPa
Scaling Factor	**866**	
Resolution	0,881	kPa
Area factor (a)	0,849	
Zero	10,839 MPa	

ERRORS
Max. Temperature effect when not loaded 11,446 kPa
Temperature range 5 –40 deg. Celsius.

Local Friction	**Sleeve Area 150cm²**	
Maximum Load	3	MPa
Range	3	MPa
Scaling Factor	**1364**	
Resolution	0,028	kPa
Area factor (b)	0,001	
Zero	349,92 kPa	

ERRORS
Max. Temperature effect when not loaded 0,363 kPa
Temperature range 5 –40 deg. Celsius.

Pore Pressure		
Maximum Load	5	MPa
Range	5	MPa
Scaling Factor	**1493**	
Resolution	0,0511	kPa
Zero	627,71 kPa	

ERRORS
Max. Temperature effect when not loaded 2,145 kPa
Temperature range 5 –40 deg. Celsius.

Tilt Angle		
Scaling Factor	**0,94**	
Range	0 - 40	Deg.

Backup memory

Ingenjörsfirman Geotech AB +46 (0)31-28 99 20 www.geotech.se
Datavägen 53 +46 (0)31-68 16 39 VAT No.

DILATOMETER TEST (D M T)

McMillan Drilling

302219

ENGEO

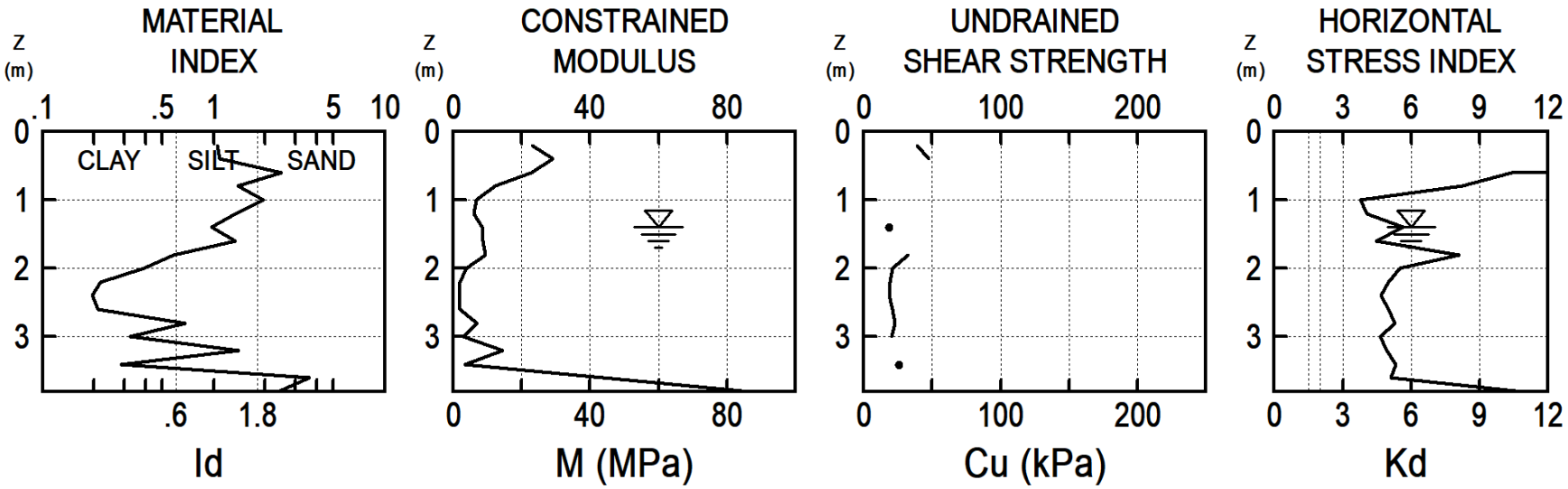
Pukekohe Park

INTERPRETED GEOTECHNICAL PARAMETERS

TEST

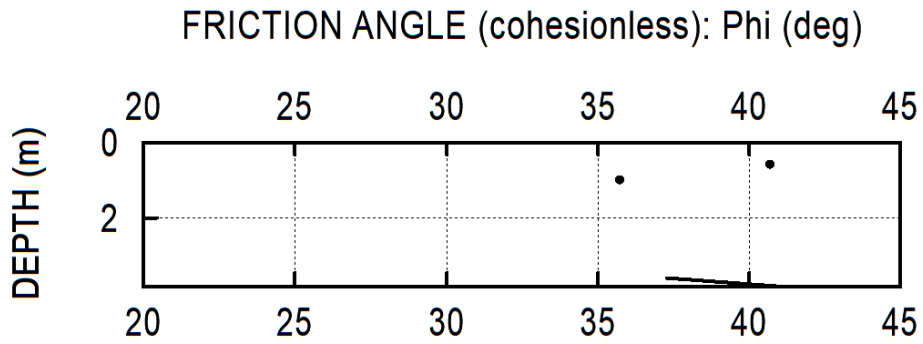
DMT001

26 MAR 2024

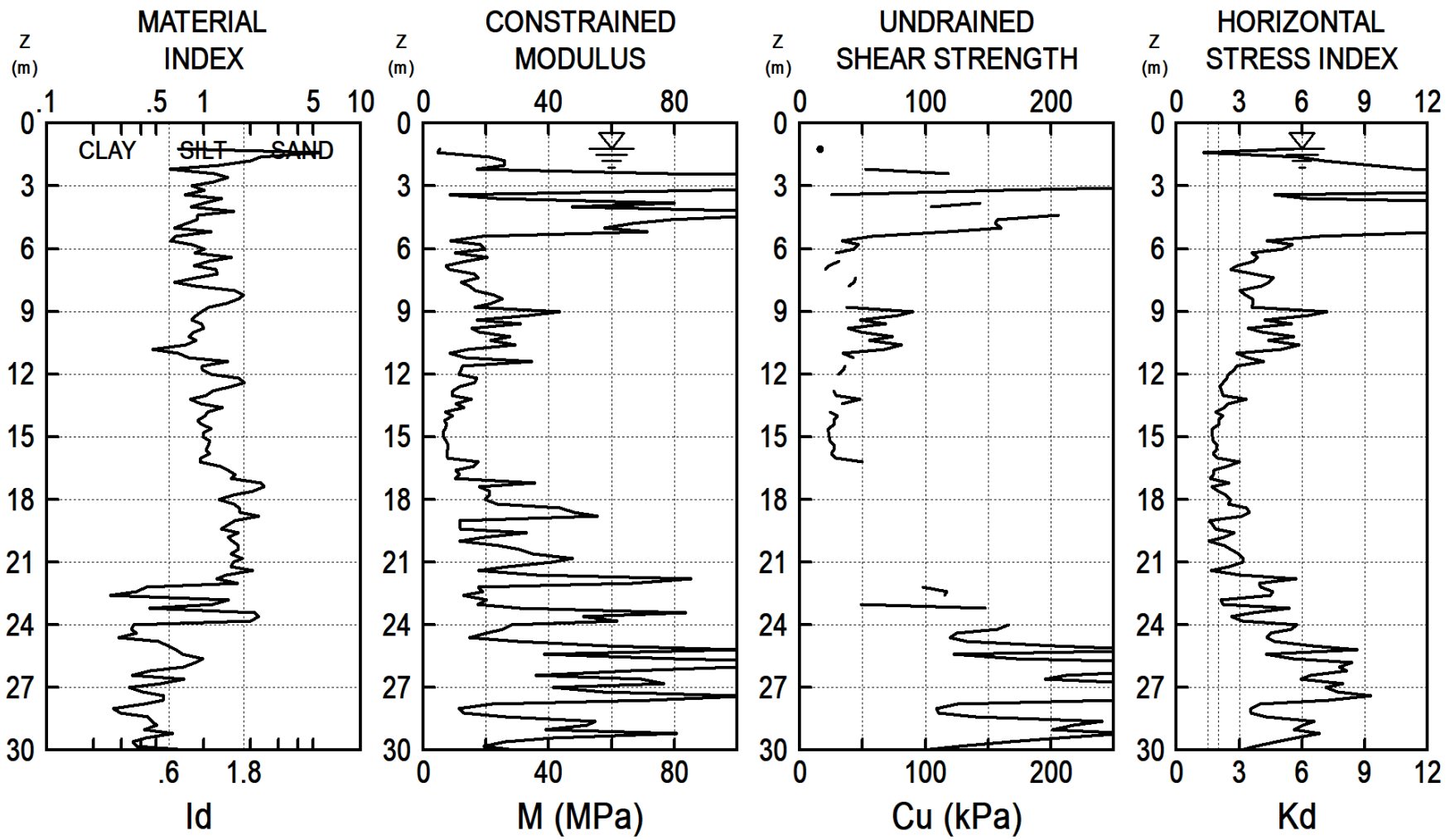


DILATOMETER TEST (D M T)

McMillan Drilling	ENGEO	TEST
302219	Pukekohe Park	DMT001
INTERPRETED GEOTECHNICAL PARAMETERS		26 MAR 2024



DILATOMETER TEST (D M T)



McMillan Drilling

302219

ENGEO

Pukekohe Park

INTERPRETED GEOTECHNICAL PARAMETERS

TEST

DMT002

25 MAR 2024

DILATOMETER TEST (D M T)

McMillan Drilling

302219

ENGEO

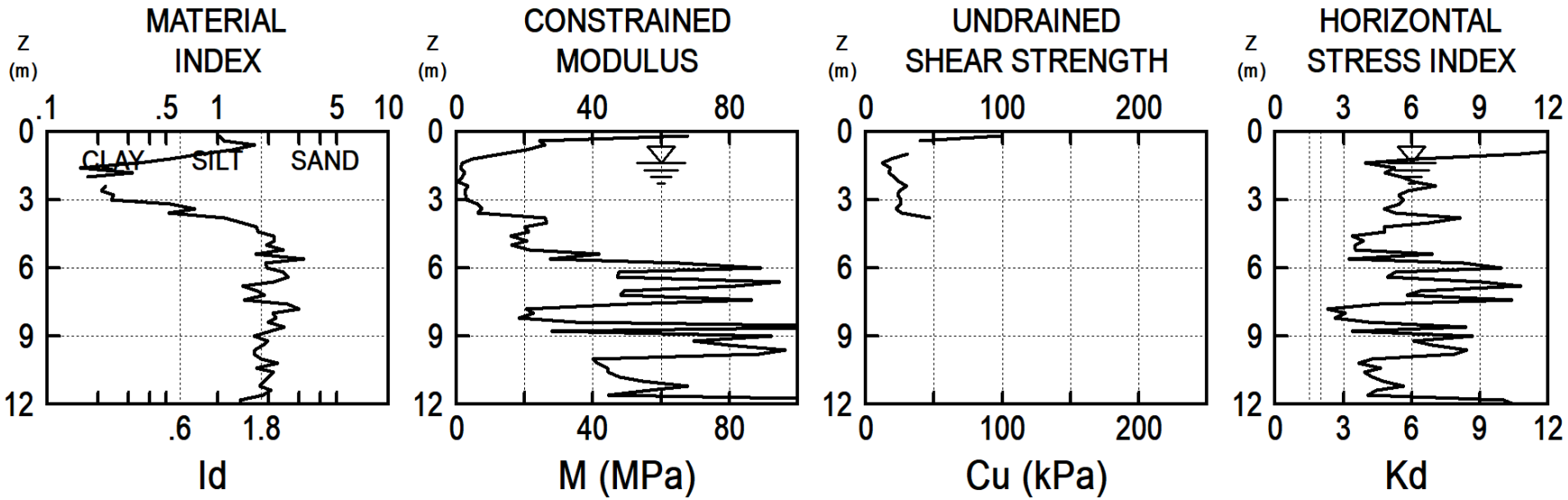
Pukekohe Park

INTERPRETED GEOTECHNICAL PARAMETERS

TEST

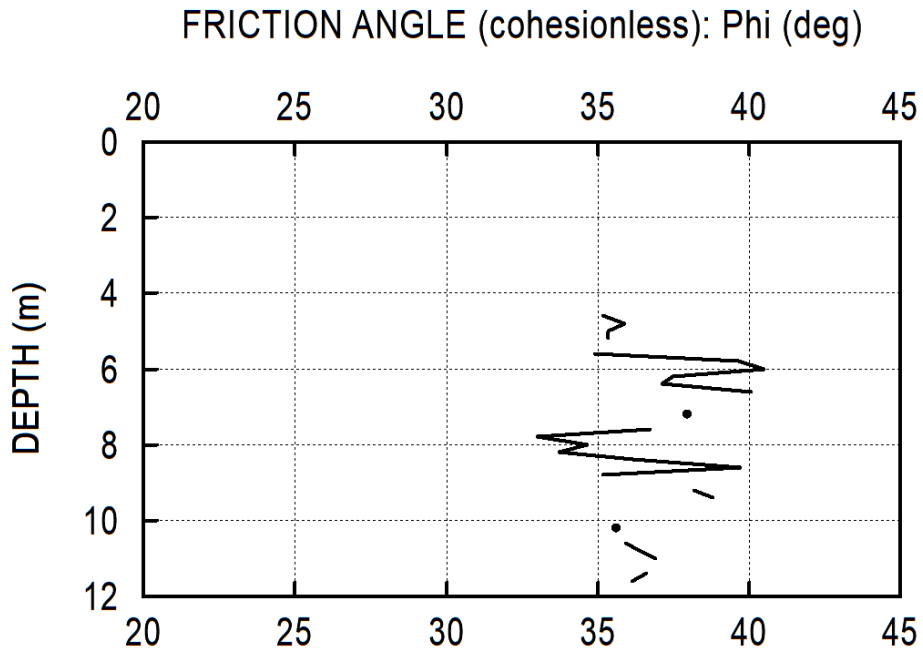
DMT003

26 MAR 2024

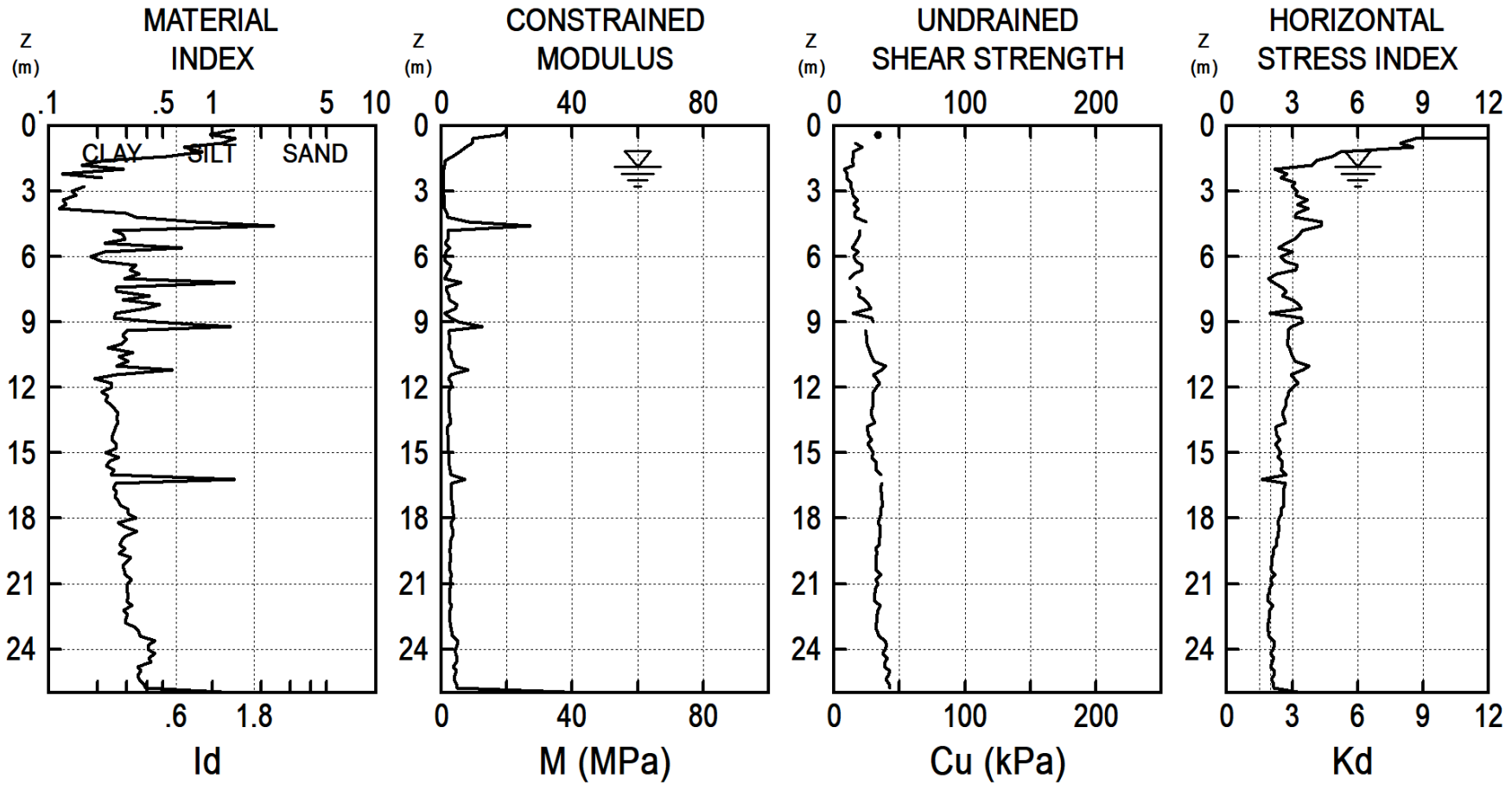


DILATOMETER TEST (D M T)

McMillan Drilling	ENGEO	TEST
302219	Pukekohe Park	DMT003
INTERPRETED GEOTECHNICAL PARAMETERS		26 MAR 2024



DILATOMETER TEST (D M T)



McMillan Drilling

302219

ENGEO

Pukekohe Park

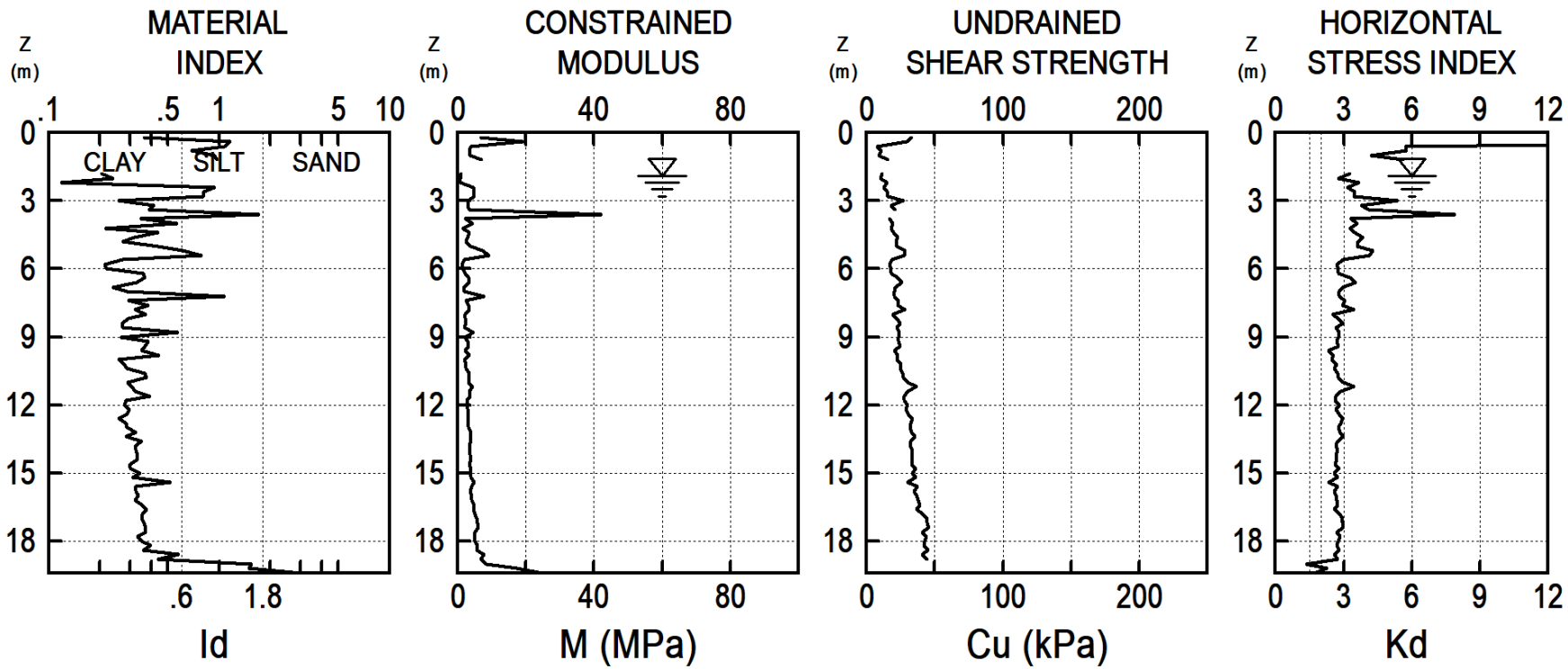
INTERPRETED GEOTECHNICAL PARAMETERS

TEST

DMT004

26 MAR 2024

DILATOMETER TEST (D M T)



McMillan Drilling

302219

ENGEO

Pukekohe Park

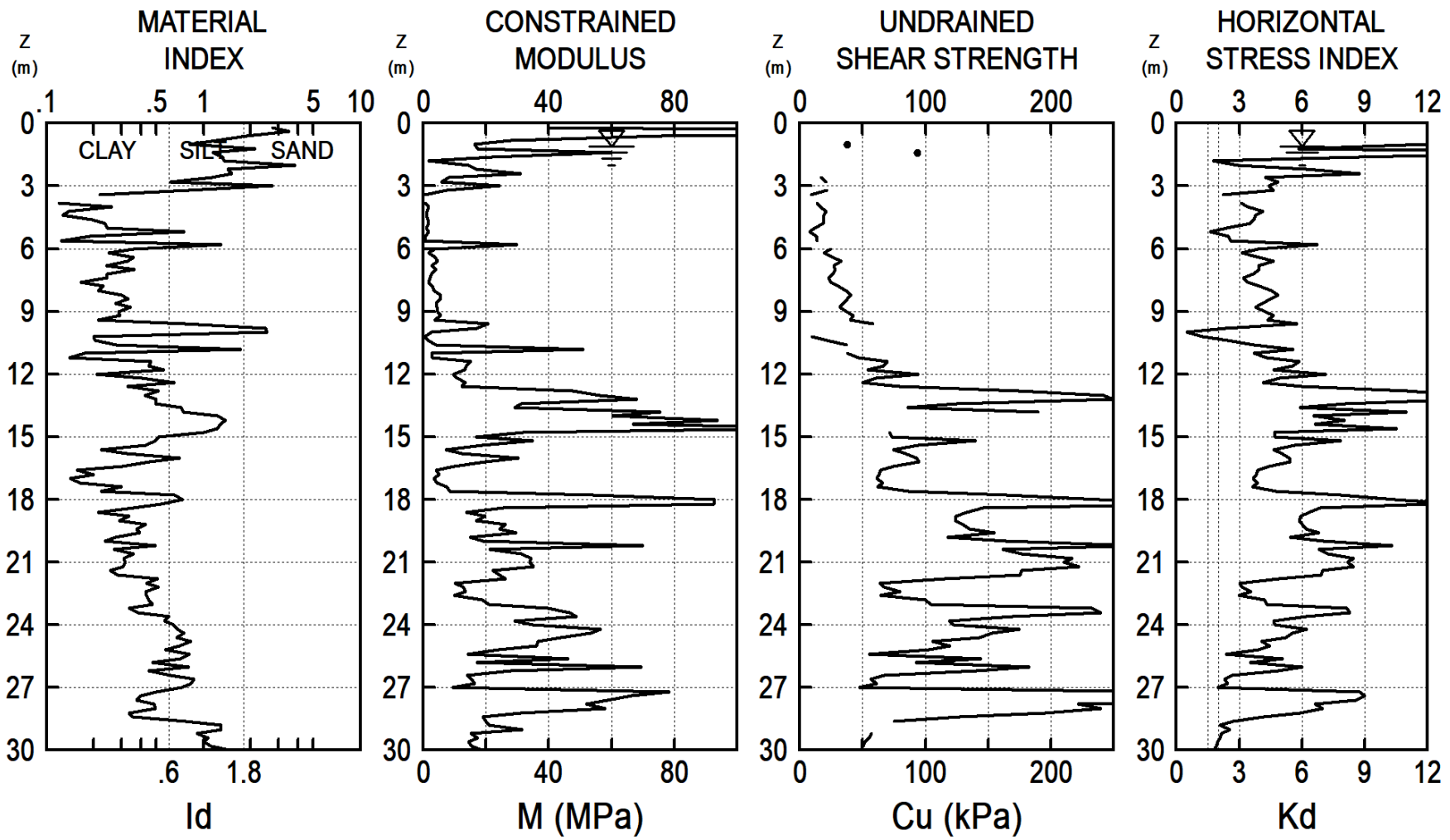
INTERPRETED GEOTECHNICAL PARAMETERS

TEST

DMT005

22 MAR 2024

DILATOMETER TEST (D M T)



McMillan Drilling

302219

ENGEO

Pukekohe Park

INTERPRETED GEOTECHNICAL PARAMETERS

TEST

DMT006

22 MAR 2024

DILATOMETER TEST (D M T)

McMillan Drilling

302219

ENGEO

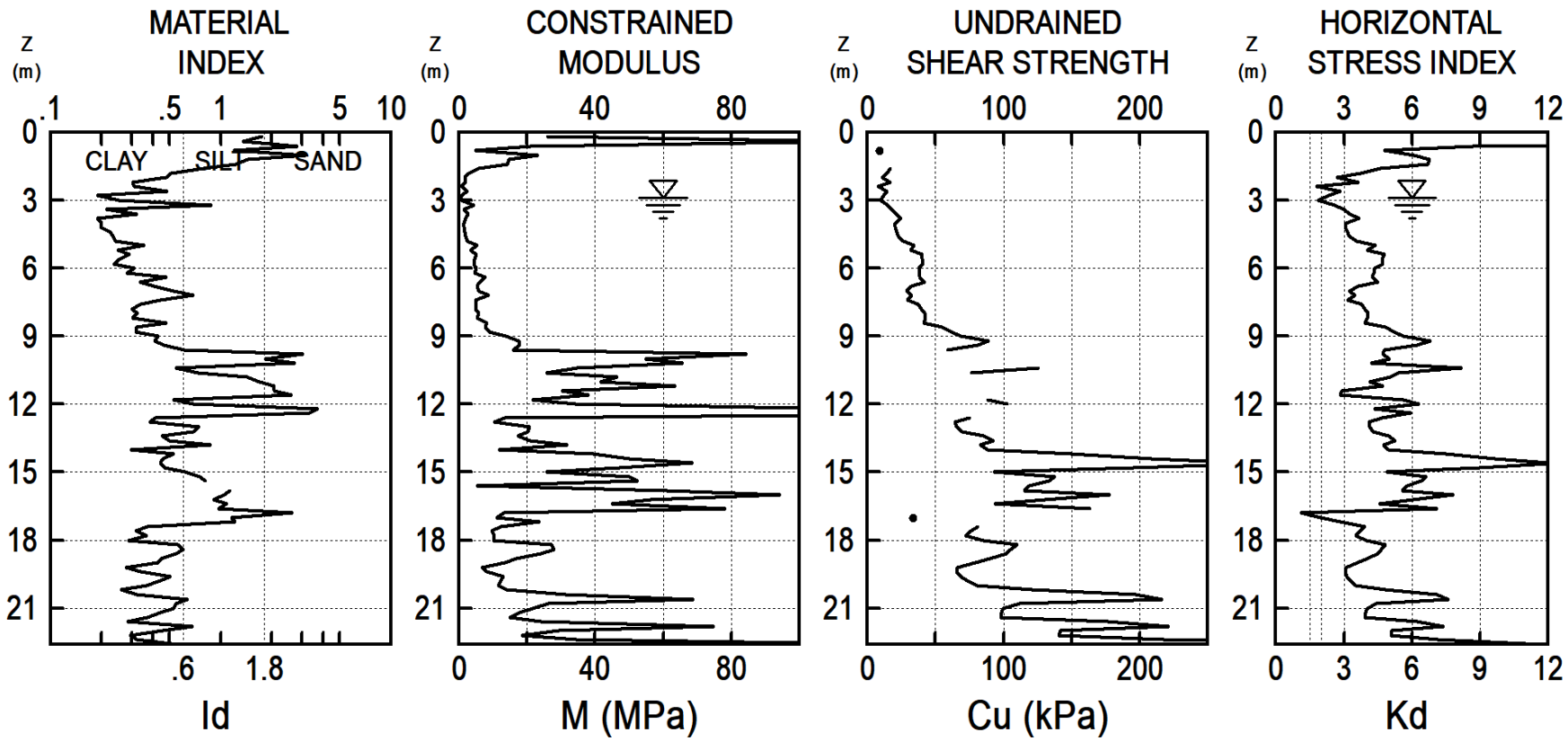
Pukekohe Park

INTERPRETED GEOTECHNICAL PARAMETERS

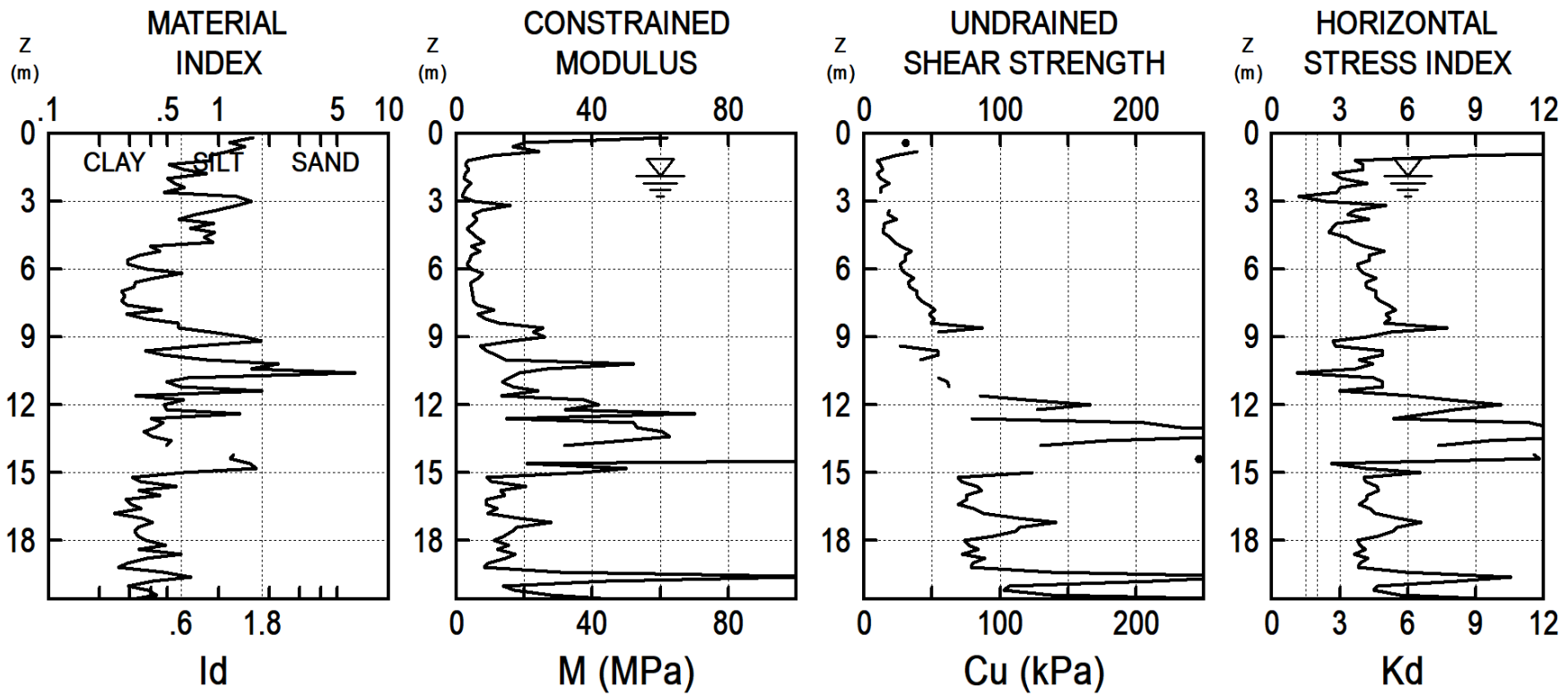
TEST

DMT007

27 MAR 2024



DILATOMETER TEST (D M T)



McMillan Drilling

302219

ENGEO

Pukekohe Park

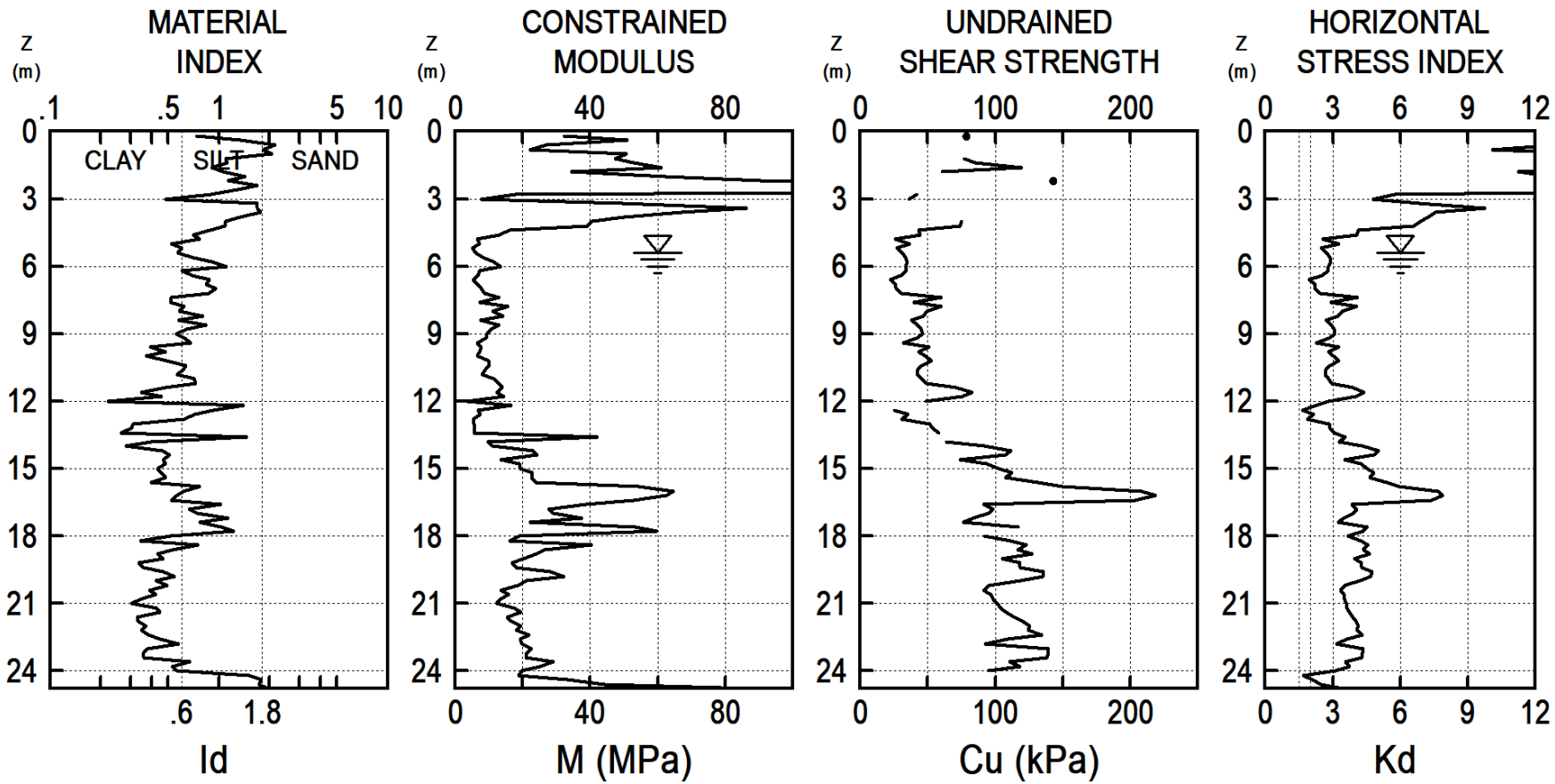
INTERPRETED GEOTECHNICAL PARAMETERS

TEST

DMT008

21 MAR 2024

DILATOMETER TEST (D M T)



McMillan Drilling

302219

ENGEO

Pukekohe Park

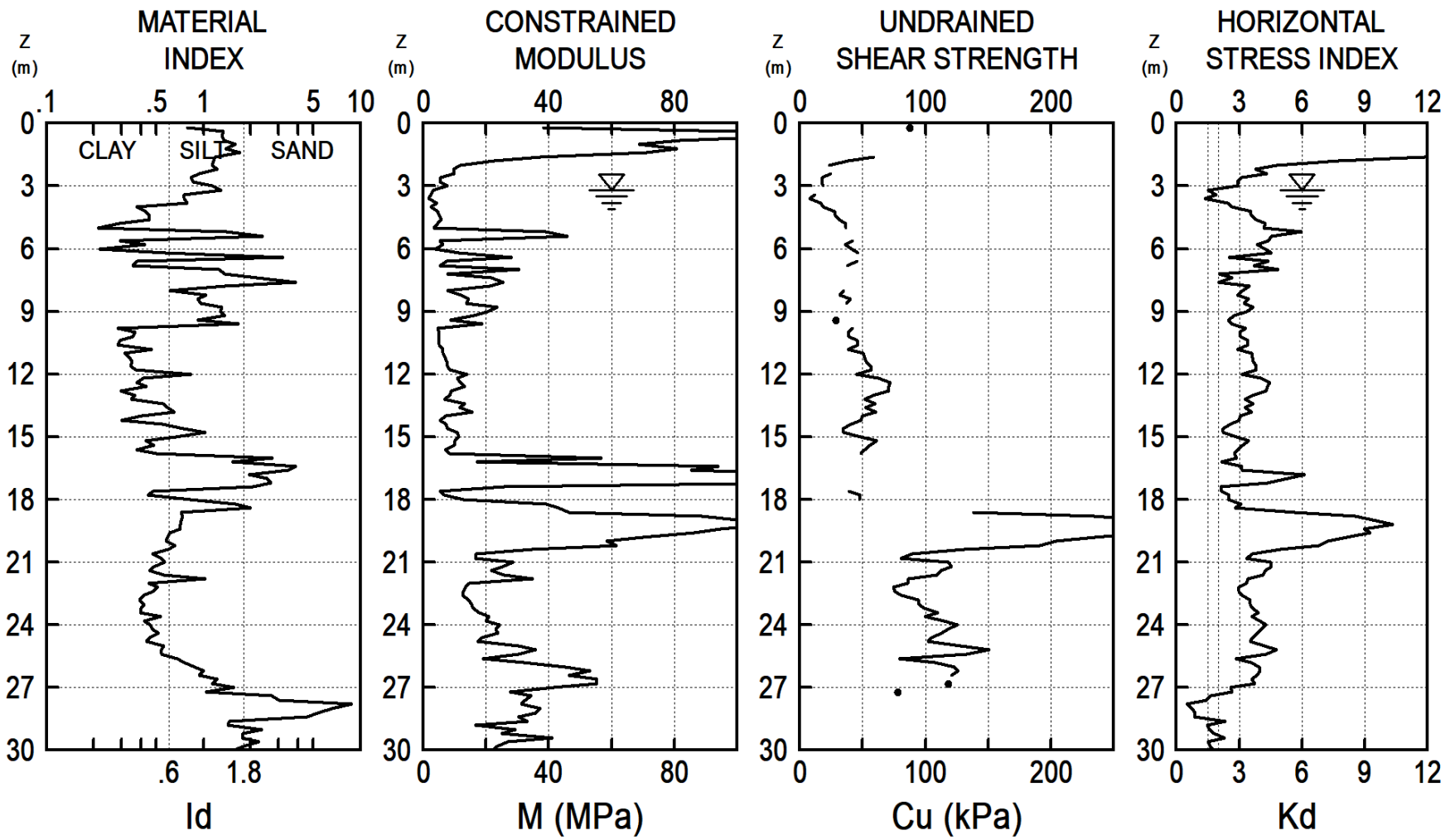
INTERPRETED GEOTECHNICAL PARAMETERS

TEST

DMT009

25 MAR 2024

DILATOMETER TEST (D M T)



McMillan Drilling

302219

ENGEO

Pukekohe Park

INTERPRETED GEOTECHNICAL PARAMETERS

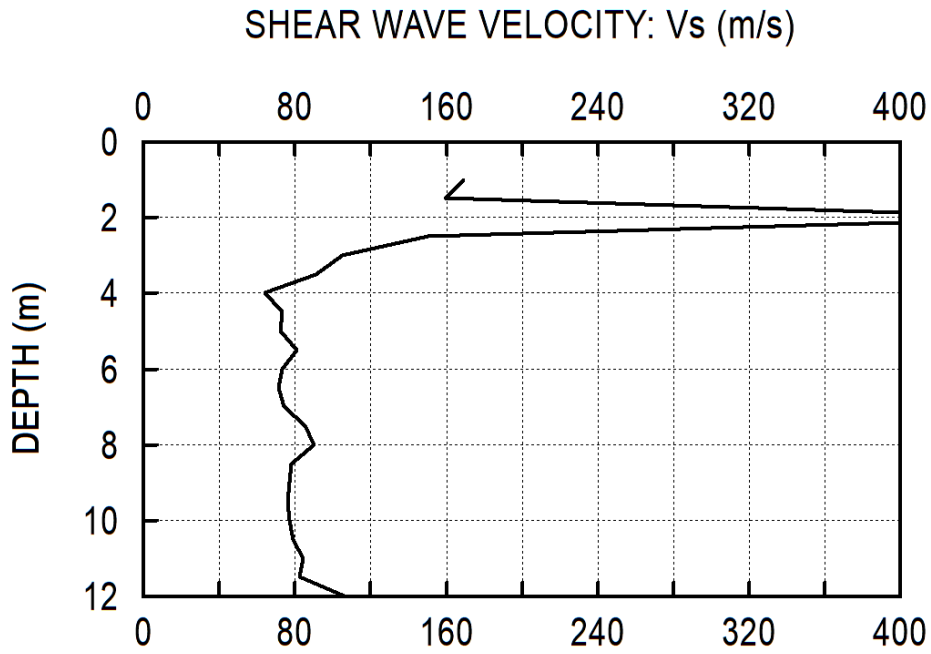
TEST

DMT010

21 MAR 2024

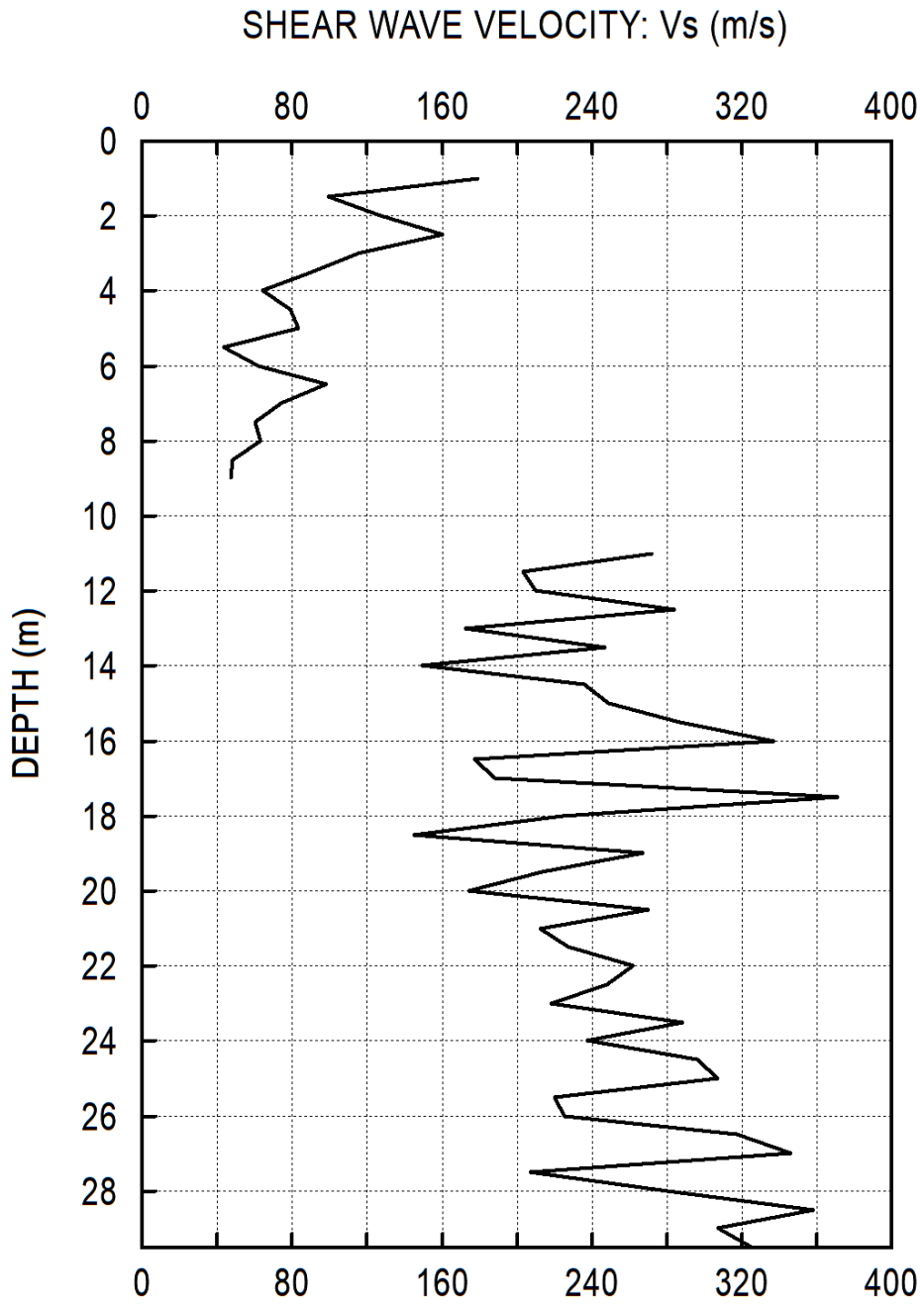
SEISMIC DILATOMETER TEST (S D M T)

McMillan Drilling	ENGEO	TEST
302219	Pukekohe Park	sCPTu014
		20 MAR 2024



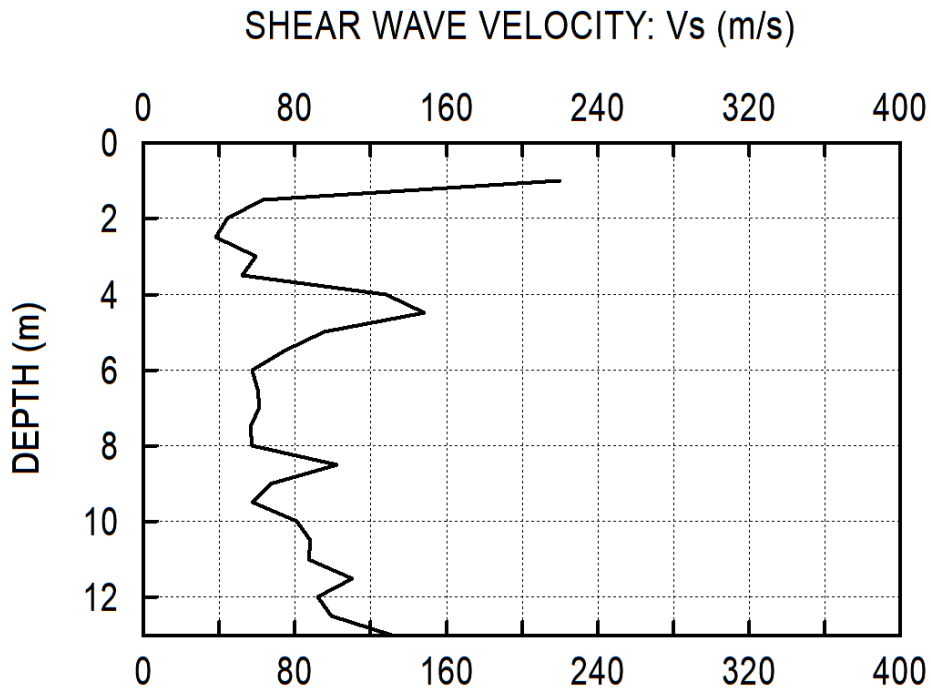
SEISMIC DILATOMETER TEST (S D M T)

McMillan Drilling	ENGEO	TEST
302219	Pukekohe Park	sCPTu015
		18 MAR 2024



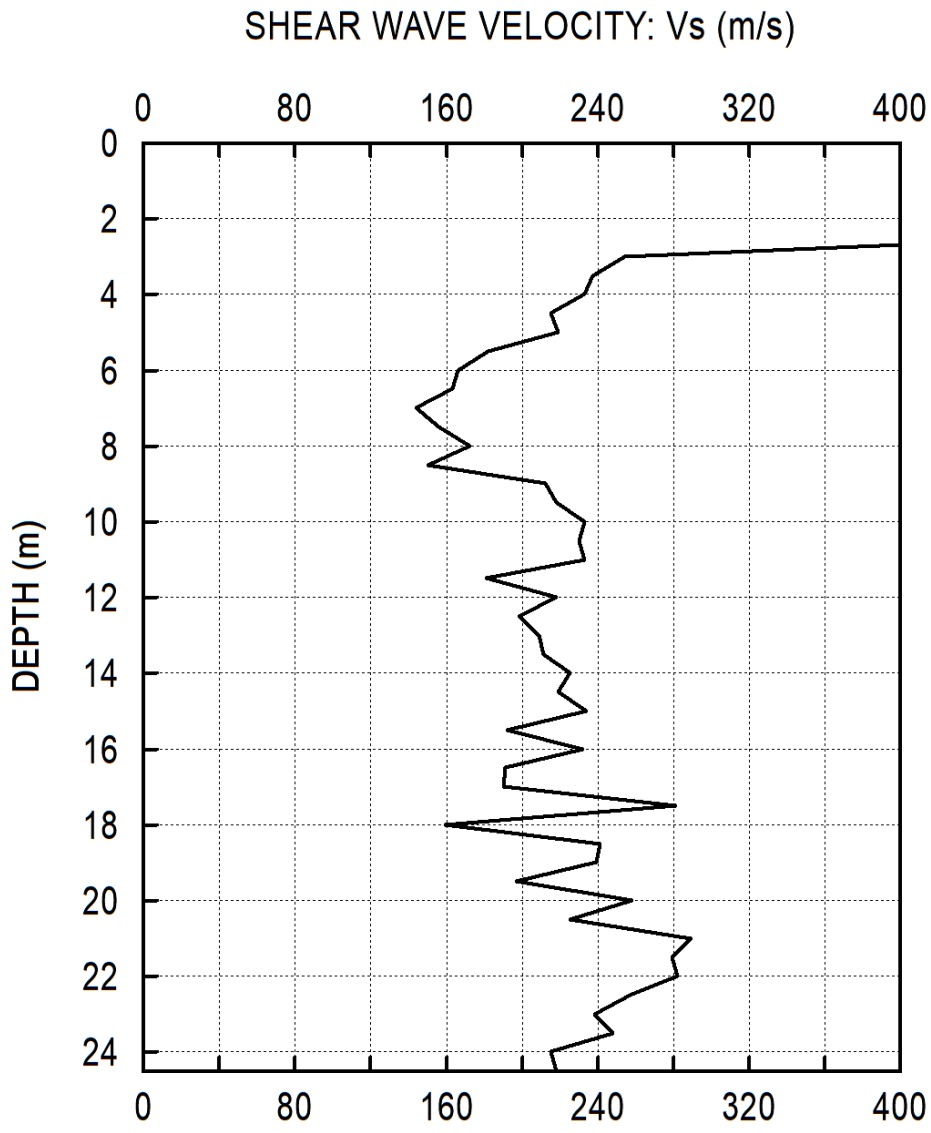
SEISMIC DILATOMETER TEST (S D M T)

McMillan Drilling	ENGEO	TEST
302219	Pukekohe Park	sCPTu016
		27 MAR 2024



SEISMIC DILATOMETER TEST (S D M T)

McMillan Drilling	ENGEO	TEST
302219	Pukekohe Park	sCPTu017
		20 MAR 2024

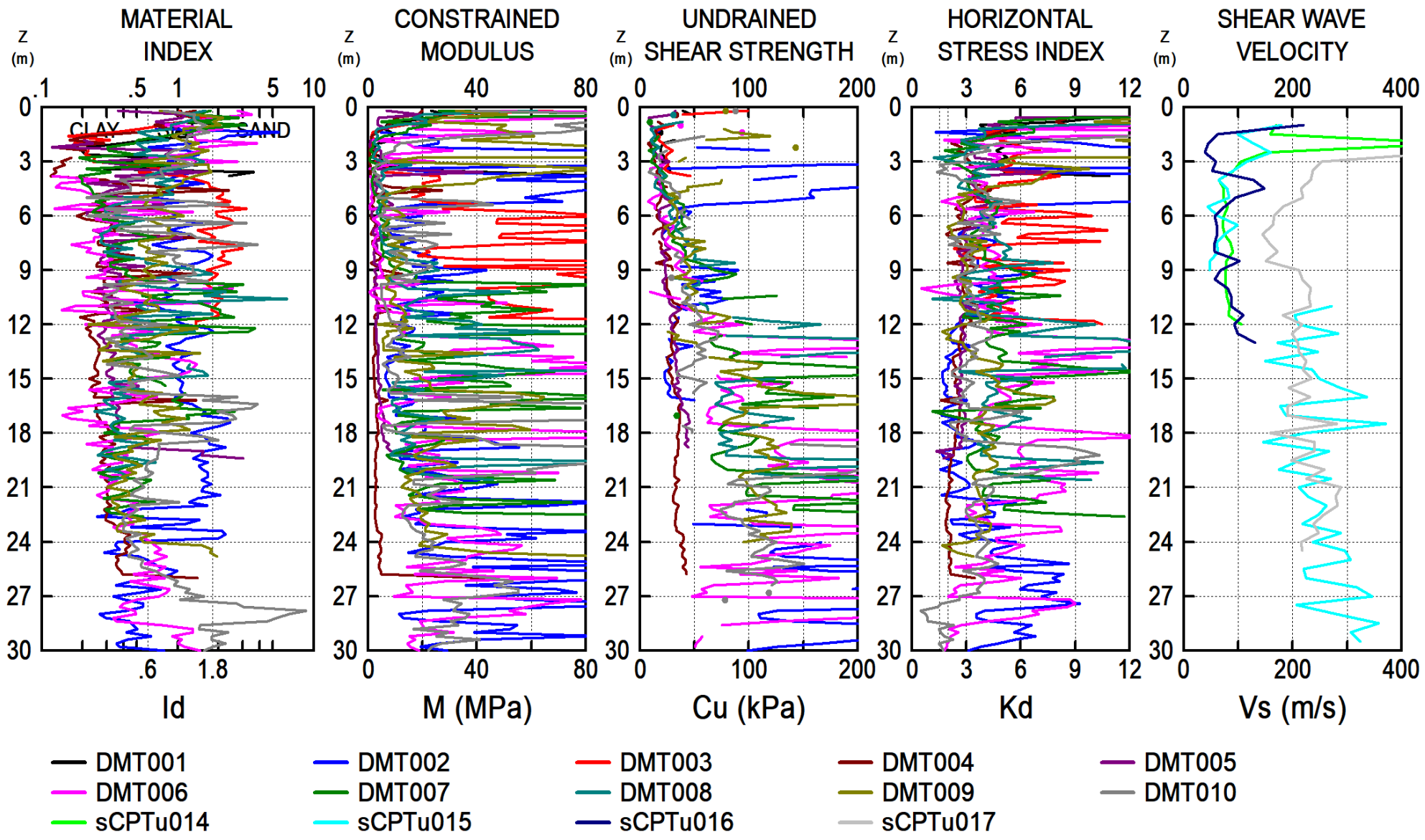


McMillan Drilling

302219

ENGEO

Pukekohe Park



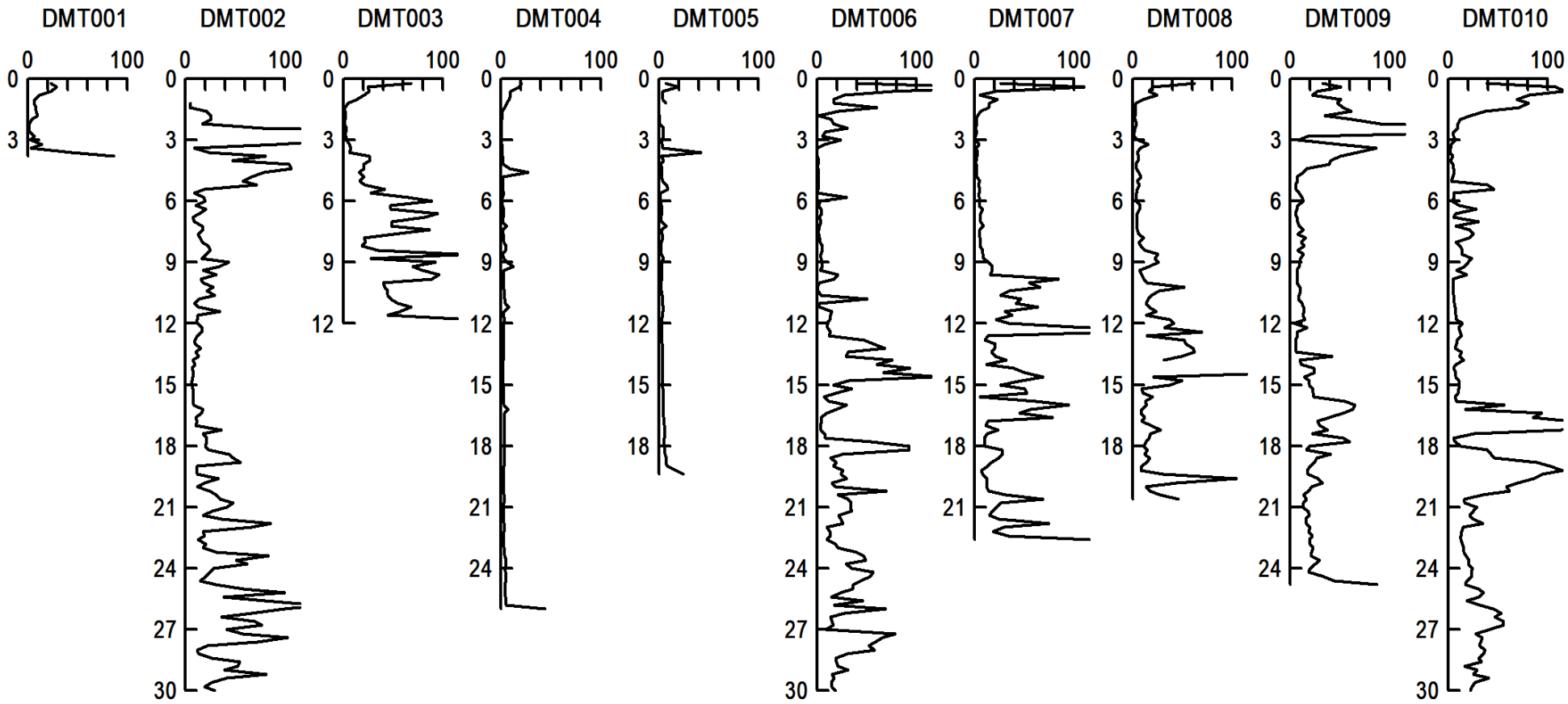
McMillan Drilling

302219

ENGEO

Pukekohe Park

CROSS SECTION OF CONSTRAINED MODULUS M (MPa)



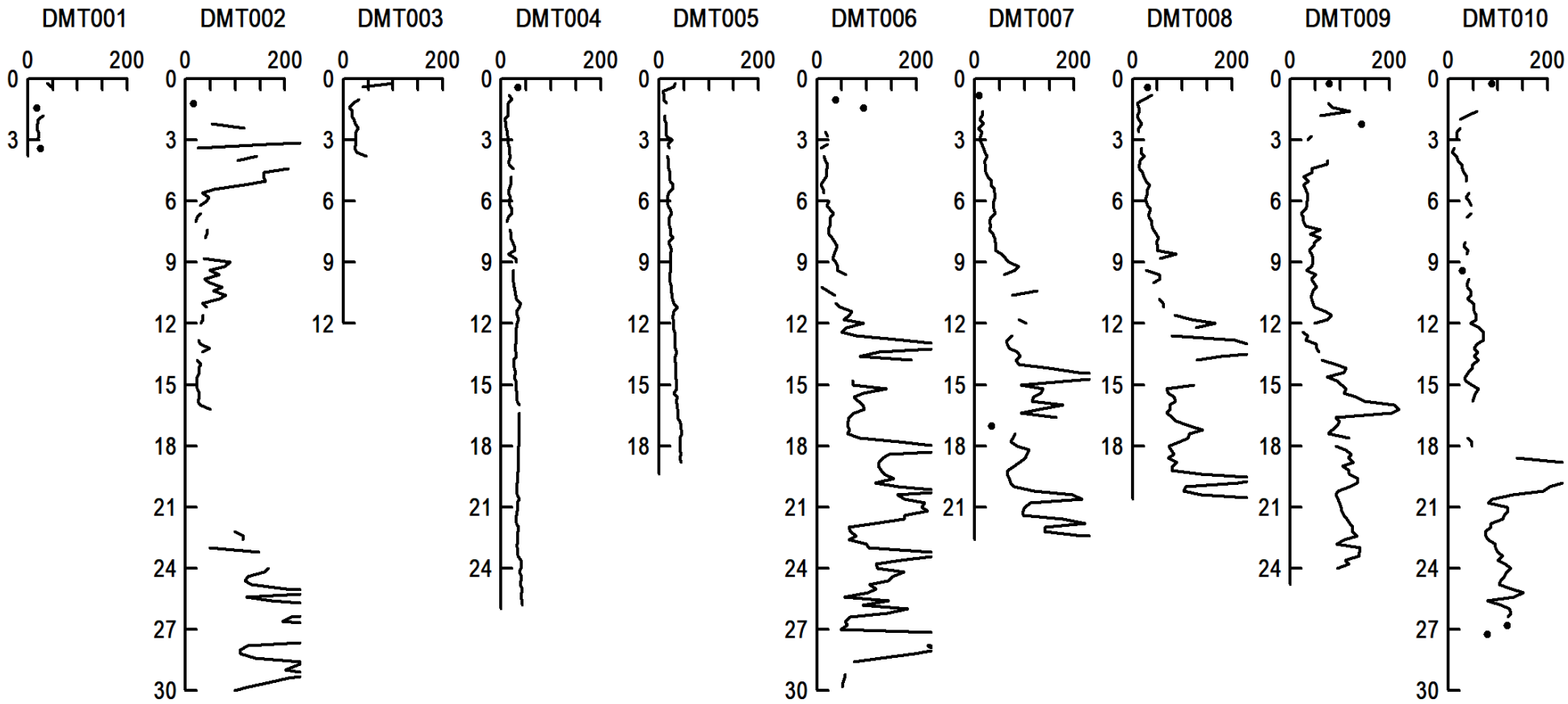
McMillan Drilling

302219

ENGEO

Pukekohe Park

CROSS SECTION OF UNDRAINED SHEAR STRENGTH Cu (kPa)



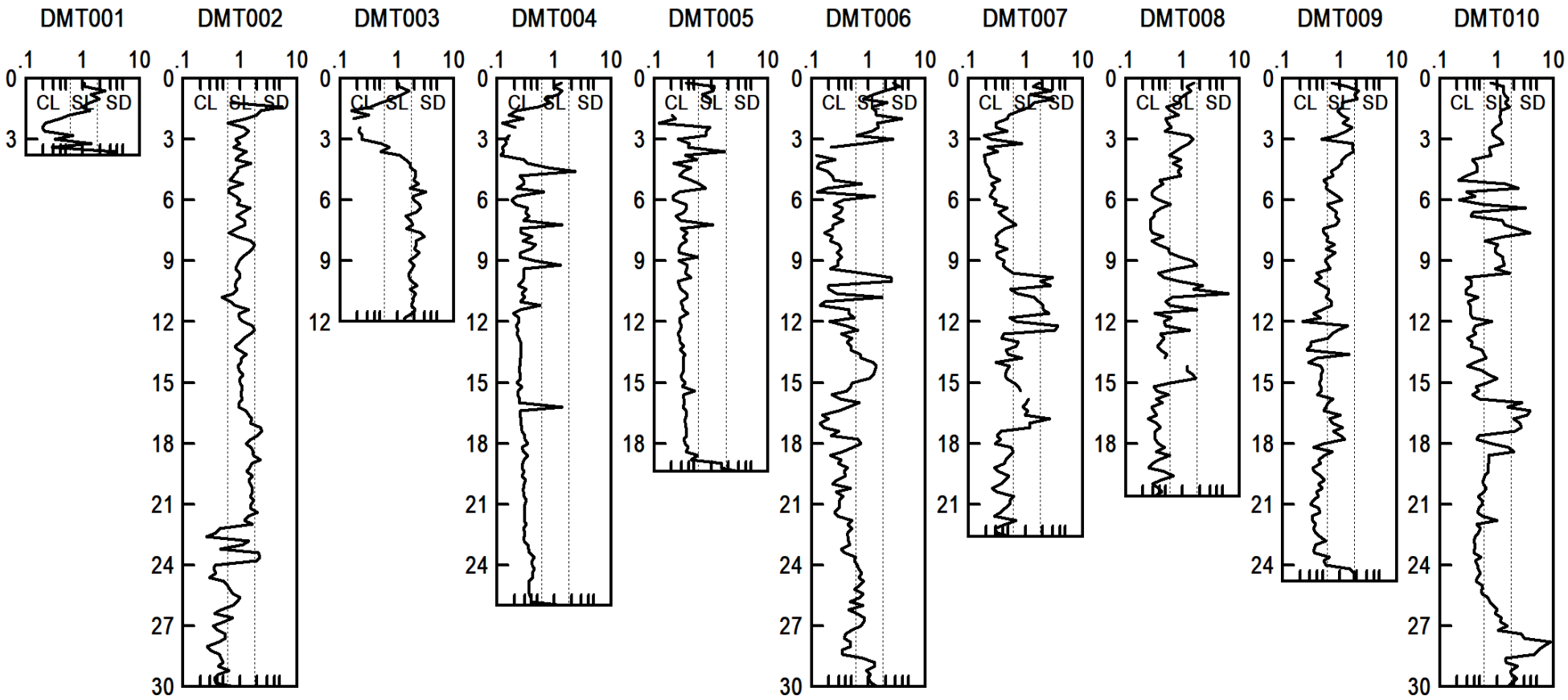
McMillan Drilling

302219

ENGEO

Pukekohe Park

CROSS SECTION OF MATERIAL INDEX Id



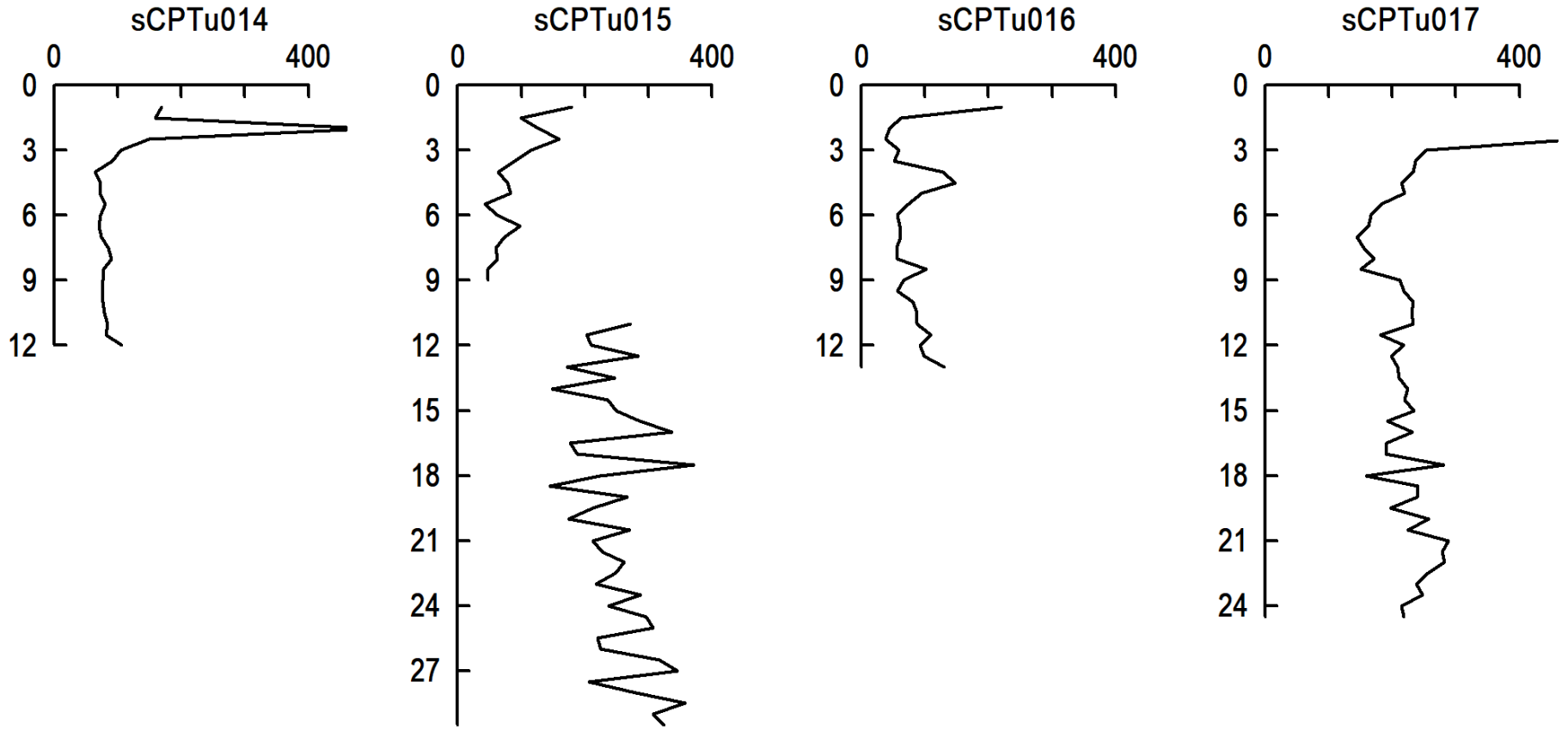
McMillan Drilling

302219

ENGEO

Pukekohe Park

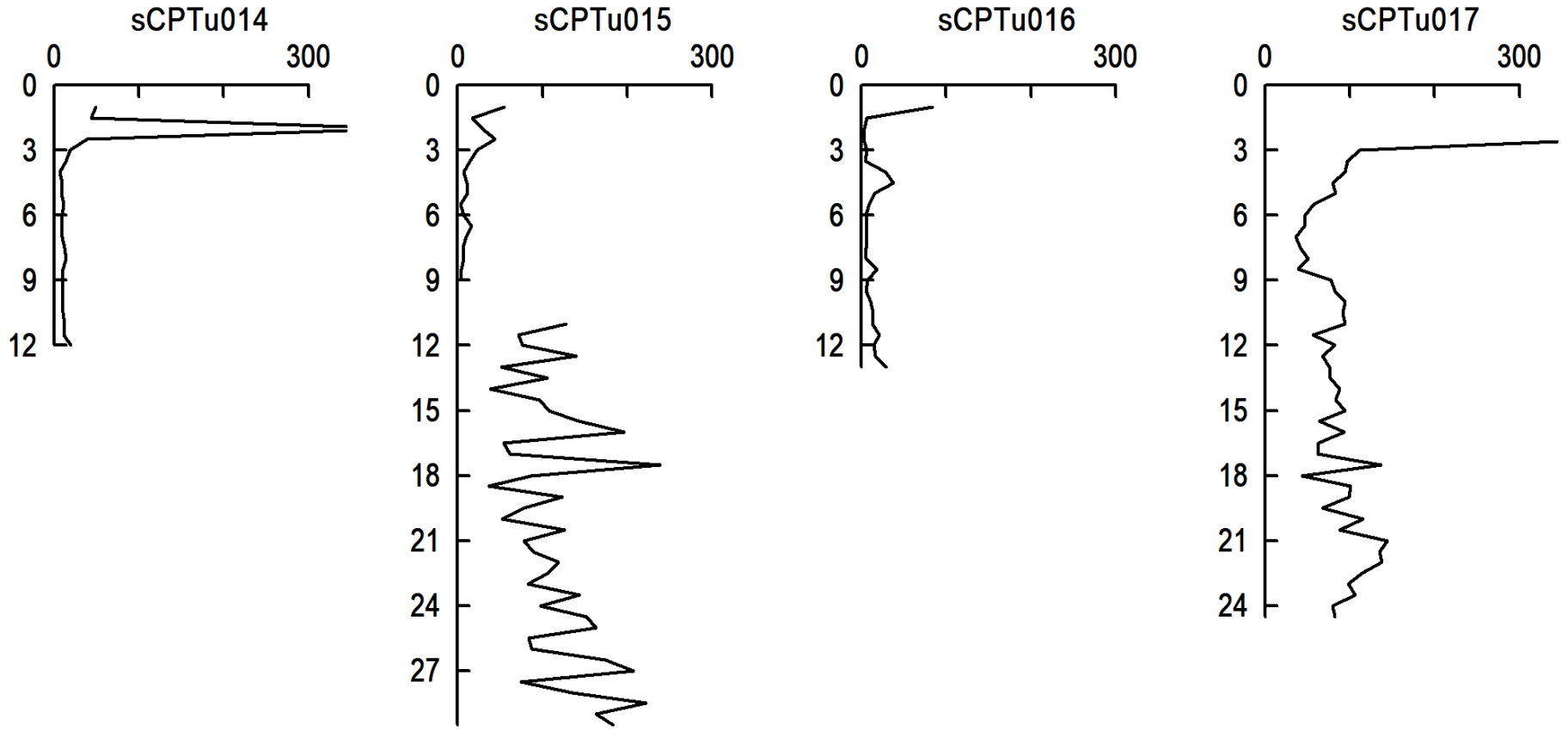
CROSS SECTION OF SHEAR WAVE VELOCITY Vs (m/s)



McMillan Drilling
302219

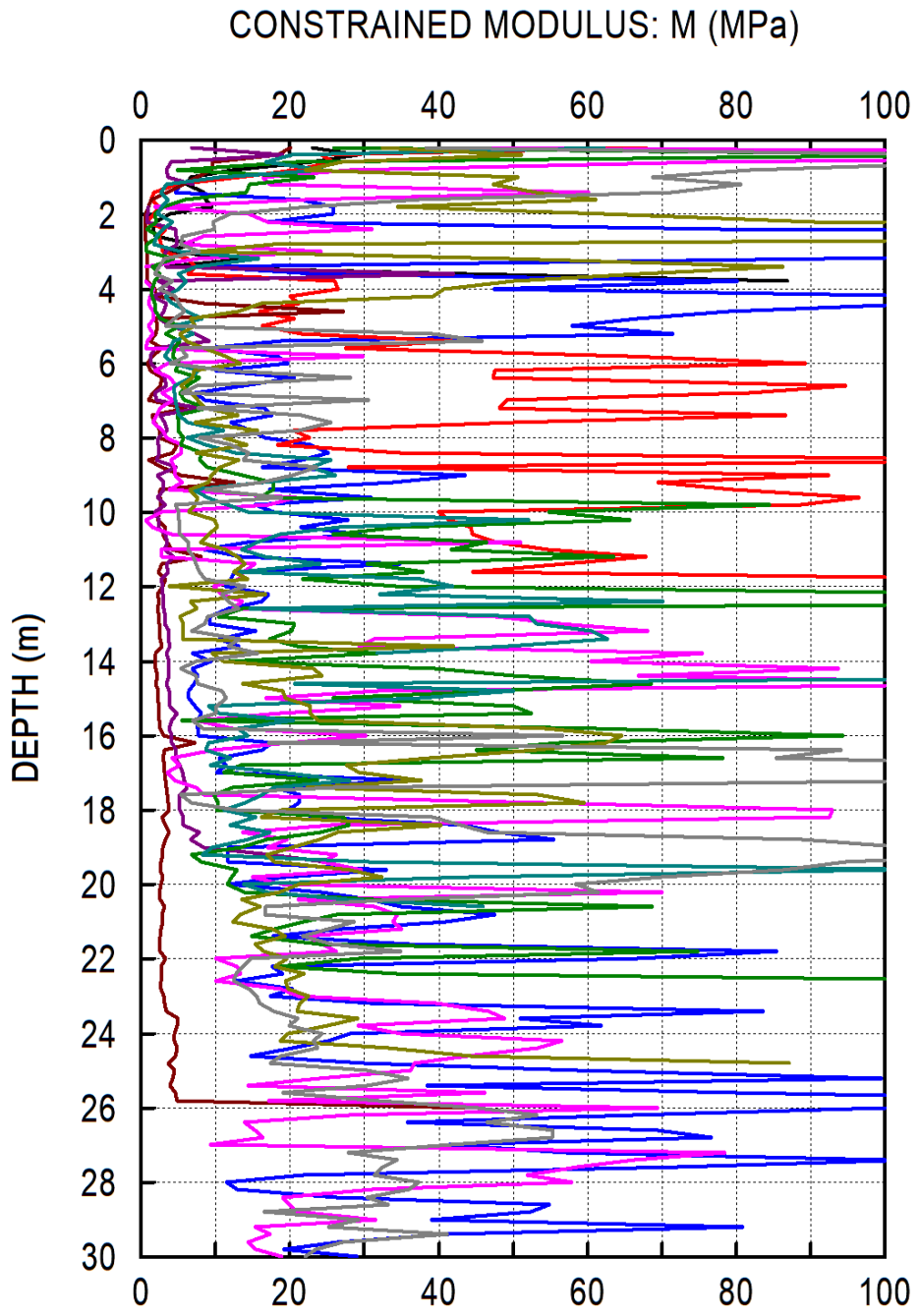
ENGEO
Pukekohe Park

CROSS SECTION OF MAX SHEAR MODULUS Go (MPa)

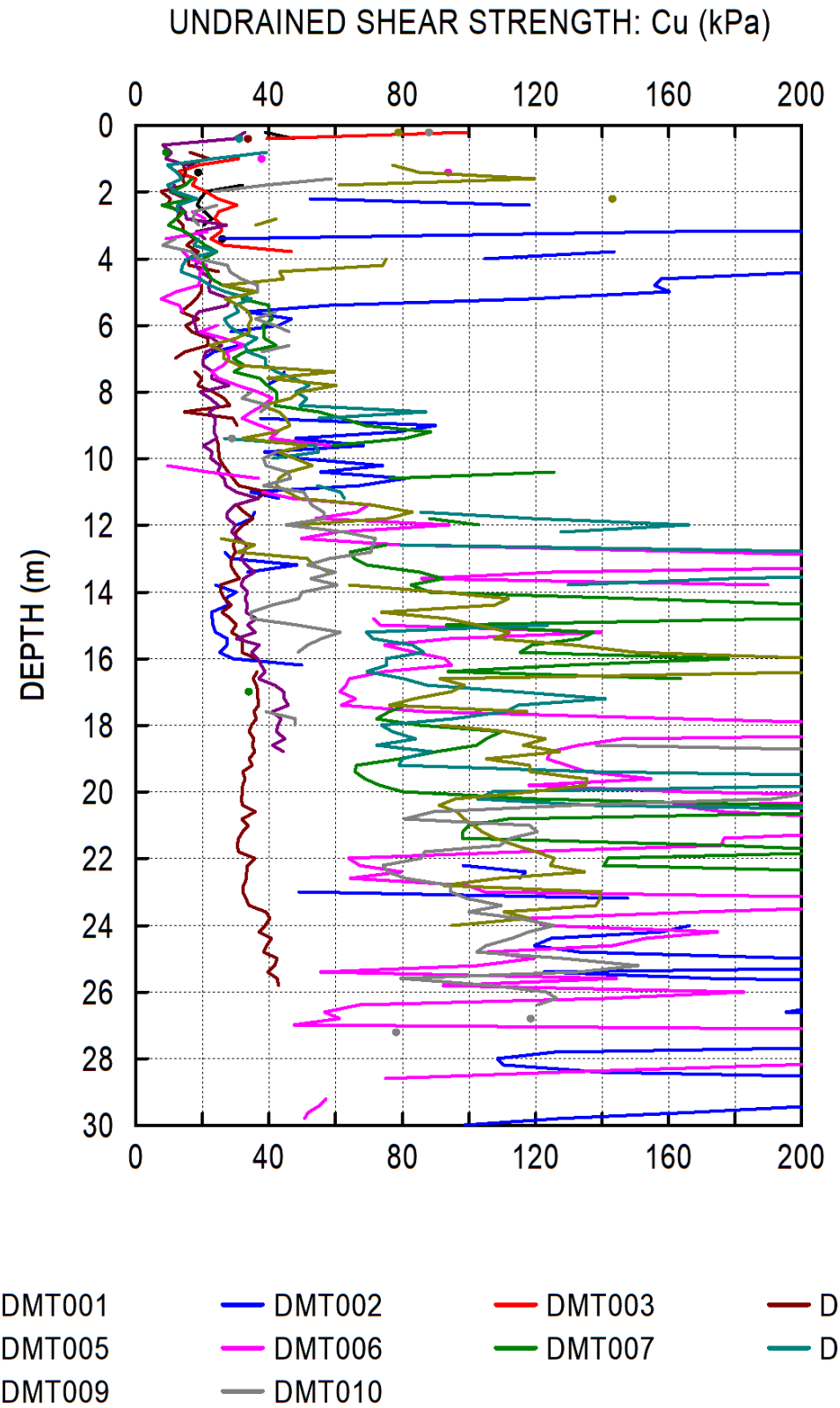


McMillan Drilling	ENGEO
302219	Pukekohe Park

SUPERIMPOSED TEST RESULTS

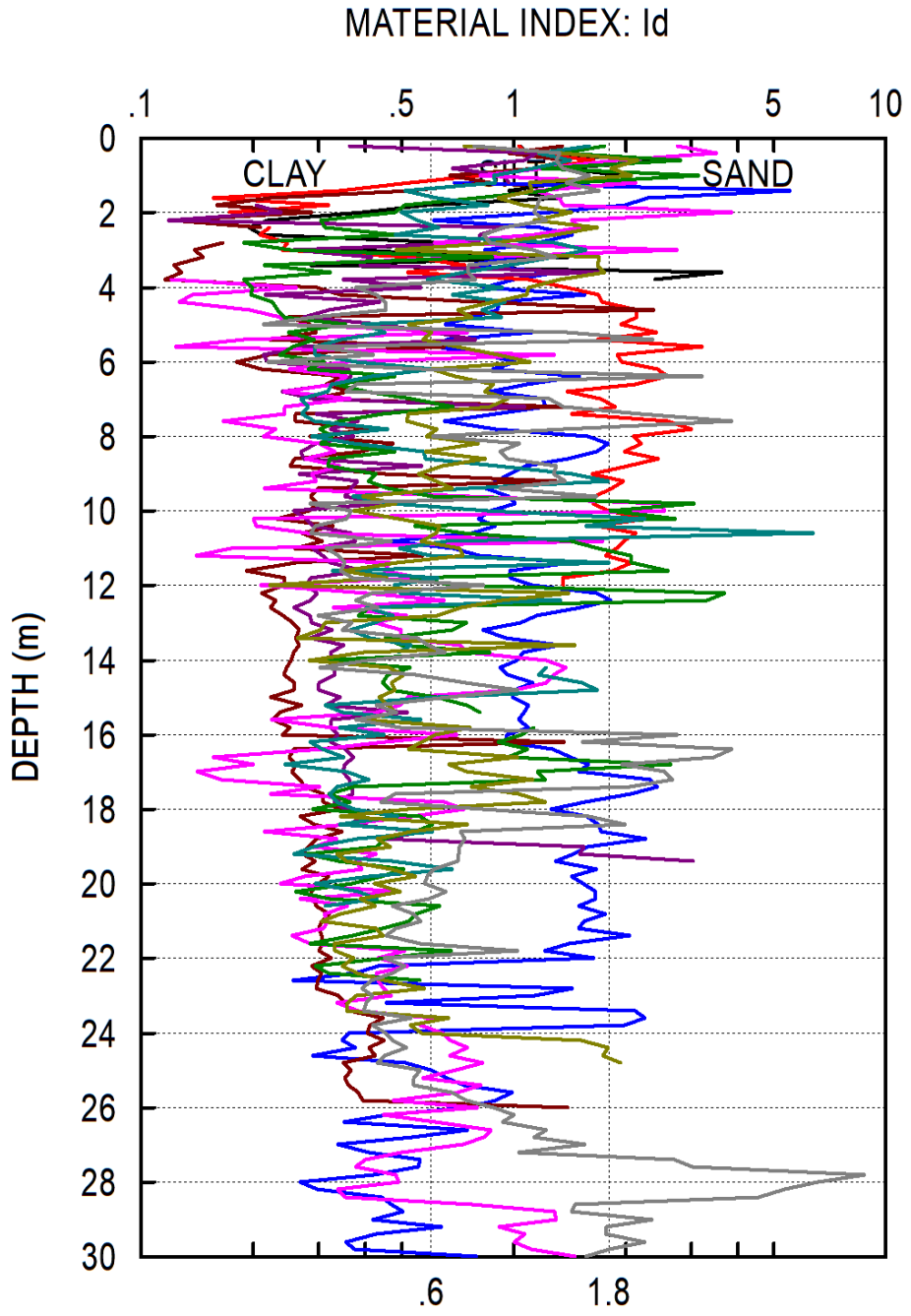


McMillan Drilling	ENGEO	
302219	Pukekohe Park	
SUPERIMPOSED TEST RESULTS		



McMillan Drilling	ENGEO
302219	Pukekohe Park

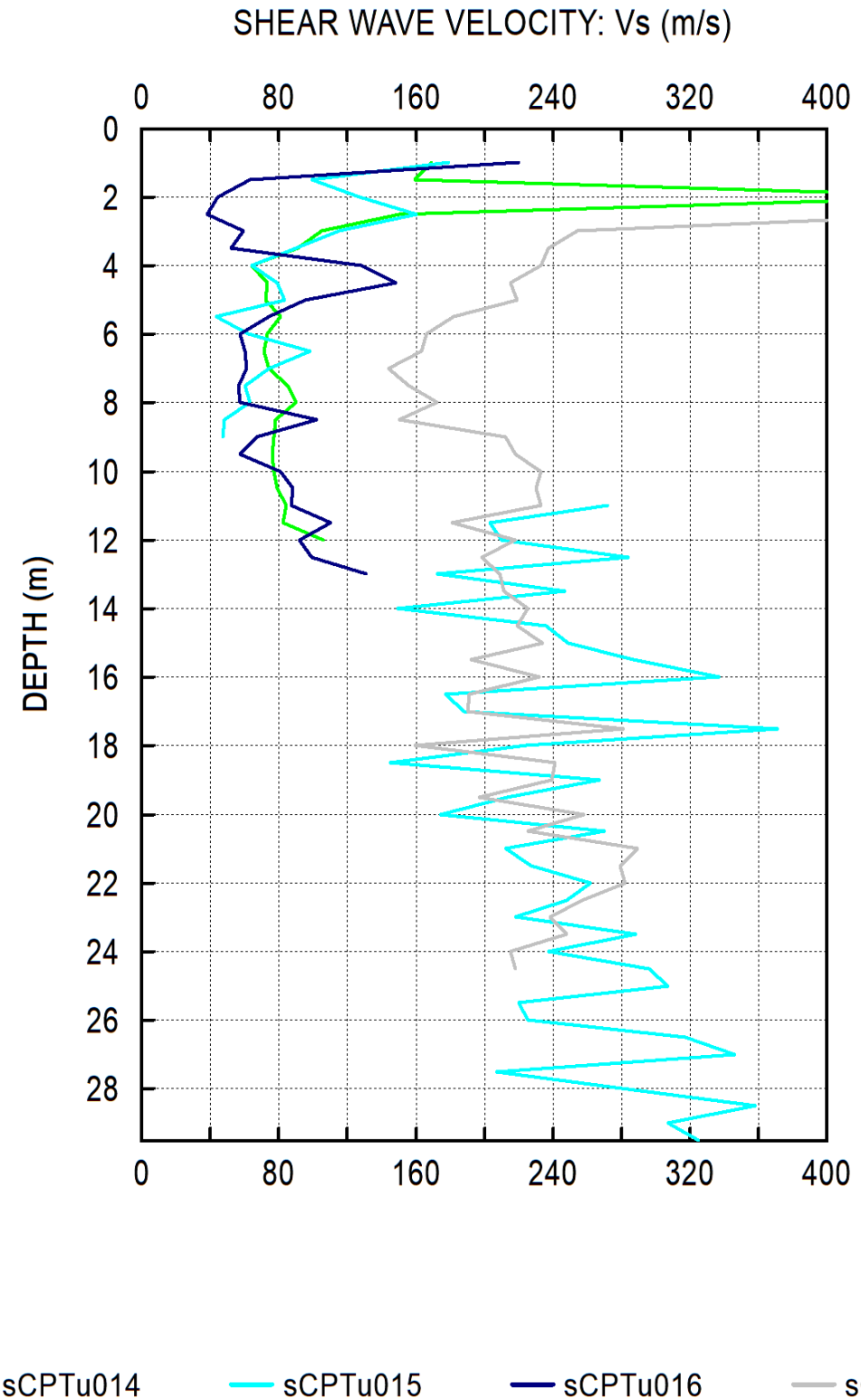
SUPERIMPOSED TEST RESULTS



DMT001 DMT002 DMT003 DMT004
DMT005 DMT006 DMT007 DMT008
DMT009 DMT010

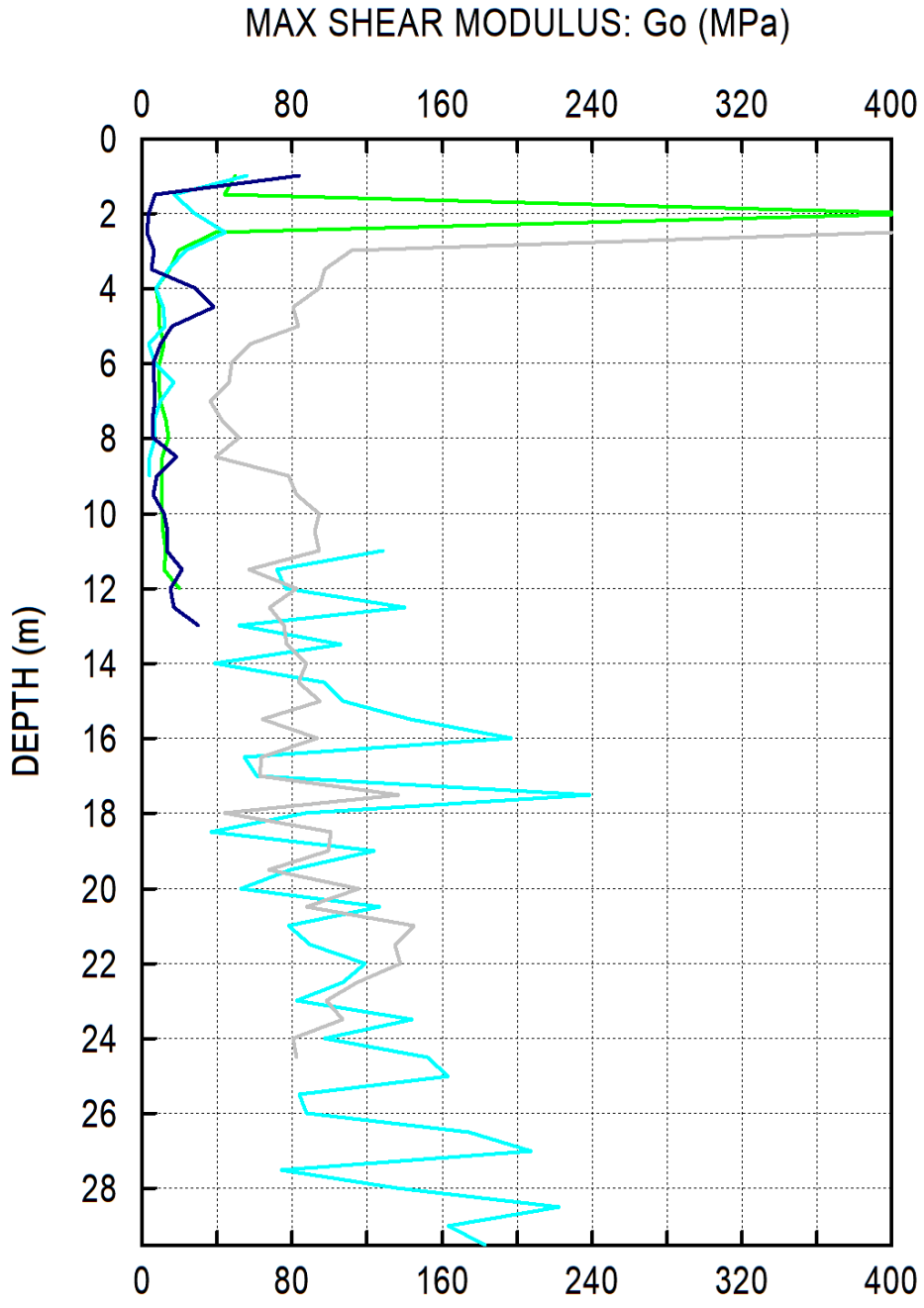
McMillan Drilling	ENGEO
302219	Pukekohe Park

SUPERIMPOSED TEST RESULTS



McMillan Drilling	ENGEO
302219	Pukekohe Park

SUPERIMPOSED TEST RESULTS



DMT001	LEGEND	INTERPRETED PARAMETERS	GENERAL PARAMETERS
26 MAR 2024	Z = Depth Below Ground Level	Phi = Safe floor value of Friction Angle	DeltaA = 18 kPa
McMillan Drilling	Po,P1,P2 = Corrected A,B,C readings	Ko = In situ earth press. coeff.	DeltaB = 35 kPa
ENGEO	Id = Material Index	M = Constrained modulus (at Sigma')	GammaTop = 17.0 kN/m^3
302219	Ed = Dilatometer Modulus	Cu = Undrained shear strength	FactorEd = 34.7
Pukekohe Park	Ud = Pore Press. Index = (P2-Uo)/(Po-Uo)	Ocr = Overconsolidation ratio	Zm = 0.0 kPa
1769627.86mE, 5879733.77mN NZTM	Gamma = Bulk unit weight	(OCR = 'relative OCR'- generally	Zabs = 0.0 m
	Sigma' = Effective overb. stress	realistic. If accurate independent OCR	Zw = 1.4 m
	Uo = Pore pressure	available, apply suitable factor)	

WaterTable at 1.40 m
Reduction formulae according to Marchetti, ASCE Geot.Jnl.Mar. 1980, Vol.109, 299-321; Phi according to TC16 ISSMGE, 2001

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT001 DESCRIPTION
0.2	150	362		160	327		16.7	3	0	1.04	47.1	5.8		4.4	>99.9		23.0	39	SILT
0.4	208	482		215	447		16.7	7	0	1.08	31.9	8.1		3.6	75.5		29.0	47	SILT
0.6	99	399		105	364		16.7	10	0	2.48	10.4	9.0				41	22.8		SILTY SAND
0.8	100	299		111	264		15.7	13	0	1.38	8.3	5.3					12.3		SANDY SILT
1.0	50	218		62	183		16.7	17	0	1.94	3.8	4.2				36	6.6		SILTY SAND
1.2	68	224		81	189		15.7	20	0	1.34	4.1	3.8					6.1		SANDY SILT
1.4	118	291		130	256		15.7	23	0	0.97	5.6	4.4		1.3	5.1		8.4	19	SILT
1.6	99	290		110	255		15.7	24	2	1.34	4.5	5.0					8.6		SANDY SILT
1.8	197	364		209	329		16.7	25	4	0.58	8.1	4.2		1.6	8.9		9.5	32	SILTY CLAY
2.0	138	246		153	211		15.7	27	6	0.39	5.5	2.0		1.2	4.9		3.8	21	SILTY CLAY
2.2	131	213		148	178		14.7	28	8	0.22	5.0	1.1		1.2	4.2		1.9	19	MUD
2.4	128	206		145	171		14.7	29	10	0.19	4.7	0.9		1.1	3.8		1.6	18	MUD
2.6	145	228		162	193		14.7	30	12	0.21	5.0	1.1		1.2	4.2		2.0	21	MUD
2.8	164	322		177	287		15.7	31	14	0.68	5.3	3.8		1.2	4.6		7.1	23	CLAYEY SILT
3.0	149	248		165	213		15.7	32	16	0.32	4.6	1.7		1.1	3.7		2.9	20	CLAY
3.2	174	445		181	410		16.7	33	18	1.40	4.9	7.9					14.4		SANDY SILT
3.4	188	291		204	256		15.7	35	20	0.29	5.3	1.8		1.2	4.6		3.4	26	CLAY
3.6	217	897		204	862		17.7	36	22	3.62	5.1	22.8				37	43.7		SAND
3.8	458	1435		430	1400		18.6	37	24	2.39	10.9	33.7				41	86.9		SILTY SAND

DMT002	LEGEND	INTERPRETED PARAMETERS	GENERAL PARAMETERS
25 MAR 2024	Z = Depth Below Ground Level	Phi = Safe floor value of Friction Angle	DeltaA = 14 kPa
McMillan Drilling	Po,P1,P2 = Corrected A,B,C readings	Ko = In situ earth press. coeff.	DeltaB = 52 kPa
ENGEO	Id = Material Index	M = Constrained modulus (at Sigma')	GammaTop = 17.0 kN/m^3
302219	Ed = Dilatometer Modulus	Cu = Undrained shear strength	FactorEd = 34.7
Pukekohe Park	Ud = Pore Press. Index = (P2-Uo)/(Po-Uo)	Ocr = Overconsolidation ratio	Zm = 0.0 kPa
1769708.56mE, 5879468.72mN NZTM	Gamma = Bulk unit weight	(OCR = 'relative OCR'- generally	Zabs = 0.0 m
	Sigma' = Effective overb. stress	realistic. If accurate independent OCR	Zw = 1.2 m
	Uo = Pore pressure	available, apply suitable factor)	

WaterTable at 1.20 m
Reduction formulae according to Marchetti, ASCE Geot.Jnl.Mar. 1980, Vol.109, 299-321; Phi according to TC16 ISSMGE, 2001

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT002 DESCRIPTION
1.2	104	245		114	193		15.7	20	0	0.69	5.6	2.7		1.3	5.0		5.2	16	CLAYEY SILT
1.4	23	235		30	183		16.7	22	2	5.53	1.3	5.3				30	4.5		SAND
1.6	138	495		137	443		17.7	23	4	2.29	5.8	10.6				38	21.3		SILTY SAND
1.8	181	574		179	522		17.7	25	6	1.99	7.0	11.9				39	25.9		SILTY SAND
2.0	252	608		252	556		16.7	26	8	1.25	9.3	10.6					25.7		SANDY SILT
2.2	313	558		318	506		16.7	27	10	0.61	11.2	6.5		2.0	14.8		17.0	52	CLAYEY SILT
2.4	630	1365		611	1313		19.1	29	12	1.17	20.8	24.4		2.8	38.6		77.8	118	SILT
2.6	1470	3414		1390	3362		20.6	31	14	1.43	44.8	68.4					268.3		SANDY SILT
2.8	1957	4075		1868	4023		20.6	33	16	1.16	56.4	74.8		4.9	>99.9		309.3	470	SILT
3.0	1508	2725		1464	2673		20.6	35	18	0.84	41.3	41.9		4.1	>99.9		161.2	339	SILT
3.2	855	1699		830	1647		19.1	37	20	1.01	21.8	28.3		2.9	41.6		91.8	162	SILT
3.4	197	395		204	343		16.7	39	22	0.76	4.7	4.8		1.1	3.8		8.3	25	CLAYEY SILT
3.6	277	657		275	605		16.7	40	24	1.31	6.2	11.4					23.3		SANDY SILT
3.8	801	1586		779	1534		19.1	42	26	1.00	18.0	26.2		2.6	31.0		80.1	144	SILT
4.0	627	1160		618	1108		17.7	44	27	0.83	13.5	17.0		2.2	19.8		47.4	105	SILT
4.2	737	1796		701	1744		19.1	45	29	1.55	14.9	36.2					104.0		SANDY SILT
4.4	1092	2058		1061	2006		19.1	47	31	0.92	21.9	32.8		2.9	41.8		106.3	206	SILT
4.6	893	1679		871	1627		19.1	49	33	0.90	17.1	26.2		2.5	28.5		78.9	158	SILT
4.8	888	1570		871	1518		19.1	51	35	0.77	16.5	22.4		2.5	26.8		66.7	156	CLAYEY SILT
5.0	911	1512		898	1460		19.1	53	37	0.65	16.3	19.5		2.5	26.6		57.8	160	CLAYEY SILT
5.2	740	1531		718	1479		19.1	55	39	1.12	12.4	26.4		2.1	17.4		71.5	118	SILT
5.4	426	736		428	684		17.7	56	41	0.66	6.9	8.9		1.4	6.8		18.8	58	CLAYEY SILT
5.6	286	499		293	447		16.7	58	43	0.62	4.3	5.4		1.0	3.3		8.8	33	CLAYEY SILT
5.8	373	702		374	650		17.7	59	45	0.84	5.5	9.6		1.2	4.9		18.2	47	SILT
6.0	357	720		356	668		17.7	61	47	1.01	5.1	10.8		1.2	4.3		19.7	43	SILT
6.2	268	521		273	469		16.7	62	49	0.88	3.6	6.8		0.90	2.5		10.0	28	SILT
6.4	303	724		299	672		16.7	64	51	1.50	3.9	12.9					20.5		SANDY SILT
6.6	293	608		295	556		16.7	65	53	1.08	3.7	9.1		0.93	2.6		13.7	31	SILT
6.8	242	467		248	415		16.7	67	55	0.86	2.9	5.8		0.76	1.8		7.3	23	SILT
7.0	228	494		232	442		16.7	68	57	1.20	2.6	7.3		0.69	1.5		8.5	21	SILT
7.2	316	679		315	627		16.7	69	59	1.22	3.7	10.8					16.4		SANDY SILT
7.4	389	734		389	682		17.7	71	61	0.89	4.6	10.2		1.1	3.7		17.6	45	SILT
7.6	379	643		383	591		16.7	72	63	0.65	4.4	7.2		1.1	3.5		12.0	43	CLAYEY SILT
7.8	362	681		363	629		16.7	74	65	0.89	4.1	9.2		0.99	3.0		14.7	39	SILT
8.0	295	699		292	647		16.7	75	67	1.57	3.0	12.3					16.5		SANDY SILT
8.2	328	824		321	772		17.7	76	69	1.79	3.3	15.7					22.7		SANDY SILT
8.4	363	879		355	827		17.7	78	71	1.66	3.6	16.4					25.2		SANDY SILT
8.6	369	823		364	771		17.7	80	73	1.40	3.7	14.1					21.5		SANDY SILT
8.8	368	734		367	682		17.7	81	75	1.08	3.6	10.9		0.91	2.5		16.2	37	SILT
9.0	684	1301		670	1249		19.1	83	77	0.97	7.2	20.1		1.5	7.4		43.5	90	SILT
9.2	620	1141		611	1089		17.7	85	78	0.90	6.3	16.6		1.4	6.0		33.7	78	SILT
9.4	443	799		443	747		17.7	86	80	0.84	4.2	10.6		1.0	3.2		17.2	48	SILT
9.6	573	1085		565	1033		17.7	88	82	0.97	5.5	16.3		1.2	4.9		30.9	68	SILT

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT002 DESCRIPTION
9.8	391	750		390	698		17.7	89	84	1.01	3.4	10.7		0.87	2.3		15.3	39	SILT
10.0	459	831		458	779		17.7	91	86	0.87	4.1	11.1		1.0	3.1		17.8	49	SILT
10.2	614	1077		608	1025		17.7	92	88	0.80	5.6	14.5		1.3	5.0		27.7	74	SILT
10.4	507	924		503	872		17.7	94	90	0.89	4.4	12.8		1.1	3.4		21.4	55	SILT
10.6	660	1138		653	1086		17.7	96	92	0.77	5.9	15.0		1.3	5.4		29.4	81	CLAYEY SILT
10.8	576	859		579	807		17.7	97	94	0.47	5.0	7.9		1.2	4.2		14.1	67	SILTY CLAY
11.0	376	628		381	576		16.7	99	96	0.69	2.9	6.8		0.76	1.8		8.4	34	CLAYEY SILT
11.2	438	766		439	714		17.7	100	98	0.81	3.4	9.5		0.87	2.3		13.5	43	SILT
11.4	540	1182		525	1130		17.7	102	100	1.42	4.2	21.0					34.7		SANDY SILT
11.6	398	739		398	687		16.7	103	102	0.97	2.9	10.0		0.76	1.8		12.5	36	SILT
11.8	393	729		394	677		16.7	105	104	0.98	2.8	9.8		0.73	1.7		12.0	35	SILT
12.0	367	712		367	660		16.7	106	106	1.12	2.5	10.2		0.66	1.4		11.3	30	SILT
12.2	373	850		366	798		17.7	107	108	1.67	2.4	15.0					17.1		SANDY SILT
12.4	357	839		350	787		18.6	109	110	1.82	2.2	15.2				33	16.2		SILTY SAND
12.6	343	737		341	685		16.7	111	112	1.51	2.1	12.0					11.7		SANDY SILT
12.8	352	680		353	628		16.7	112	114	1.15	2.1	9.5		0.58	1.1		9.3	27	SILT
13.0	367	683		369	631		16.7	113	116	1.04	2.2	9.1		0.60	1.2		9.1	29	SILT
13.2	504	872		503	820		17.7	115	118	0.82	3.4	11.0		0.86	2.2		15.4	48	SILT
13.4	406	733		407	681		16.7	116	120	0.95	2.5	9.5		0.66	1.4		10.4	33	SILT
13.6	394	799		391	747		17.7	118	122	1.32	2.3	12.4					13.1		SANDY SILT
13.8	341	629		344	577		16.7	119	124	1.06	1.8	8.1		0.50	0.89		6.9	24	SILT
14.0	391	716		392	664		16.7	121	126	1.02	2.2	9.4		0.60	1.2		9.4	30	SILT
14.2	367	645		370	593		16.7	122	128	0.92	2.0	7.7		0.54	0.99		6.8	27	SILT
14.4	377	673		380	621		16.7	123	129	0.97	2.0	8.4		0.55	1.0		7.6	28	SILT
14.6	342	636		345	584		16.7	125	131	1.12	1.7	8.3		0.46	<0.8		7.1	23	SILT
14.8	345	616		349	564		16.7	126	133	1.00	1.7	7.5		0.46	<0.8		6.3	23	SILT
15.0	350	622		354	570		16.7	128	135	0.99	1.7	7.5		0.46	<0.8		6.4	23	SILT
15.2	359	658		361	606		16.7	129	137	1.09	1.7	8.5		0.47	0.81		7.2	24	SILT
15.4	389	710		390	658		16.7	130	139	1.07	1.9	9.3		0.52	0.95		8.0	27	SILT
15.6	389	700		391	648		16.7	132	141	1.03	1.9	8.9		0.52	0.92		7.6	27	SILT
15.8	376	687		378	635		16.7	133	143	1.10	1.8	8.9		0.48	0.82		7.6	25	SILT
16.0	408	715		410	663		16.7	134	145	0.96	2.0	8.8		0.54	0.98		7.7	29	SILT
16.2	561	998		556	946		17.7	136	147	0.95	3.0	13.5		0.79	1.9		17.6	50	SILT
16.4	487	955		481	903		17.7	137	149	1.27	2.4	14.6					16.2		SANDY SILT
16.6	403	806		400	754		16.7	139	151	1.42	1.8	12.3					10.4		SANDY SILT
16.8	401	836		397	784		16.7	140	153	1.59	1.7	13.4					11.4		SANDY SILT
17.0	386	777		384	725		16.7	142	155	1.49	1.6	11.8					10.1		SANDY SILT
17.2	541	1399		515	1347		18.6	143	157	2.32	2.5	28.9				33	35.7		SILTY SAND
17.4	414	1039		400	987		18.6	145	159	2.43	1.7	20.4				31	17.9		SILTY SAND
17.6	471	1115		456	1063		18.6	147	161	2.06	2.0	21.1				32	21.3		SILTY SAND
17.8	528	1115		516	1063		17.7	148	163	1.55	2.4	19.0					21.2		SANDY SILT
18.0	561	1090		552	1038		17.7	150	165	1.26	2.6	16.9					19.7		SANDY SILT
18.2	555	1179		541	1127		17.7	151	167	1.57	2.5	20.3					23.5		SANDY SILT
18.4	707	1593		680	1541		19.1	153	169	1.68	3.3	29.9					43.4		SANDY SILT
18.6	741	1688		711	1636		19.1	155	171	1.71	3.5	32.1					48.0		SANDY SILT
18.8	704	1829		665	1777		19.6	157	173	2.26	3.1	38.6				35	55.5		SILTY SAND
19.0	429	871		424	819		17.7	159	175	1.58	1.6	13.7					11.6		SANDY SILT
19.2	455	898		450	846		17.7	160	177	1.45	1.7	13.7					11.7		SANDY SILT
19.4	486	925		481	873		17.7	162	179	1.29	1.9	13.6					11.7		SANDY SILT
19.6	651	1431		629	1379		17.7	163	181	1.67	2.7	26.0					32.9		SANDY SILT
19.8	565	1136		554	1084		17.7	165	182	1.43	2.3	18.4					19.4		SANDY SILT
20.0	447	889		442	837		17.7	167	184	1.53	1.5	13.7					11.6		SANDY SILT
20.2	587	1261		571	1209		17.7	168	186	1.66	2.3	22.2					24.1		SANDY SILT
20.4	649	1410		628	1358		17.7	170	188	1.66	2.6	25.3					30.6		SANDY SILT
20.6	720	1508		698	1456		19.1	171	190	1.49	3.0	26.3					34.8		SANDY SILT
20.8	775	1764		743	1712		19.1	173	192	1.76	3.2	33.6					47.5		SANDY SILT
21.0	772	1647		746	1595		19.1	175	194	1.54	3.2	29.5					40.9		SANDY SILT
21.2	659	1359		641	1307		17.7	177	196	1.50	2.5	23.1					26.9		SANDY SILT
21.4	504	1139		490	1087		18.6	178	198	2.05	1.6	20.7				31	17.6		SILTY SAND

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT002 DESCRIPTION
21.6	773	1573		750	1521		19.1	180	200	1.40	3.1	26.7					36.0		SANDY SILT
21.8	1292	2559		1246	2507		20.6	182	202	1.21	5.7	43.8					85.4		SANDY SILT
22.0	974	2176		931	2124		19.1	184	204	1.64	3.9	41.4					66.6		SANDY SILT
22.2	956	1330		955	1278		18.6	186	206	0.43	4.0	11.2		0.99	3.0		17.6	98	SILTY CLAY
22.4	1072	1445		1071	1393		18.6	188	208	0.37	4.6	11.2		1.1	3.7		19.0	117	SILTY CLAY
22.6	1061	1334		1065	1282		17.7	190	210	0.25	4.5	7.5		1.1	3.6		12.7	115	CLAY
22.8	633	1256		619	1204		17.7	191	212	1.44	2.1	20.3					20.3		SANDY SILT
23.0	654	1188		645	1136		17.7	193	214	1.14	2.2	17.1		0.61	1.2		17.3	49	SILT
23.2	1273	1792		1264	1740		18.6	194	216	0.45	5.4	16.5		1.2	4.7		30.8	148	SILTY CLAY
23.4	998	2522		939	2470		19.6	196	218	2.12	3.7	53.1				36	83.6		SILTY SAND
23.6	777	1946		736	1894		19.6	198	220	2.24	2.6	40.2				34	50.9		SILTY SAND
23.8	899	2159		853	2107		19.6	200	222	1.98	3.2	43.5				35	61.9		SILTY SAND
24.0	1391	1855		1385	1803		18.6	202	224	0.36	5.8	14.5		1.3	5.2		28.0	166	SILTY CLAY
24.2	1344	1777		1340	1725		18.6	204	226	0.35	5.5	13.4		1.2	4.8		25.2	158	SILTY CLAY
24.4	1155	1552		1152	1500		18.6	206	228	0.38	4.5	12.1		1.1	3.6		20.3	125	SILTY CLAY
24.6	1124	1436		1126	1384		18.6	207	230	0.29	4.3	9.0		1.0	3.3		14.7	120	CLAY
24.8	1219	1763		1209	1711		18.6	209	232	0.51	4.7	17.4		1.1	3.8		30.0	133	SILTY CLAY
25.0	1631	2477		1606	2425		20.1	211	233	0.60	6.5	28.4		1.4	6.3		58.5	203	SILTY CLAY
25.2	2122	3349		2078	3297		20.6	213	235	0.66	8.7	42.3		1.7	9.9		99.5	292	CLAYEY SILT
25.4	1176	1885		1158	1833		19.1	215	237	0.73	4.3	23.4		1.0	3.3		38.4	122	CLAYEY SILT
25.6	1495	2703		1452	2651		20.6	217	239	0.99	5.6	41.6		1.3	5.0		79.8	172	SILT
25.8	2140	3762		2076	3710		20.6	219	241	0.89	8.4	56.7		1.6	9.4		131.6	289	SILT
26.0	2007	3294		1960	3242		20.6	221	243	0.75	7.8	44.5		1.6	8.3		99.8	265	CLAYEY SILT
26.2	2091	2948		2065	2896		20.1	223	245	0.46	8.1	28.8		1.6	9.0		66.0	284	SILTY CLAY
26.4	1700	2246		1690	2194		18.6	225	247	0.35	6.4	17.5		1.4	6.2		35.7	212	SILTY CLAY
26.6	1635	2666		1601	2614		20.6	227	249	0.75	5.9	35.2		1.3	5.5		69.4	195	CLAYEY SILT
26.8	2112	3106		2080	3054		20.1	229	251	0.53	8.0	33.8		1.6	8.7		76.7	284	SILTY CLAY
27.0	1914	2507		1902	2455		20.1	231	253	0.34	7.1	19.2		1.5	7.3		41.3	249	SILTY CLAY
27.2	2078	2846		2057	2794		20.1	233	255	0.41	7.7	25.6		1.6	8.2		57.2	278	SILTY CLAY
27.4	2488	3717		2444	3665		20.1	236	257	0.56	9.3	42.4		1.8	11.0		102.7	353	SILTY CLAY
27.6	2018	2994		1987	2942		20.1	238	259	0.55	7.3	33.2		1.5	7.5		72.1	262	SILTY CLAY
27.8	1226	1675		1221	1623		18.6	240	261	0.42	4.0	14.0		0.99	3.0		21.8	126	SILTY CLAY
28.0	1115	1398		1118	1346		17.7	241	263	0.27	3.5	7.9		0.90	2.4		11.4	109	CLAY
28.2	1131	1442		1133	1390		18.6	243	265	0.30	3.6	8.9		0.90	2.5		12.9	110	CLAY
28.4	1325	1831		1317	1779		18.6	245	267	0.44	4.3	16.0		1.0	3.3		26.2	140	SILTY CLAY
28.6	1916	2708		1894	2656		20.1	247	269	0.47	6.6	26.5		1.4	6.4		54.8	241	SILTY CLAY
28.8	1796	2585		1774	2533		20.1	249	271	0.51	6.0	26.3		1.3	5.6		52.3	218	SILTY CLAY
29.0	1697	2323		1683	2271		20.1	251	273	0.42	5.6	20.4		1.3	5.0		39.0	201	SILTY CLAY
29.2	2039	3156		2000	3104		20.6	253	275	0.64	6.8	38.3		1.4	6.8		80.8	258	CLAYEY SILT
29.4	1740	2396		1725	2344		20.1	255	277	0.43	5.7	21.5		1.3	5.1		41.3	207	SILTY CLAY
29.6	1512	1992		1505	1940		18.6	257	279	0.35	4.8	15.1		1.1	3.9		26.3	168	SILTY CLAY
29.8	1264	1679		1261	1627		18.6	259	281	0.37	3.8	12.7		0.94	2.7		19.1	126	SILTY CLAY
30.0	1103	1777		1087	1725		19.1	260	283	0.79	3.1	22.2		0.80	2.0		29.0	99	CLAYEY SILT

DMT003

26 MAR 2024

McMillan Drilling
ENGEO
302219
Pukekohe Park
1769793.24mE, 5879758.10mN NZTM

LEGEND
Z = Depth Below Ground Level
Po,P1,P2 = Corrected A,B,C readings
Id = Material Index
Ed = Dilatometer Modulus
Ud = Pore Press. Index = (P2-Uo)/(Po-Uo)
Gamma = Bulk unit weight
Sigma' = Effective overb. stress
Uo = Pore pressure

INTERPRETED PARAMETERS
Phi = Safe floor value of Friction Angle
Ko = In situ earth press. coeff.
M = Constrained modulus (at Sigma')
Cu = Undrained shear strength
Ocr = Overconsolidation ratio
(OCR = 'relative OCR'- generally realistic. If accurate independent OCR available, apply suitable factor)

GENERAL PARAMETERS
DeltaA = 18 kPa
DeltaB = 35 kPa
GammaTop = 17.0 kN/m^3
FactorEd = 34.7
Zm = 0.0 kPa
Zabs = 0.0 m
Zw = 1.4 m

WaterTable at 1.40 m
Reduction formulae according to Marchetti, ASCE Geot.Jnl.Mar. 1980, Vol.109, 299-321; Phi according to TC16 ISSMGE, 2001

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT003 DESCRIPTION
0.2	408	859		406	824		17.7	3	0	1.03	>99.9	14.5		6.6	>99.9		67.9	99	SILT
0.4	178	424		186	389		16.7	7	0	1.09	26.9	7.0		3.3	57.7		24.2	39	SILT
0.6	151	449		157	414		16.7	10	0	1.64	15.3	8.9					25.9		SANDY SILT
0.8	169	427		177	392		16.7	14	0	1.22	13.0	7.5					20.5		SANDY SILT
1.0	172	365		183	330		16.7	17	0	0.80	10.8	5.1		1.9	13.9		13.1	31	SILT
1.2	113	230		128	195		15.7	20	0	0.53	6.3	2.3		1.4	6.0		4.7	19	SILTY CLAY
1.4	76	159		93	124		14.7	23	0	0.34	4.0	1.1		0.98	2.9		1.7	12	MUD
1.6	113	185		130	150		14.7	24	2	0.16	5.3	0.7		1.2	4.5		1.3	18	MUD
1.8	110	200		126	165		15.7	25	4	0.32	4.8	1.3		1.1	3.9		2.4	17	CLAY
2.0	136	213		153	178		14.7	27	6	0.17	5.5	0.9		1.2	4.9		1.7	21	MUD
2.2	159	220		177	185		13.7	28	8	0.05	6.1	0.3		1.3	5.8		0.6	25	MUD AND/OR PEAT
2.4	194	289		210	254		15.7	28	10	0.22	7.1	1.5		1.5	7.2		3.3	30	CLAY
2.6	167	254		183	219		15.7	29	12	0.21	5.8	1.2		1.3	5.3		2.4	25	CLAY
2.8	164	256		180	221		15.7	31	14	0.25	5.4	1.4		1.2	4.8		2.7	23	CLAY
3.0	180	274		196	239		15.7	32	16	0.24	5.7	1.5		1.3	5.1		2.9	26	CLAY
3.2	185	329		198	294		15.7	33	18	0.53	5.5	3.3		1.2	4.8		6.2	26	SILTY CLAY
3.4	171	339		183	304		15.7	34	20	0.74	4.8	4.2		1.1	3.9		7.3	22	CLAYEY SILT
3.6	195	340		208	305		15.7	35	22	0.52	5.3	3.4		1.2	4.6		6.2	26	SILTY CLAY
3.8	319	682		322	647		17.7	37	24	1.09	8.2	11.3		1.6	9.0		25.9	47	SILT
4.0	283	678		284	643		16.7	38	26	1.39	6.8	12.5					26.4		SANDY SILT
4.2	214	571		217	536		16.7	40	27	1.69	4.8	11.1					19.9		SANDY SILT
4.4	224	599		226	564		16.7	41	29	1.72	4.8	11.7					21.1		SANDY SILT
4.6	171	515		174	480		17.7	42	31	2.14	3.4	10.6				35	15.9		SILTY SAND
4.8	203	603		204	568		17.7	44	33	2.14	3.9	12.6				36	20.6		SILTY SAND
5.0	191	537		194	502		17.7	45	35	1.93	3.5	10.7				35	16.2		SILTY SAND
5.2	203	636		202	601		17.7	47	37	2.42	3.5	13.8				35	21.5		SILTY SAND
5.4	383	970		374	935		17.7	49	39	1.67	6.9	19.5					41.8		SANDY SILT
5.6	210	758		203	723		17.7	50	41	3.21	3.2	18.0				35	27.4		SILTY SAND
5.8	491	1316		470	1281		18.6	52	43	1.90	8.3	28.1				40	65.3		SILTY SAND
6.0	607	1642		576	1607		19.6	53	45	1.94	9.9	35.8				40	89.2		SILTY SAND
6.2	356	1087		340	1052		18.6	55	47	2.43	5.3	24.7				37	47.5		SILTY SAND
6.4	348	1095		331	1060		18.6	57	49	2.58	4.9	25.3				37	47.2		SILTY SAND
6.6	621	1753		585	1718		19.6	59	51	2.12	9.1	39.3				40	94.7		SILTY SAND
6.8	736	1661		710	1626		19.1	61	53	1.39	10.8	31.8					81.7		SANDY SILT
7.0	470	1173		456	1138		17.7	63	55	1.70	6.4	23.7					49.1		SANDY SILT
7.2	445	1163		430	1128		18.6	64	57	1.87	5.8	24.2				38	48.1		SILTY SAND
7.4	775	1765		746	1730		19.1	66	59	1.43	10.4	34.1					86.6		SANDY SILT
7.6	392	1209		372	1174		18.6	68	61	2.58	4.6	27.8				37	50.1		SILTY SAND
7.8	228	740		223	705		17.7	70	63	3.01	2.3	16.7				33	20.5		SILTY SAND
8.0	289	781		285	746		17.7	71	65	2.09	3.1	16.0				35	22.6		SILTY SAND
8.2	259	710		257	675		17.7	73	67	2.19	2.6	14.5				34	18.3		SILTY SAND
8.4	384	1011		373	976		18.6	74	69	1.98	4.1	20.9				36	34.8		SILTY SAND
8.6	765	2306		709	2271		19.6	76	71	2.45	8.4	54.2				40	126.8		SILTY SAND

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT003 DESCRIPTION
8.8	345	909		337	874		18.6	78	73	2.03	3.4	18.6				35	27.8		SILTY SAND
9.0	804	1929		768	1894		19.1	80	75	1.62	8.7	39.1					92.4		SANDY SILT
9.2	603	1592		574	1557		19.6	82	77	1.97	6.1	34.1				38	69.4		SILTY SAND
9.4	691	1757		658	1722		19.6	84	78	1.83	6.9	36.9				39	79.5		SILTY SAND
9.6	841	2028		802	1993		19.1	86	80	1.65	8.4	41.3					96.5		SANDY SILT
9.8	809	1933		773	1898		19.1	88	82	1.63	7.9	39.0					88.7		SANDY SILT
10.0	479	1181		465	1146		17.7	89	84	1.79	4.3	23.6					40.0		SANDY SILT
10.2	438	1209		420	1174		18.6	91	86	2.26	3.7	26.2				36	41.3		SILTY SAND
10.4	535	1276		519	1241		17.7	93	88	1.68	4.6	25.1					44.3		SANDY SILT
10.6	479	1280		460	1245		18.6	94	90	2.13	3.9	27.3				36	44.5		SILTY SAND
10.8	523	1345		503	1310		18.6	96	92	1.97	4.3	28.0				36	47.7		SILTY SAND
11.0	582	1469		558	1434		19.6	98	94	1.89	4.7	30.4				37	54.6		SILTY SAND
11.2	690	1693		660	1658		19.1	100	96	1.77	5.7	34.6					67.8		SANDY SILT
11.4	578	1523		551	1488		19.6	102	98	2.07	4.5	32.5				37	56.8		SILTY SAND
11.6	541	1333		522	1298		18.6	104	100	1.84	4.1	26.9				36	44.5		SILTY SAND
11.8	1212	2630		1162	2595		20.6	105	102	1.35	10.1	49.7					124.6		SANDY SILT
12.0	1286	2798		1231	2763		20.6	108	104	1.36	10.5	53.2					135.2		SANDY SILT

DMT004	LEGEND	INTERPRETED PARAMETERS	GENERAL PARAMETERS
26 MAR 2024	Z = Depth Below Ground Level	Phi = Safe floor value of Friction Angle	DeltaA = 16 kPa
McMillan Drilling	Po,P1,P2 = Corrected A,B,C readings	Ko = In situ earth press. coeff.	DeltaB = 35 kPa
ENGEO	Id = Material Index	M = Constrained modulus (at Sigma')	GammaTop = 17.0 kN/m^3
302219	Ed = Dilatometer Modulus	Cu = Undrained shear strength	FactorEd = 34.7
Pukekohe Park	Ud = Pore Press. Index = (P2-Uo)/(Po-Uo)	Ocr = Overconsolidation ratio	Zm = 0.0 kPa
1769990.93mE, 5879891.46mN NZTM	Gamma = Bulk unit weight	(OCR = 'relative OCR'- generally	Zabs = 0.0 m
	Sigma' = Effective overb. stress	realistic. If accurate independent OCR	Zw = 1.9 m
	Uo = Pore pressure	available, apply suitable factor)	

WaterTable at 1.90 m
Reduction formulae according to Marchetti, ASCE Geot.Jnl.Mar. 1980, Vol.109, 299-321; Phi according to TC16 ISSMGE, 2001

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT004 DESCRIPTION
0.2	108	309		117	274		15.7	3	0	1.35	34.3	5.5					20.0		SANDY SILT
0.4	153	353		162	318		16.7	7	0	0.97	24.7	5.4		3.1	50.6		18.2	33	SILT
0.6	75	238		85	203		15.7	10	0	1.38	8.6	4.1					9.6		SANDY SILT
0.8	93	257		103	222		15.7	13	0	1.15	7.9	4.1		1.6	8.6		9.4	16	SILT
1.0	126	265		138	230		15.7	16	0	0.67	8.5	3.2		1.7	9.6		7.5	22	CLAYEY SILT
1.2	89	223		101	188		15.7	19	0	0.86	5.2	3.0		1.2	4.5		5.6	14	SILT
1.4	95	200		108	165		15.7	22	0	0.52	4.8	2.0		1.1	4.0		3.5	15	SILTY CLAY
1.6	90	163		105	128		14.7	26	0	0.22	4.1	0.8		1.0	3.1		1.3	14	MUD
1.8	97	165		112	130		14.7	29	0	0.16	3.9	0.6		0.97	2.9		1.0	15	MUD
2.0	52	121		67	86		14.7	30	1	0.29	2.2	0.7		0.59	1.1		0.6	7	MUD
2.2	74	135		89	100		14.7	31	3	0.12	2.8	0.4		0.73	1.6		0.4	10	MUD
2.4	70	137		85	102		14.7	32	5	0.21	2.5	0.6		0.66	1.4		0.6	9	MUD
2.6	96	156		112	121		13.7	33	7	0.09	3.1	0.3		0.81	2.0		0.4	13	MUD AND/OR PEAT
2.8	95	162		110	127		14.7	34	9	0.17	3.0	0.6		0.78	1.9		0.7	12	MUD
3.0	109	175		124	140		14.7	35	11	0.14	3.2	0.5		0.83	2.1		0.7	14	MUD
3.2	112	179		127	144		14.7	36	13	0.15	3.2	0.6		0.82	2.1		0.8	14	MUD
3.4	137	204		152	169		14.7	37	15	0.12	3.7	0.6		0.93	2.6		0.9	18	MUD
3.6	124	190		139	155		14.7	38	17	0.13	3.2	0.5		0.83	2.1		0.7	15	MUD
3.8	149	216		164	181		14.7	39	19	0.12	3.7	0.6		0.93	2.6		0.9	19	MUD
4.0	134	221		148	186		15.7	40	21	0.30	3.2	1.3		0.82	2.1		1.7	16	CLAY
4.2	138	231		152	196		15.7	41	23	0.34	3.1	1.5		0.81	2.0		2.0	16	SILTY CLAY
4.4	200	391		209	356		16.7	42	25	0.80	4.3	5.1		1.0	3.4		8.5	25	CLAYEY SILT
4.6	221	701		216	666		17.7	44	26	2.38	4.3	15.6				36	27.1		SILTY SAND
4.8	171	259		185	224		15.7	45	28	0.25	3.5	1.3		0.88	2.3		1.9	20	CLAY
5.0	172	265		186	230		15.7	47	30	0.28	3.3	1.5		0.86	2.2		2.1	19	CLAY
5.2	165	257		179	222		15.7	48	32	0.29	3.1	1.5		0.80	2.0		1.9	18	CLAY
5.4	153	232		168	197		14.7	49	34	0.22	2.7	1.0		0.72	1.6		1.2	16	MUD
5.6	142	266		154	231		15.7	50	36	0.65	2.4	2.7		0.64	1.3		2.7	14	CLAYEY SILT
5.8	177	260		191	225		14.7	51	38	0.22	3.0	1.2		0.78	1.9		1.5	19	MUD
6.0	154	227		169	192		14.7	52	40	0.18	2.5	0.8		0.66	1.4		0.9	15	MUD
6.2	168	247		183	212		14.7	53	42	0.21	2.6	1.0		0.71	1.6		1.2	17	MUD
6.4	205	313		218	278		15.7	54	44	0.34	3.2	2.1		0.83	2.1		2.8	22	SILTY CLAY
6.6	207	310		220	275		15.7	55	46	0.31	3.2	1.9		0.82	2.0		2.5	21	CLAY
6.8	163	258		177	223		15.7	56	48	0.36	2.3	1.6		0.62	1.2		1.6	15	SILTY CLAY
7.0	144	225		159	190		14.7	58	50	0.29	1.9	1.1		0.51	0.91		0.9	12	MUD
7.2	170	384		178	349		15.7	59	52	1.36	2.2	5.9					5.9		SANDY SILT
7.4	190	278		204	243		15.7	60	54	0.26	2.5	1.3		0.67	1.4		1.5	17	CLAY
7.6	208	300		222	265		15.7	61	56	0.26	2.7	1.5		0.72	1.6		1.7	20	CLAY
7.8	203	316		216	281		15.7	62	58	0.41	2.5	2.3		0.68	1.5		2.5	18	SILTY CLAY
8.0	236	338		249	303		15.7	63	60	0.28	3.0	1.9		0.78	1.9		2.4	23	CLAY
8.2	263	410		274	375		15.7	64	62	0.47	3.3	3.5		0.85	2.2		4.8	26	SILTY CLAY
8.4	276	410		288	375		15.7	66	64	0.39	3.4	3.0		0.87	2.3		4.2	28	SILTY CLAY
8.6	182	265		196	230		14.7	67	66	0.26	2.0	1.2		0.53	0.97		1.0	14	MUD

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT004 DESCRIPTION
8.8	285	391		298	356		15.7	68	68	0.25	3.4	2.0		0.87	2.3		2.8	29	CLAY
9.0	298	452		309	417		16.7	69	70	0.45	3.5	3.8		0.88	2.4		5.3	30	SILTY CLAY
9.2	279	590		282	555		16.7	70	72	1.30	3.0	9.5					12.5		SANDY SILT
9.4	261	369		274	334		15.7	72	74	0.30	2.8	2.1		0.74	1.7		2.5	24	CLAY
9.6	269	376		282	341		15.7	73	76	0.28	2.8	2.0		0.75	1.7		2.5	25	CLAY
9.8	272	382		285	347		15.7	74	77	0.30	2.8	2.1		0.74	1.7		2.6	25	CLAY
10.0	275	382		288	347		15.7	75	79	0.28	2.8	2.0		0.73	1.7		2.4	25	CLAY
10.2	286	385		300	350		15.7	76	81	0.23	2.9	1.7		0.75	1.7		2.1	26	CLAY
10.4	299	421		311	386		15.7	78	83	0.33	2.9	2.6		0.77	1.8		3.2	28	CLAY
10.6	310	422		323	387		15.7	79	85	0.27	3.0	2.2		0.79	1.9		2.8	29	CLAY
10.8	325	449		337	414		15.7	80	87	0.31	3.1	2.7		0.81	2.0		3.5	31	CLAY
11.0	382	508		394	473		16.7	81	89	0.26	3.8	2.7		0.94	2.7		4.1	39	CLAY
11.2	371	578		379	543		16.7	82	91	0.57	3.5	5.7		0.89	2.4		8.1	36	SILTY CLAY
11.4	328	440		341	405		15.7	84	93	0.26	3.0	2.2		0.77	1.8		2.8	30	CLAY
11.6	345	444		359	409		15.7	85	95	0.19	3.1	1.7		0.81	2.0		2.3	32	CLAY
11.8	366	482		379	447		15.7	86	97	0.24	3.3	2.4		0.84	2.2		3.2	35	CLAY
12.0	350	462		363	427		15.7	87	99	0.24	3.0	2.2		0.79	1.9		2.8	32	CLAY
12.2	337	438		351	403		15.7	89	101	0.21	2.8	1.8		0.74	1.7		2.2	30	CLAY
12.4	341	447		354	412		15.7	90	103	0.23	2.8	2.0		0.74	1.7		2.4	30	CLAY
12.6	337	440		350	405		15.7	91	105	0.22	2.7	1.9		0.72	1.6		2.2	29	CLAY
12.8	344	452		357	417		15.7	92	107	0.24	2.7	2.1		0.72	1.6		2.4	30	CLAY
13.0	339	449		352	414		15.7	93	109	0.25	2.6	2.1		0.70	1.5		2.4	29	CLAY
13.2	340	452		353	417		15.7	94	111	0.26	2.6	2.2		0.69	1.5		2.5	28	CLAY
13.4	351	464		364	429		15.7	96	113	0.26	2.6	2.3		0.70	1.5		2.6	30	CLAY
13.6	364	481		377	446		15.7	97	115	0.26	2.7	2.4		0.72	1.6		2.8	31	CLAY
13.8	325	430		338	395		15.7	98	117	0.26	2.3	2.0		0.61	1.2		1.9	25	CLAY
14.0	330	435		343	400		15.7	99	119	0.25	2.3	2.0		0.61	1.2		1.9	25	CLAY
14.2	339	444		352	409		15.7	100	121	0.24	2.3	2.0		0.62	1.3		2.0	26	CLAY
14.4	357	465		370	430		15.7	101	123	0.24	2.4	2.1		0.66	1.4		2.2	29	CLAY
14.6	339	446		352	411		15.7	103	125	0.26	2.2	2.0		0.60	1.2		2.0	26	CLAY
14.8	360	471		373	436		15.7	104	127	0.26	2.4	2.2		0.64	1.3		2.2	28	CLAY
15.0	375	481		388	446		15.7	105	129	0.22	2.5	2.0		0.66	1.4		2.1	30	CLAY
15.2	367	482		380	447		15.7	106	130	0.27	2.3	2.3		0.63	1.3		2.4	29	CLAY
15.4	392	504		405	469		15.7	107	132	0.24	2.5	2.2		0.68	1.5		2.4	32	CLAY
15.6	396	506		409	471		15.7	109	134	0.23	2.5	2.1		0.68	1.4		2.3	32	CLAY
15.8	396	512		409	477		15.7	110	136	0.25	2.5	2.4		0.67	1.4		2.5	32	CLAY
16.0	429	549		442	514		16.7	111	138	0.24	2.7	2.5		0.73	1.6		2.9	36	CLAY
16.2	316	601		320	566		16.7	112	140	1.36	1.6	8.5					7.2		SANDY SILT
16.4	437	563		449	528		16.7	114	142	0.26	2.7	2.7		0.72	1.6		3.2	36	CLAY
16.6	431	553		443	518		16.7	115	144	0.25	2.6	2.6		0.69	1.5		2.9	35	CLAY
16.8	440	567		452	532		16.7	116	146	0.26	2.6	2.8		0.70	1.5		3.1	36	CLAY
17.0	446	572		458	537		16.7	118	148	0.25	2.6	2.7		0.70	1.5		3.1	37	CLAY
17.2	449	579		461	544		16.7	119	150	0.27	2.6	2.9		0.70	1.5		3.2	37	CLAY
17.4	454	587		466	552		16.7	121	152	0.27	2.6	3.0		0.70	1.5		3.3	37	CLAY
17.6	446	586		458	551		16.7	122	154	0.31	2.5	3.2		0.67	1.4		3.5	35	CLAY
17.8	455	597		466	562		16.7	123	156	0.31	2.5	3.3		0.68	1.4		3.6	36	CLAY
18.0	448	597		459	562		16.7	125	158	0.34	2.4	3.6		0.65	1.3		3.7	35	SILTY CLAY
18.2	443	569		455	534		16.7	126	160	0.27	2.3	2.7		0.63	1.3		2.8	34	CLAY
18.4	457	593		469	558		16.7	127	162	0.29	2.4	3.1		0.65	1.3		3.2	35	CLAY
18.6	456	607		467	572		16.7	129	164	0.35	2.4	3.6		0.64	1.3		3.7	35	SILTY CLAY
18.8	463	601		475	566		16.7	130	166	0.30	2.4	3.2		0.64	1.3		3.3	35	CLAY
19.0	455	586		467	551		16.7	132	168	0.28	2.3	2.9		0.62	1.2		2.9	34	CLAY
19.2	464	594		476	559		16.7	133	170	0.27	2.3	2.9		0.62	1.3		2.9	35	CLAY
19.4	446	577		458	542		16.7	134	172	0.29	2.1	2.9		0.58	1.1		2.7	32	CLAY
19.6	454	580		466	545		16.7	136	174	0.27	2.2	2.7		0.59	1.1		2.5	33	CLAY
19.8	451	589		463	554		16.7	137	176	0.32	2.1	3.2		0.57	1.1		2.8	32	CLAY
20.0	454	587		466	552		16.7	138	178	0.30	2.1	3.0		0.57	1.1		2.7	32	CLAY
20.2	452	580		464	545		16.7	140	180	0.28	2.0	2.8		0.55	1.0		2.4	31	CLAY
20.4	459	590		471	555		16.7	141	181	0.29	2.1	2.9		0.56	1.0		2.6	32	CLAY

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT004 DESCRIPTION
20.6	489	629		501	594		16.7	143	183	0.29	2.2	3.2		0.60	1.2		3.1	36	CLAY
20.8	462	601		474	566		16.7	144	185	0.32	2.0	3.2		0.54	1.0		2.7	32	CLAY
21.0	479	618		491	583		16.7	145	187	0.30	2.1	3.2		0.57	1.1		2.9	34	CLAY
21.2	468	602		480	567		16.7	147	189	0.30	2.0	3.0		0.54	0.99		2.6	32	CLAY
21.4	463	596		475	561		16.7	148	191	0.30	1.9	3.0		0.52	0.94		2.5	31	CLAY
21.6	462	595		474	560		16.7	149	193	0.31	1.9	3.0		0.51	0.91		2.5	30	CLAY
21.8	468	600		480	565		16.7	151	195	0.30	1.9	3.0		0.51	0.92		2.5	31	CLAY
22.0	505	654		516	619		16.7	152	197	0.32	2.1	3.6		0.57	1.1		3.2	35	CLAY
22.2	492	626		504	591		16.7	153	199	0.29	2.0	3.0		0.54	0.99		2.6	33	CLAY
22.4	493	632		505	597		16.7	155	201	0.30	2.0	3.2		0.53	0.97		2.7	33	CLAY
22.6	495	632		507	597		16.7	156	203	0.30	1.9	3.1		0.53	0.96		2.7	33	CLAY
22.8	490	624		502	589		16.7	158	205	0.29	1.9	3.0		0.51	0.91		2.6	32	CLAY
23.0	491	637		502	602		16.7	159	207	0.34	1.9	3.5		0.50	0.89		2.9	32	SILTY CLAY
23.2	502	655		513	620		16.7	160	209	0.35	1.9	3.7		0.52	0.92		3.2	33	SILTY CLAY
23.4	511	669		522	634		16.7	162	211	0.36	1.9	3.9		0.52	0.94		3.3	34	SILTY CLAY
23.6	552	751		561	716		16.7	163	213	0.45	2.1	5.4		0.58	1.1		4.9	39	SILTY CLAY
23.8	564	755		573	720		16.7	164	215	0.41	2.2	5.1		0.59	1.1		4.8	40	SILTY CLAY
24.0	556	741		565	706		16.7	166	217	0.40	2.1	4.9		0.57	1.1		4.4	39	SILTY CLAY
24.2	545	739		554	704		16.7	167	219	0.45	2.0	5.2		0.55	1.0		4.4	37	SILTY CLAY
24.4	575	767		584	732		16.7	169	221	0.41	2.2	5.1		0.58	1.1		4.8	41	SILTY CLAY
24.6	566	759		575	724		16.7	170	223	0.42	2.1	5.2		0.56	1.1		4.6	39	SILTY CLAY
24.8	561	727		571	692		16.7	171	225	0.35	2.0	4.2		0.55	1.0		3.6	38	SILTY CLAY
25.0	594	776		603	741		16.7	173	227	0.37	2.2	4.8		0.59	1.1		4.5	42	SILTY CLAY
25.2	590	765		600	730		16.7	174	229	0.35	2.1	4.5		0.58	1.1		4.1	41	SILTY CLAY
25.4	577	750		587	715		16.7	175	231	0.36	2.0	4.4		0.55	1.0		3.9	39	SILTY CLAY
25.6	601	789		610	754		16.7	177	232	0.38	2.1	5.0		0.58	1.1		4.6	42	SILTY CLAY
25.8	608	802		617	767		16.7	178	234	0.39	2.1	5.2		0.58	1.1		4.8	43	SILTY CLAY
26.0	881	1758		856	1723		19.1	180	236	1.40	3.4	30.1					44.1		SANDY SILT

DMT005	LEGEND	INTERPRETED PARAMETERS	GENERAL PARAMETERS
22 MAR 2024	Z = Depth Below Ground Level	Phi = Safe floor value of Friction Angle	DeltaA = 16 kPa
McMillan Drilling	Po,P1,P2 = Corrected A,B,C readings	Ko = In situ earth press. coeff.	DeltaB = 36 kPa
ENGEO	Id = Material Index	M = Constrained modulus (at Sigma')	GammaTop = 17.0 kN/m^3
302219	Ed = Dilatometer Modulus	Cu = Undrained shear strength	FactorEd = 34.7
Pukekohe Park	Ud = Pore Press. Index = (P2-Uo)/(Po-Uo)	Ocr = Overconsolidation ratio	Zm = 0.0 kPa
1770102.73mE, 5879969.62mN NZTM	Gamma = Bulk unit weight	(OCR = 'relative OCR'- generally	Zabs = 0.0 m
	Sigma' = Effective overb. stress	realistic. If accurate independent OCR	Zw = 1.9 m
	Uo = Pore pressure	available, apply suitable factor)	

WaterTable at 1.90 m
Reduction formulae according to Marchetti, ASCE Geot.Jnl.Mar. 1980, Vol.109, 299-321; Phi according to TC16 ISSMGE, 2001

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT005 DESCRIPTION
0.2	126	226		140	190		15.7	3	0	0.36	41.1	1.7		4.1	>99.9		6.7	33	SILTY CLAY
0.4	138	350		146	314		15.7	7	0	1.15	22.3	5.8		3.0	43.2		19.0	29	SILT
0.6	42	150		55	114		15.7	10	0	1.07	5.7	2.0		1.3	5.1		4.0	8	SILT
0.8	60	160		74	124		15.7	13	0	0.68	5.7	1.7		1.3	5.2		3.4	11	CLAYEY SILT
1.0	54	166		67	130		15.7	16	0	0.94	4.2	2.2		1.0	3.2		3.6	9	SILT
1.2	96	247		107	211		15.7	19	0	0.97	5.6	3.6		1.3	5.0		6.9	15	SILT
1.8	78	148		93	112		14.7	29	0	0.20	3.3	0.7		0.84	2.2		0.9	12	MUD
2.0	70	141		85	105		14.7	30	1	0.24	2.8	0.7		0.73	1.7		0.8	10	MUD
2.2	103	168		118	132		14.7	31	3	0.12	3.7	0.5		0.92	2.6		0.7	15	MUD
2.4	96	240		107	204		15.7	32	5	0.94	3.2	3.4		0.82	2.0		4.5	13	SILT
2.6	112	254		124	218		15.7	34	7	0.81	3.5	3.3		0.88	2.4		4.7	15	SILT
2.8	118	262		129	226		15.7	35	9	0.80	3.5	3.4		0.88	2.4		4.8	15	SILT
3.0	190	289		204	253		15.7	36	11	0.26	5.4	1.7		1.2	4.7		3.2	27	CLAY
3.2	139	246		152	210		15.7	37	13	0.41	3.8	2.0		0.94	2.7		3.0	18	SILTY CLAY
3.4	159	269		172	233		15.7	38	15	0.39	4.1	2.1		1.0	3.1		3.4	21	SILTY CLAY
3.6	337	896		328	860		17.7	40	17	1.71	7.9	18.5					42.0		SANDY SILT
3.8	141	238		155	202		15.7	41	19	0.35	3.3	1.6		0.85	2.2		2.2	17	SILTY CLAY
4.0	160	293		172	257		15.7	42	21	0.56	3.6	3.0		0.90	2.5		4.3	19	SILTY CLAY
4.2	150	231		165	195		14.7	43	23	0.21	3.3	1.1		0.84	2.2		1.4	18	MUD
4.4	166	282		179	246		15.7	44	25	0.44	3.5	2.3		0.88	2.4		3.3	19	SILTY CLAY
4.6	188	293		201	257		15.7	46	26	0.32	3.8	1.9		0.95	2.8		2.9	23	CLAY
4.8	184	280		198	244		15.7	47	28	0.27	3.6	1.6		0.91	2.5		2.3	22	CLAY
5.0	191	315		203	279		15.7	48	30	0.44	3.6	2.6		0.91	2.5		3.8	22	SILTY CLAY
5.2	233	407		243	371		16.7	49	32	0.61	4.3	4.4		1.0	3.3		7.3	28	CLAYEY SILT
5.4	234	442		242	406		16.7	50	34	0.79	4.1	5.7		1.0	3.1		9.1	27	CLAYEY SILT
5.6	177	269		191	233		15.7	52	36	0.27	3.0	1.5		0.78	1.9		1.8	19	CLAY
5.8	167	248		182	212		14.7	53	38	0.21	2.7	1.1		0.72	1.6		1.2	17	MUD
6.0	175	258		189	222		14.7	54	40	0.22	2.8	1.1		0.73	1.7		1.3	18	MUD
6.2	181	285		194	249		15.7	55	42	0.36	2.8	1.9		0.73	1.7		2.2	18	SILTY CLAY
6.4	215	331		228	295		15.7	56	44	0.37	3.3	2.3		0.84	2.2		3.2	23	SILTY CLAY
6.6	236	351		249	315		15.7	57	46	0.33	3.5	2.3		0.90	2.4		3.3	26	CLAY
6.8	206	297		220	261		15.7	59	48	0.24	2.9	1.4		0.77	1.8		1.8	21	CLAY
7.0	204	302		218	266		15.7	60	50	0.29	2.8	1.7		0.74	1.7		2.0	20	CLAY
7.2	214	439		221	403		16.7	61	52	1.07	2.8	6.3		0.74	1.7		7.7	20	SILT
7.4	230	335		243	299		15.7	62	54	0.29	3.0	1.9		0.79	1.9		2.5	23	CLAY
7.6	230	350		243	314		15.7	63	56	0.38	2.9	2.5		0.77	1.8		3.1	23	SILTY CLAY
7.8	267	387		280	351		15.7	65	58	0.32	3.4	2.5		0.87	2.3		3.5	28	CLAY
8.0	211	321		224	285		15.7	66	60	0.37	2.5	2.1		0.67	1.4		2.3	19	SILTY CLAY
8.2	234	338		247	302		15.7	67	62	0.29	2.8	1.9		0.73	1.7		2.2	22	CLAY
8.4	254	358		267	322		15.7	68	64	0.27	3.0	1.9		0.78	1.9		2.4	25	CLAY
8.6	237	337		251	301		15.7	69	66	0.27	2.7	1.7		0.71	1.6		2.0	22	CLAY
8.8	255	414		266	378		15.7	71	68	0.57	2.8	3.9		0.74	1.7		4.7	24	SILTY CLAY
9.0	254	356		268	320		15.7	72	70	0.27	2.8	1.8		0.73	1.7		2.2	24	CLAY

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT005 DESCRIPTION
9.2	255	378		267	342		15.7	73	72	0.38	2.7	2.6		0.71	1.6		3.0	23	SILTY CLAY
9.4	265	388		277	352		15.7	74	74	0.37	2.8	2.6		0.73	1.7		3.0	24	SILTY CLAY
9.6	239	350		252	314		15.7	75	76	0.35	2.3	2.1		0.63	1.3		2.2	20	SILTY CLAY
9.8	260	394		272	358		15.7	76	77	0.44	2.5	3.0		0.68	1.5		3.3	23	SILTY CLAY
10.0	258	357		272	321		15.7	78	79	0.26	2.5	1.7		0.67	1.4		1.8	22	CLAY
10.2	281	389		294	353		15.7	79	81	0.28	2.7	2.0		0.72	1.6		2.4	25	CLAY
10.4	278	387		291	351		15.7	80	83	0.29	2.6	2.1		0.69	1.5		2.3	24	CLAY
10.6	295	424		307	388		15.7	81	85	0.36	2.7	2.8		0.73	1.6		3.3	26	SILTY CLAY
10.8	302	435		314	399		15.7	82	87	0.38	2.8	3.0		0.73	1.7		3.5	27	SILTY CLAY
11.0	324	444		337	408		15.7	83	89	0.29	3.0	2.5		0.78	1.9		3.1	30	CLAY
11.2	371	508		383	472		16.7	85	91	0.31	3.4	3.1		0.88	2.3		4.4	37	CLAY
11.4	329	457		341	421		15.7	86	93	0.32	2.9	2.8		0.76	1.8		3.4	30	CLAY
11.6	316	455		328	419		16.7	87	95	0.39	2.7	3.2		0.71	1.6		3.6	27	SILTY CLAY
11.8	317	432		330	396		15.7	89	97	0.28	2.6	2.3		0.70	1.5		2.6	27	CLAY
12.0	336	454		349	418		15.7	90	99	0.28	2.8	2.4		0.74	1.7		2.9	30	CLAY
12.2	330	450		343	414		15.7	91	101	0.30	2.7	2.5		0.71	1.6		2.8	29	CLAY
12.4	348	470		361	434		15.7	92	103	0.29	2.8	2.6		0.74	1.7		3.0	31	CLAY
12.6	367	486		380	450		15.7	93	105	0.26	2.9	2.4		0.77	1.8		3.0	33	CLAY
12.8	365	490		377	454		16.7	94	107	0.28	2.9	2.7		0.75	1.8		3.2	33	CLAY
13.0	361	485		373	449		16.7	96	109	0.29	2.8	2.6		0.73	1.7		3.1	32	CLAY
13.2	374	511		386	475		16.7	97	111	0.32	2.8	3.1		0.75	1.7		3.7	33	CLAY
13.4	394	525		406	489		16.7	99	113	0.28	3.0	2.9		0.78	1.9		3.6	36	CLAY
13.6	374	516		386	480		16.7	100	115	0.35	2.7	3.3		0.72	1.6		3.8	32	SILTY CLAY
13.8	372	506		384	470		16.7	101	117	0.32	2.6	3.0		0.70	1.5		3.4	31	CLAY
14.0	388	527		400	491		16.7	103	119	0.33	2.7	3.2		0.73	1.6		3.7	33	CLAY
14.2	386	525		398	489		16.7	104	121	0.33	2.7	3.2		0.71	1.6		3.6	33	CLAY
14.4	394	535		406	499		16.7	105	123	0.33	2.7	3.2		0.71	1.6		3.7	33	SILTY CLAY
14.6	393	525		405	489		16.7	107	125	0.30	2.6	2.9		0.70	1.5		3.3	33	CLAY
14.8	416	554		428	518		16.7	108	127	0.30	2.8	3.1		0.74	1.7		3.7	36	CLAY
15.0	402	547		413	511		16.7	110	129	0.34	2.6	3.4		0.69	1.5		3.8	33	SILTY CLAY
15.2	420	561		432	525		16.7	111	130	0.31	2.7	3.2		0.72	1.6		3.8	36	CLAY
15.4	385	566		395	530		16.7	112	132	0.52	2.3	4.7		0.63	1.3		4.7	30	SILTY CLAY
15.6	435	583		446	547		16.7	114	134	0.32	2.7	3.5		0.73	1.6		4.1	37	CLAY
15.8	420	563		431	527		16.7	115	136	0.32	2.6	3.3		0.69	1.5		3.7	35	CLAY
16.0	436	587		447	551		16.7	116	138	0.34	2.7	3.6		0.71	1.6		4.1	36	SILTY CLAY
16.2	446	595		457	559		16.7	118	140	0.32	2.7	3.5		0.72	1.6		4.1	38	CLAY
16.4	458	620		469	584		16.7	119	142	0.35	2.7	4.0		0.73	1.6		4.7	39	SILTY CLAY
16.6	447	610		457	574		16.7	121	144	0.37	2.6	4.0		0.69	1.5		4.5	37	SILTY CLAY
16.8	482	650		492	614		16.7	122	146	0.35	2.8	4.2		0.75	1.7		5.1	42	SILTY CLAY
17.0	503	676		513	640		16.7	123	148	0.35	3.0	4.4		0.78	1.8		5.5	44	SILTY CLAY
17.2	507	685		517	649		16.7	125	150	0.36	2.9	4.6		0.77	1.8		5.7	44	SILTY CLAY
17.4	519	703		528	667		16.7	126	152	0.37	3.0	4.8		0.78	1.9		6.1	46	SILTY CLAY
17.6	488	661		498	625		16.7	127	154	0.37	2.7	4.4		0.72	1.6		5.1	41	SILTY CLAY
17.8	509	675		519	639		16.7	129	156	0.33	2.8	4.2		0.74	1.7		5.0	44	CLAY
18.0	506	678		516	642		16.7	130	158	0.35	2.8	4.4		0.73	1.6		5.1	43	SILTY CLAY
18.2	506	692		515	656		16.7	132	160	0.40	2.7	4.9		0.72	1.6		5.7	42	SILTY CLAY
18.4	526	706		536	670		16.7	133	162	0.36	2.8	4.7		0.74	1.7		5.6	45	SILTY CLAY
18.6	505	748		511	712		16.7	134	164	0.58	2.6	7.0		0.69	1.5		7.8	41	SILTY CLAY
18.8	529	736		537	700		16.7	136	166	0.44	2.7	5.6		0.73	1.6		6.6	44	SILTY CLAY
19.0	350	673		352	637		16.7	137	168	1.54	1.3	9.9					8.4		SANDY SILT
19.2	489	988		483	952		17.7	138	170	1.50	2.3	16.3					17.3		SANDY SILT
19.4	432	1182		413	1146		18.6	140	172	3.04	1.7	25.4				31	24.8		SILTY SAND

DMT006	LEGEND	INTERPRETED PARAMETERS	GENERAL PARAMETERS
22 MAR 2024	Z = Depth Below Ground Level	Phi = Safe floor value of Friction Angle	DeltaA = 13 kPa
McMillan Drilling	Po,P1,P2 = Corrected A,B,C readings	Ko = In situ earth press. coeff.	DeltaB = 95 kPa
ENGEO	Id = Material Index	M = Constrained modulus (at Sigma')	GammaTop = 17.0 kN/m^3
302219	Ed = Dilatometer Modulus	Cu = Undrained shear strength	FactorEd = 34.7
Pukekohe Park	Ud = Pore Press. Index = (P2-Uo)/(Po-Uo)	Ocr = Overconsolidation ratio	Zm = 0.0 kPa
1770547.41mE, 5879481.32mN NZTM	Gamma = Bulk unit weight	(OCR = 'relative OCR'- generally	Zabs = 0.0 m
	Sigma' = Effective overb. stress	realistic. If accurate independent OCR	Zw = 1.1 m
	Uo = Pore pressure	available, apply suitable factor)	

WaterTable at 1.10 m
Reduction formulae according to Marchetti, ASCE Geot.Jnl.Mar. 1980, Vol.109, 299-321; Phi according to TC16 ISSMGE, 2001

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT006 DESCRIPTION
0.2	117	526		115	431		17.7	3	0	2.75	33.8	11.0				45	40.1		SILTY SAND
0.4	409	1723		362	1628		18.6	7	0	3.50	52.2	43.9				47	178.6		SAND
0.6	343	1036		327	941		18.6	11	0	1.88	30.7	21.3				45	75.9		SILTY SAND
0.8	227	597		227	502		16.7	14	0	1.21	15.8	9.5					28.0		SANDY SILT
1.0	212	487		217	392		16.7	18	0	0.81	12.2	6.1		2.1	16.9		16.4	37	SILT
1.2	117	462		118	367		17.7	20	1	2.12	5.8	8.6				38	17.3		SILTY SAND
1.4	484	1103		471	1008		17.7	22	3	1.15	21.6	18.6		2.9	41.2		60.2	93	SILT
1.6	207	570		207	475		16.7	23	5	1.32	8.7	9.3					22.0		SANDY SILT
1.8	40	204		50	109		15.7	25	7	1.36	1.8	2.0					1.7		SANDY SILT
2.0	85	469		84	374		16.7	26	9	3.84	2.9	10.1				34	14.4		SAND
2.2	177	513		179	418		16.7	27	11	1.43	6.2	8.3					16.9		SANDY SILT
2.4	267	734		262	639		16.7	29	13	1.51	8.7	13.1					31.0		SANDY SILT
2.6	135	380		141	285		15.7	30	15	1.14	4.2	5.0		1.0	3.2		8.2	17	SILT
2.8	159	355		168	260		15.7	31	17	0.61	4.9	3.2		1.1	4.0		5.6	21	CLAYEY SILT
3.0	167	648		161	553		17.7	32	19	2.74	4.4	13.6				37	24.2		SILTY SAND
3.2	171	399		178	304		15.7	34	21	0.80	4.7	4.4		1.1	3.7		7.5	21	SILT
3.4	88	212		100	117		14.7	35	23	0.22	2.2	0.6		0.60	1.2		0.6	9	MUD
3.6	86	182		100			13.7	36	25										
3.8	128	249		140	154		14.7	37	26	0.12	3.1	0.5		0.81	2.0		0.6	14	MUD
4.0	146	286		157	191		14.7	38	28	0.26	3.4	1.2		0.87	2.3		1.6	16	MUD
4.2	179	308		191	213		14.7	39	30	0.14	4.1	0.8		1.0	3.1		1.2	21	MUD
4.4	170	296		182	201		14.7	40	32	0.13	3.8	0.7		0.94	2.7		1.0	19	MUD
4.6	173	309		185	214		14.7	41	34	0.20	3.7	1.0		0.93	2.6		1.5	19	MUD
4.8	172	313		183	218		15.7	42	36	0.24	3.5	1.2		0.89	2.4		1.7	19	CLAY
5.0	130	262		142	167		14.7	43	38	0.24	2.4	0.9		0.65	1.3		0.9	12	MUD
5.2	101	260		111	165		15.7	44	40	0.75	1.6	1.9		0.44	<0.8		1.6	7	CLAYEY SILT
5.4	142	270		154	175		14.7	45	42	0.19	2.5	0.7		0.67	1.4		0.8	13	MUD
5.6	151	273		163	178		14.7	46	44	0.12	2.6	0.5		0.69	1.5		0.6	14	MUD
5.8	369	865		363	770		17.7	47	46	1.29	6.7	14.1					29.9		SANDY SILT
6.0	226	398		236	303		15.7	49	48	0.36	3.9	2.3		0.96	2.8		3.6	24	SILTY CLAY
6.2	195	340		206	245		15.7	50	50	0.25	3.1	1.3		0.81	2.0		1.8	19	CLAY
6.4	243	419		253	324		15.7	51	52	0.36	3.9	2.5		0.97	2.9		3.8	26	SILTY CLAY
6.6	286	469		295	374		15.7	52	54	0.33	4.6	2.7		1.1	3.7		4.7	33	CLAY
6.8	254	410		265	315		15.7	53	56	0.24	3.9	1.7		0.97	2.9		2.7	27	CLAY
7.0	263	445		272	350		15.7	54	58	0.36	3.9	2.7		0.97	2.9		4.2	28	SILTY CLAY
7.2	253	408		264	313		15.7	56	60	0.24	3.7	1.7		0.92	2.6		2.5	26	CLAY
7.4	233	383		244	288		15.7	57	62	0.24	3.2	1.5		0.83	2.1		2.0	23	CLAY
7.6	249	388		260	293		14.7	58	64	0.17	3.4	1.1		0.87	2.3		1.6	25	MUD
7.8	289	448		299	353		15.7	59	66	0.23	4.0	1.9		0.98	2.9		2.9	31	CLAY
8.0	329	492		339	397		15.7	60	68	0.21	4.5	2.0		1.1	3.6		3.4	37	CLAY
8.2	359	552		368	457		16.7	61	70	0.30	4.9	3.1		1.1	4.0		5.5	41	CLAY
8.4	345	542		354	447		16.7	63	72	0.33	4.5	3.2		1.1	3.6		5.5	38	SILTY CLAY
8.6	327	504		337	409		15.7	64	74	0.28	4.1	2.5		1.0	3.1		4.0	35	CLAY

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT006 DESCRIPTION
8.8	313	501		322	406		16.7	65	76	0.34	3.8	2.9		0.94	2.7		4.4	32	SILTY CLAY
9.0	350	535		359	440		16.7	67	77	0.29	4.2	2.8		1.0	3.2		4.5	37	CLAY
9.2	385	581		394	486		16.7	68	79	0.29	4.6	3.2		1.1	3.7		5.5	43	CLAY
9.4	372	541		382	446		16.7	69	81	0.21	4.3	2.2		1.0	3.4		3.7	40	CLAY
9.6	492	894		490	799		17.7	71	83	0.76	5.8	10.7		1.3	5.2		20.8	58	CLAYEY SILT
9.8	260	764		253	669		17.7	72	85	2.48	2.3	14.4				33	17.1		SILTY SAND
10.0	115	311		124	216		16.7	74	87	2.55	0.5	3.2					2.7		SILTY SAND
10.2	172	298		184	203		14.7	75	89	0.20	1.3	0.7		0.32	<0.8		0.6	9	MUD
10.4	266	410		277	315		15.7	76	91	0.20	2.4	1.3		0.66	1.4		1.4	22	CLAY
10.6	371	555		380	460		16.7	77	93	0.28	3.7	2.8		0.93	2.6		4.1	37	CLAY
10.8	556	1385		533	1290		17.7	79	95	1.73	5.6	26.3					51.0		SANDY SILT
11.0	383	540		394	445		15.7	80	97	0.17	3.7	1.8		0.93	2.6		2.6	38	CLAY
11.2	440	595		451	500		15.7	81	99	0.14	4.3	1.7		1.0	3.3		2.8	47	CLAY
11.4	583	905		585	810		17.7	83	101	0.46	5.9	7.8		1.3	5.4		15.2	70	SILTY CLAY
11.6	567	874		570	779		17.7	84	103	0.45	5.5	7.3		1.2	4.9		13.7	66	SILTY CLAY
11.8	499	818		501	723		17.7	86	105	0.56	4.6	7.7		1.1	3.7		13.1	54	SILTY CLAY
12.0	723	955		730	860		17.7	87	107	0.21	7.1	4.5		1.5	7.3		9.7	94	CLAY
12.2	543	819		548	724		17.7	89	109	0.40	4.9	6.1		1.1	4.1		10.9	60	SILTY CLAY
12.4	485	825		486	730		17.7	91	111	0.65	4.1	8.5		1.0	3.1		13.5	50	CLAYEY SILT
12.6	658	937		662	842		17.7	92	113	0.33	6.0	6.2		1.3	5.5		12.3	79	CLAY
12.8	1159	1772		1147	1677		18.6	94	115	0.51	11.0	18.4		2.0	14.4		47.7	174	SILTY CLAY
13.0	1481	2135		1467	2040		18.6	95	117	0.42	14.1	19.9		2.3	21.2		56.3	242	SILTY CLAY
13.2	1525	2292		1505	2197		20.1	97	119	0.50	14.3	24.0		2.3	21.5		68.1	249	SILTY CLAY
13.4	927	1411		921	1316		18.6	99	121	0.49	8.1	13.7		1.6	8.8		31.2	125	SILTY CLAY
13.6	725	1241		718	1146		17.7	101	123	0.72	5.9	14.9		1.3	5.4		29.2	86	CLAYEY SILT
13.8	1279	2187		1252	2092		19.1	103	125	0.75	11.0	29.1		1.9	14.3		75.5	190	CLAYEY SILT
14.0	837	1741		810	1646		19.1	104	127	1.22	6.5	29.0					60.4		SANDY SILT
14.2	1025	2258		982	2163		19.1	106	129	1.38	8.0	41.0					93.7		SANDY SILT
14.4	879	1860		848	1765		19.1	108	130	1.28	6.6	31.8					66.7		SANDY SILT
14.6	1344	2797		1290	2702		20.6	110	132	1.22	10.5	49.0					124.9		SANDY SILT
14.8	670	1280		658	1185		17.7	112	134	1.01	4.7	18.3		1.1	3.8		31.8	71	SILT
15.0	674	1047		674	952		17.7	114	136	0.52	4.7	9.7		1.1	3.8		16.7	73	SILTY CLAY
15.2	1050	1582		1042	1487		18.6	115	138	0.49	7.8	15.4		1.6	8.4		34.8	140	SILTY CLAY
15.4	801	1177		801	1082		17.7	117	140	0.43	5.6	9.8		1.3	5.1		18.7	94	SILTY CLAY
15.6	685	910		692	815		17.7	119	142	0.22	4.6	4.3		1.1	3.7		7.3	75	CLAY
15.8	745	1040		749	945		17.7	120	144	0.32	5.0	6.8		1.2	4.2		12.2	84	CLAY
16.0	814	1364		805	1269		19.1	122	146	0.70	5.4	16.1		1.2	4.7		30.2	93	CLAYEY SILT
16.2	821	1218		820	1123		17.7	124	148	0.45	5.4	10.5		1.2	4.8		19.7	95	SILTY CLAY
16.4	701	970		706	875		17.7	125	150	0.30	4.4	5.9		1.1	3.5		9.8	75	CLAY
16.6	636	817		645	722		16.7	127	152	0.16	3.9	2.7		0.96	2.8		4.1	64	CLAY
16.8	634	835		642	740		16.7	128	154	0.20	3.8	3.4		0.95	2.7		5.1	63	CLAY
17.0	623	795		633	700		16.7	130	156	0.14	3.7	2.3		0.92	2.6		3.4	61	CLAY
17.2	657	844		666	749		16.7	131	158	0.16	3.9	2.9		0.96	2.8		4.4	66	CLAY
17.4	636	882		642	787		17.7	132	160	0.30	3.6	5.0		0.92	2.6		7.4	62	CLAY
17.6	789	1031		795	936		17.7	134	162	0.22	4.7	4.9		1.1	3.8		8.5	86	CLAY
17.8	1246	2013		1226	1918		19.1	135	164	0.65	7.8	24.0		1.6	8.4		54.1	164	CLAYEY SILT
18.0	1638	2749		1601	2654		20.6	137	166	0.73	10.5	36.5		1.9	13.2		92.9	239	CLAYEY SILT
18.2	2022	3053		1989	2958		20.1	139	168	0.53	13.1	33.6		2.2	18.7		92.6	320	SILTY CLAY
18.4	1146	1584		1143	1489		18.6	142	170	0.36	6.9	12.0		1.4	6.9		25.4	146	SILTY CLAY
18.6	1073	1365		1077	1270		17.7	143	172	0.21	6.3	6.7		1.4	6.0		13.6	133	CLAY
18.8	1036	1418		1035	1323		18.6	145	174	0.33	5.9	10.0		1.3	5.5		19.6	124	SILTY CLAY
19.0	1033	1379		1034	1284		18.6	147	176	0.29	5.9	8.7		1.3	5.4		16.9	124	CLAY
19.2	1076	1547		1071	1452		18.6	148	178	0.43	6.0	13.2		1.3	5.6		26.2	129	SILTY CLAY
19.4	1111	1551		1107	1456		18.6	150	180	0.38	6.2	12.1		1.3	5.8		24.3	135	SILTY CLAY
19.6	1223	1717		1217	1622		18.6	152	181	0.39	6.8	14.1		1.4	6.8		29.6	155	SILTY CLAY
19.8	1016	1342		1018	1247		17.7	154	183	0.27	5.4	7.9		1.2	4.8		14.9	118	CLAY
20.0	1273	1625		1274	1530		18.6	155	185	0.24	7.0	8.9		1.5	7.1		19.0	164	CLAY
20.2	1828	2696		1803	2601		20.1	157	187	0.49	10.3	27.7		1.9	12.9		70.0	268	SILTY CLAY
20.4	1271	1654		1270	1559		18.6	159	189	0.27	6.8	10.0		1.4	6.8		21.1	161	CLAY

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT006 DESCRIPTION
20.6	1362	1866		1355	1771		18.6	161	191	0.36	7.2	14.4		1.5	7.5		31.3	177	SILTY CLAY
20.8	1574	2087		1567	1992		18.6	163	193	0.31	8.4	14.8		1.7	9.5		34.3	217	CLAY
21.0	1547	2060		1540	1965		18.6	164	195	0.32	8.2	14.8		1.6	9.0		33.9	210	CLAY
21.2	1613	2133		1605	2038		18.6	166	197	0.31	8.5	15.0		1.7	9.5		35.0	222	CLAY
21.4	1375	1767		1374	1672		18.6	168	199	0.25	7.0	10.3		1.5	7.1		22.1	177	CLAY
21.6	1375	1798		1372	1703		18.6	170	201	0.28	6.9	11.5		1.4	6.9		24.3	176	CLAY
21.8	1049	1564		1042	1469		18.6	171	203	0.51	4.9	14.8		1.1	4.0		26.2	115	SILTY CLAY
22.0	726	1049		728	954		17.7	173	205	0.43	3.0	7.8		0.79	1.9		10.0	64	SILTY CLAY
22.2	753	1130		753	1035		17.7	175	207	0.52	3.1	9.8		0.81	2.0		12.8	67	SILTY CLAY
22.4	835	1198		835	1103		17.7	176	209	0.43	3.6	9.3		0.90	2.5		13.4	80	SILTY CLAY
22.6	738	1063		740	968		17.7	178	211	0.43	3.0	7.9		0.78	1.9		9.9	64	SILTY CLAY
22.8	968	1396		965	1301		18.6	179	213	0.45	4.2	11.7		1.0	3.2		18.8	100	SILTY CLAY
23.0	1004	1463		999	1368		18.6	181	215	0.47	4.3	12.8		1.0	3.3		21.0	105	SILTY CLAY
23.2	1717	2300		1706	2205		20.1	183	217	0.33	8.1	17.3		1.6	9.0		39.6	233	SILTY CLAY
23.4	1763	2427		1748	2332		20.1	185	219	0.38	8.3	20.3		1.6	9.2		46.7	240	SILTY CLAY
23.6	1400	2175		1380	2080		19.1	187	221	0.60	6.2	24.3		1.3	5.8		48.8	169	CLAYEY SILT
23.8	1108	1683		1098	1588		18.6	189	223	0.56	4.6	17.0		1.1	3.7		29.1	119	SILTY CLAY
24.0	1139	1800		1124	1705		19.1	191	225	0.65	4.7	20.1		1.1	3.8		34.9	123	CLAYEY SILT
24.2	1448	2327		1422	2232		20.6	193	227	0.68	6.2	28.1		1.3	5.9		56.6	175	CLAYEY SILT
24.4	1333	2211		1308	2116		19.1	195	229	0.75	5.5	28.1		1.2	4.9		53.3	153	CLAYEY SILT
24.6	1275	2038		1255	1943		19.1	197	231	0.67	5.2	23.9		1.2	4.5		43.8	143	CLAYEY SILT
24.8	1056	1797		1037	1702		19.1	199	232	0.83	4.1	23.1		0.99	3.0		36.6	106	SILT
25.0	1141	1842		1124	1747		19.1	200	234	0.70	4.4	21.6		1.1	3.5		36.2	119	CLAYEY SILT
25.2	1034	1570		1026	1475		18.6	202	236	0.57	3.9	15.6		0.97	2.8		23.9	103	SILTY CLAY
25.4	727	1210		721	1115		17.7	204	238	0.82	2.4	13.7		0.64	1.3		14.3	55	SILT
25.6	1303	2113		1281	2018		19.1	206	240	0.71	5.1	25.6		1.2	4.3		46.2	144	CLAYEY SILT
25.8	974	1411		971	1316		18.6	207	242	0.47	3.5	12.0		0.89	2.4		17.1	92	SILTY CLAY
26.0	1539	2606		1504	2511		20.6	209	244	0.80	6.0	34.9		1.3	5.6		69.4	183	CLAYEY SILT
26.2	1280	1824		1271	1729		18.6	211	246	0.45	4.8	15.9		1.1	4.0		27.9	141	SILTY CLAY
26.4	819	1259		815	1164		17.7	213	248	0.61	2.7	12.1		0.71	1.6		13.8	67	CLAYEY SILT
26.6	754	1272		747	1177		17.7	215	250	0.87	2.3	14.9		0.62	1.3		15.3	57	SILT
26.8	788	1313		780	1218		17.7	216	252	0.83	2.4	15.2		0.66	1.4		16.3	61	SILT
27.0	687	1094		685	999		17.7	218	254	0.73	2.0	10.9		0.54	0.99		9.3	47	CLAYEY SILT
27.2	2206	3226		2173	3131		20.1	219	256	0.50	8.7	33.2		1.7	10.0		78.5	305	SILTY CLAY
27.4	2278	3146		2253	3051		20.1	221	258	0.40	9.0	27.7		1.7	10.5		66.3	320	SILTY CLAY
27.6	2197	2991		2176	2896		20.1	224	260	0.38	8.6	25.0		1.7	9.7		58.5	303	SILTY CLAY
27.8	1778	2571		1757	2476		20.1	226	262	0.48	6.6	25.0		1.4	6.5		51.9	222	SILTY CLAY
28.0	1880	2732		1856	2637		20.1	228	264	0.49	7.0	27.1		1.5	7.1		57.8	239	SILTY CLAY
28.2	1629	2171		1620	2076		18.6	230	266	0.34	5.9	15.8		1.3	5.4		31.0	195	SILTY CLAY
28.4	1234	1667		1231	1572		18.6	231	268	0.35	4.2	11.8		1.0	3.1		19.0	127	SILTY CLAY
28.6	911	1483		901	1388		19.1	233	270	0.77	2.7	16.9		0.72	1.6		19.9	75	CLAYEY SILT
28.8	776	1482		759	1387		17.7	235	272	1.29	2.1	21.8					20.9		SANDY SILT
29.0	901	1755		877	1660		19.1	237	274	1.30	2.5	27.2					31.6		SANDY SILT
29.2	794	1343		785	1248		17.7	239	276	0.91	2.1	16.1		0.58	1.1		15.2	57	SILT
29.4	788	1403		776	1308		17.7	240	278	1.07	2.1	18.5		0.56	1.1		17.3	55	SILT
29.6	762	1321		752	1226		17.7	242	280	1.00	2.0	16.4		0.53	0.97		14.3	52	SILT
29.8	758	1359		746	1264		17.7	243	282	1.11	1.9	18.0		0.52	0.93		15.4	51	SILT
30.0	738	1454		721	1359		17.7	245	284	1.46	1.8	22.2					18.8		SANDY SILT

DMT007	LEGEND	INTERPRETED PARAMETERS	GENERAL PARAMETERS
27 MAR 2024	Z = Depth Below Ground Level	Phi = Safe floor value of Friction Angle	DeltaA = 16 kPa
McMillan Drilling	Po,P1,P2 = Corrected A,B,C readings	Ko = In situ earth press. coeff.	DeltaB = 36 kPa
ENGEO	Id = Material Index	M = Constrained modulus (at Sigma')	GammaTop = 17.0 kN/m^3
302219	Ed = Dilatometer Modulus	Cu = Undrained shear strength	FactorEd = 34.7
Pukekohe Park	Ud = Pore Press. Index = (P2-Uo)/(Po-Uo)	Ocr = Overconsolidation ratio	Zm = 0.0 kPa
1770213.28mE, 5879589.81mN NZTM	Gamma = Bulk unit weight	(OCR = 'relative OCR'- generally	Zabs = 0.0 m
	Sigma' = Effective overb. stress	realistic. If accurate independent OCR	Zw = 2.9 m
	Uo = Pore pressure	available, apply suitable factor)	

WaterTable at 2.90 m
Reduction formulae according to Marchetti, ASCE Geot.Jnl.Mar. 1980, Vol.109, 299-321; Phi according to TC16 ISSMGE, 2001

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT007 DESCRIPTION
0.2	110	356		116	320		15.7	3	0	1.75	34.2	7.1					25.9		SANDY SILT
0.4	543	1272		525	1236		19.1	7	0	1.35	80.3	24.7					110.3		SANDY SILT
0.6	86	379		90	343		16.7	10	0	2.81	8.7	8.8				40	20.9		SILTY SAND
0.8	53	179		65	143		15.7	14	0	1.19	4.8	2.7		1.1	3.9		4.8	9	SILT
1.0	102	461		103	425		17.7	17	0	3.14	6.1	11.2				38	23.2		SILTY SAND
1.2	131	372		138	336		16.7	20	0	1.44	6.8	6.9					14.6		SANDY SILT
1.4	152	388		159	352		16.7	24	0	1.22	6.7	6.7					14.1		SANDY SILT
1.6	113	259		124	223		15.7	27	0	0.79	4.6	3.4		1.1	3.7		5.9	17	CLAYEY SILT
1.8	100	207		113	171		15.7	30	0	0.51	3.8	2.0		0.94	2.7		3.0	15	SILTY CLAY
2.0	76	169		90	133		15.7	33	0	0.48	2.7	1.5		0.72	1.6		1.7	11	SILTY CLAY
2.2	118	208		132	172		15.7	36	0	0.30	3.6	1.4		0.91	2.5		2.0	17	CLAY
2.4	56	129		71	93		14.7	40	0	0.31	1.8	0.8		0.49	0.84		0.7	8	MUD
2.6	107	214		120	178		15.7	43	0	0.48	2.8	2.0		0.75	1.7		2.4	14	SILTY CLAY
2.8	91	162		106	126		14.7	46	0	0.19	2.3	0.7		0.63	1.3		0.7	12	MUD
3.0	74	147		89	111		14.7	48	1	0.25	1.8	0.8		0.50	0.89		0.7	9	MUD
3.2	117	273		128	237		15.7	49	3	0.87	2.6	3.8		0.69	1.5		4.3	15	SILT
3.4	138	220		153	184		14.7	50	5	0.21	3.0	1.1		0.78	1.9		1.4	18	MUD
3.6	160	263		173	227		15.7	51	7	0.32	3.3	1.9		0.84	2.2		2.5	21	CLAY
3.8	185	271		199	235		15.7	52	9	0.19	3.7	1.2		0.92	2.6		1.8	24	CLAY
4.0	160	243		174	207		14.7	53	11	0.20	3.1	1.1		0.80	2.0		1.5	20	MUD
4.2	164	247		178	211		14.7	54	13	0.20	3.1	1.1		0.80	1.9		1.5	20	MUD
4.4	174	263		188	227		15.7	55	15	0.22	3.1	1.3		0.82	2.0		1.8	21	CLAY
4.6	184	276		198	240		15.7	56	17	0.23	3.2	1.5		0.83	2.1		2.0	22	CLAY
4.8	210	309		224	273		15.7	57	19	0.24	3.6	1.7		0.90	2.5		2.5	26	CLAY
5.0	265	403		277	367		16.7	59	21	0.35	4.4	3.1		1.1	3.4		5.2	34	SILTY CLAY
5.2	251	360		264	324		15.7	60	23	0.25	4.0	2.1		0.99	3.0		3.3	32	CLAY
5.4	305	438		317	402		16.7	61	25	0.29	4.8	3.0		1.1	3.9		5.1	40	CLAY
5.6	307	430		319	394		16.7	63	26	0.25	4.7	2.6		1.1	3.8		4.5	40	CLAY
5.8	316	435		329	399		16.7	64	28	0.23	4.7	2.4		1.1	3.8		4.2	41	CLAY
6.0	303	439		315	403		16.7	65	30	0.31	4.4	3.1		1.0	3.4		5.0	38	CLAY
6.2	309	438		321	402		16.7	67	32	0.28	4.3	2.8		1.0	3.3		4.6	39	CLAY
6.4	314	498		323	462		16.7	68	34	0.48	4.2	4.8		1.0	3.2		7.8	38	SILTY CLAY
6.6	337	488		348	452		16.7	69	36	0.33	4.5	3.6		1.1	3.5		6.1	42	SILTY CLAY
6.8	283	433		294	397		16.7	71	38	0.40	3.6	3.6		0.91	2.5		5.2	33	SILTY CLAY
7.0	264	434		274	398		16.7	72	40	0.53	3.2	4.3		0.84	2.1		5.8	29	SILTY CLAY
7.2	291	511		299	475		16.7	74	42	0.69	3.5	6.1		0.89	2.4		8.7	32	CLAYEY SILT
7.4	270	422		281	386		16.7	75	44	0.44	3.2	3.6		0.82	2.0		4.8	29	SILTY CLAY
7.6	322	467		333	431		16.7	76	46	0.34	3.8	3.4		0.94	2.7		5.1	37	SILTY CLAY
7.8	340	479		352	443		16.7	78	48	0.30	3.9	3.2		0.97	2.9		4.9	39	CLAY
8.0	359	510		370	474		16.7	79	50	0.32	4.0	3.6		0.99	3.0		5.7	42	CLAY
8.2	364	509		375	473		16.7	80	52	0.30	4.0	3.4		0.99	3.0		5.3	42	CLAY
8.4	365	563		374	527		16.7	82	54	0.48	3.9	5.3		0.97	2.9		8.2	42	SILTY CLAY
8.6	446	620		456	584		16.7	83	56	0.32	4.8	4.4		1.1	3.9		7.8	55	CLAY

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT007 DESCRIPTION
8.8	490	675		499	639		16.7	85	58	0.32	5.2	4.8		1.2	4.5		8.9	62	CLAY
9.0	536	784		542	748		17.7	86	60	0.43	5.6	7.1		1.3	5.0		13.6	69	SILTY CLAY
9.2	651	933		656	897		17.7	87	62	0.41	6.8	8.4		1.4	6.7		17.6	89	SILTY CLAY
9.4	613	907		617	871		17.7	89	64	0.46	6.2	8.8		1.3	5.9		17.7	81	SILTY CLAY
9.6	494	795		498	759		17.7	91	66	0.61	4.8	9.1		1.1	3.9		15.8	59	CLAYEY SILT
9.8	548	1857		501	1821		19.6	92	68	3.04	4.7	45.8				37	84.5		SILTY SAND
10.0	566	1432		541	1396		19.6	94	70	1.81	5.0	29.7				37	54.8		SILTY SAND
10.2	511	1605		475	1569		19.6	96	72	2.71	4.2	38.0				36	65.7		SILTY SAND
10.4	881	1348		876	1312		18.6	98	74	0.54	8.2	15.1		1.6	9.0		34.7	126	SILTY CLAY
10.6	617	1046		614	1010		17.7	100	76	0.73	5.4	13.7		1.2	4.7		25.7	76	CLAYEY SILT
10.8	607	1354		588	1318		19.1	101	77	1.43	5.0	25.3					46.4		SANDY SILT
11.0	526	1267		508	1231		17.7	103	79	1.69	4.1	25.1					41.7		SANDY SILT
11.2	608	1628		576	1592		19.6	105	81	2.06	4.7	35.3				37	63.5		SILTY SAND
11.4	410	1076		395	1040		18.6	107	83	2.07	2.9	22.4				34	30.3		SILTY SAND
11.6	414	1226		392	1190		18.6	109	85	2.60	2.8	27.7				34	37.9		SILTY SAND
11.8	705	1069		705	1033		17.7	110	87	0.53	5.6	11.4		1.3	5.0		21.7	88	SILTY CLAY
12.0	799	1313		792	1277		19.1	112	89	0.69	6.3	16.8		1.4	6.0		34.1	103	CLAYEY SILT
12.2	656	2440		585	2404		19.6	114	91	3.68	4.3	63.1				36	112.1		SAND
12.4	873	3083		781	3047		19.6	116	93	3.29	5.9	78.6				38	161.0		SILTY SAND
12.6	641	909		646	873		17.7	118	95	0.41	4.7	7.9		1.1	3.8		13.6	75	SILTY CLAY
12.8	578	808		585	772		17.7	119	97	0.38	4.1	6.5		1.0	3.1		10.3	64	SILTY CLAY
13.0	598	1003		596	967		17.7	121	99	0.75	4.1	12.9		1.0	3.1		20.6	66	CLAYEY SILT
13.2	624	1016		623	980		17.7	122	101	0.68	4.3	12.4		1.0	3.3		20.2	69	CLAYEY SILT
13.4	717	1034		720	998		17.7	124	103	0.45	5.0	9.7		1.2	4.2		17.2	85	SILTY CLAY
13.6	763	1127		763	1091		17.7	126	105	0.50	5.2	11.4		1.2	4.5		20.9	92	SILTY CLAY
13.8	720	1269		711	1233		19.1	127	107	0.86	4.8	18.1		1.1	3.9		31.7	83	SILT
14.0	742	975		749	939		17.7	129	109	0.30	5.0	6.6		1.2	4.1		11.8	88	CLAY
14.2	1096	1639		1087	1603		18.6	131	111	0.53	7.5	17.9		1.5	7.9		39.4	149	SILTY CLAY
14.4	1402	2012		1390	1976		18.6	132	113	0.46	9.7	20.3		1.8	11.7		50.1	208	SILTY CLAY
14.6	1787	2536		1768	2500		20.1	134	115	0.44	12.3	25.4		2.1	17.1		68.5	287	SILTY CLAY
14.8	1349	1943		1338	1907		18.6	136	117	0.47	9.0	19.7		1.7	10.4		47.2	195	SILTY CLAY
15.0	799	1249		795	1213		19.1	138	119	0.62	4.9	14.5		1.1	4.1		25.7	93	CLAYEY SILT
15.2	1064	1776		1047	1740		19.1	140	121	0.75	6.6	24.0		1.4	6.5		50.1	137	CLAYEY SILT
15.4	1048	1802		1029	1766		19.1	142	123	0.81	6.4	25.6		1.4	6.2		52.4	133	SILT
15.6	941	1069		953	1033		17.7	143	125	0.10	5.8	2.8		1.3	5.2		5.4	119	CLAY
15.8	965	1889		937	1853		19.1	145	127	1.13	5.6	31.8		1.3	5.0		61.1	115	SILT
16.0	1320	2519		1279	2483		20.6	147	129	1.05	7.8	41.8		1.6	8.4		94.3	178	SILT
16.2	1052	1879		1029	1843		19.1	149	130	0.91	6.0	28.2		1.3	5.6		56.2	130	SILT
16.4	844	1612		824	1576		19.1	151	132	1.09	4.6	26.1		1.1	3.7		45.0	94	SILT
16.6	1252	2299		1218	2263		20.6	153	134	0.96	7.1	36.3		1.5	7.2		78.2	164	SILT
16.8	313	795		308	759		17.7	155	136	2.64	1.1	15.7				29	13.3		SILTY SAND
17.0	447	838		446	802		17.7	157	138	1.16	2.0	12.4		0.53	0.98		11.0	34	SILT
17.2	597	1166		587	1130		17.7	158	140	1.21	2.8	18.8					23.7		SANDY SILT
17.4	760	1032		765	996		17.7	160	142	0.37	3.9	8.0		0.97	2.8		12.3	81	SILTY CLAY
17.6	731	963		738	927		17.7	161	144	0.32	3.7	6.6		0.92	2.6		9.7	76	CLAY
17.8	711	961		717	925		17.7	163	146	0.36	3.5	7.2		0.89	2.4		10.3	72	SILTY CLAY
18.0	794	1025		801	989		17.7	164	148	0.29	4.0	6.5		0.98	2.9		10.1	85	CLAY
18.2	955	1433		950	1397		18.6	166	150	0.56	4.8	15.5		1.1	4.0		27.2	110	SILTY CLAY
18.4	934	1433		928	1397		19.1	168	152	0.61	4.6	16.3		1.1	3.7		27.8	105	CLAYEY SILT
18.6	918	1363		914	1327		18.6	170	154	0.54	4.5	14.3		1.1	3.5		24.0	102	SILTY CLAY
18.8	843	1189		844	1153		17.7	171	156	0.45	4.0	10.7		0.99	3.0		16.8	90	SILTY CLAY
19.0	776	1081		779	1045		17.7	173	158	0.43	3.6	9.2		0.91	2.5		13.4	79	SILTY CLAY
19.2	691	886		700	850		17.7	174	160	0.28	3.1	5.2		0.80	2.0		6.8	66	CLAY
19.4	691	916		698	880		17.7	176	162	0.34	3.0	6.3		0.79	1.9		8.1	66	SILTY CLAY
19.6	719	1040		722	1004		17.7	178	164	0.51	3.1	9.8		0.81	2.0		12.9	69	SILTY CLAY
19.8	749	1047		753	1011		17.7	179	166	0.44	3.3	9.0		0.84	2.2		12.2	73	SILTY CLAY
20.0	796	1069		801	1033		17.7	181	168	0.37	3.5	8.1		0.89	2.4		11.5	80	SILTY CLAY
20.2	1043	1312		1048	1276		17.7	182	170	0.26	4.8	7.9		1.1	4.0		13.8	120	CLAY
20.4	1479	1929		1475	1893		18.6	184	172	0.32	7.1	14.5		1.5	7.2		31.1	197	CLAY

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT007 DESCRIPTION
20.6	1610	2512		1584	2476		20.6	186	174	0.63	7.6	31.0		1.5	8.0		68.7	216	CLAYEY SILT
20.8	1013	1497		1007	1461		18.6	188	176	0.55	4.4	15.7		1.1	3.5		26.2	112	SILTY CLAY
21.0	943	1376		940	1340		18.6	190	178	0.52	4.0	13.9		0.99	3.0		21.7	100	SILTY CLAY
21.2	933	1303		933	1267		18.6	191	180	0.44	3.9	11.6		0.97	2.9		17.9	98	SILTY CLAY
21.4	932	1249		935	1213		17.7	193	181	0.37	3.9	9.7		0.97	2.8		14.8	98	SILTY CLAY
21.6	1394	1773		1394	1737		18.6	195	183	0.28	6.2	11.9		1.3	5.9		24.0	177	CLAY
21.8	1666	2655		1635	2619		20.6	196	185	0.68	7.4	34.1		1.5	7.7		74.8	221	CLAYEY SILT
22.0	1211	1705		1205	1669		18.6	199	187	0.46	5.1	16.1		1.2	4.3		29.2	142	SILTY CLAY
22.2	1201	1535		1203	1499		18.6	200	189	0.29	5.1	10.3		1.2	4.3		18.5	141	CLAY
22.4	1636	2125		1630	2089		18.6	202	191	0.32	7.1	15.9		1.5	7.3		34.3	217	CLAY
22.6	2632	3957		2584	3921		20.1	204	193	0.56	11.7	46.4		2.0	15.8		122.9	409	SILTY CLAY

DMT008	LEGEND	INTERPRETED PARAMETERS	GENERAL PARAMETERS
21 MAR 2024	Z = Depth Below Ground Level	Phi = Safe floor value of Friction Angle	DeltaA = 12 kPa
McMillan Drilling	Po,P1,P2 = Corrected A,B,C readings	Ko = In situ earth press. coeff.	DeltaB = 98 kPa
ENGEO	Id = Material Index	M = Constrained modulus (at Sigma')	GammaTop = 17.0 kN/m^3
302219	Ed = Dilatometer Modulus	Cu = Undrained shear strength	FactorEd = 34.7
Pukekohe Park	Ud = Pore Press. Index = (P2-Uo)/(Po-Uo)	Ocr = Overconsolidation ratio	Zm = 0.0 kPa
1770486.49mE, 5879177.64mN NZTM	Gamma = Bulk unit weight	(OCR = 'relative OCR'- generally	Zabs = 0.0 m
	Sigma' = Effective overb. stress	realistic. If accurate independent OCR	Zw = 1.9 m
	Uo = Pore pressure	available, apply suitable factor)	

WaterTable at 1.90 m
Reduction formulae according to Marchetti, ASCE Geot.Jnl.Mar. 1980, Vol.109, 299-321; Phi according to TC16 ISSMGE, 2001

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT008 DESCRIPTION
0.2	262	759		255	661		17.7	3	0	1.60	74.9	14.1					62.1		SANDY SILT
0.4	150	430		154	332		16.7	7	0	1.16	22.1	6.2		2.9	42.7		20.1	31	SILT
0.6	122	402		126	304		15.7	10	0	1.42	12.2	6.2					16.7		SANDY SILT
0.8	212	550		213	452		16.7	13	0	1.13	15.9	8.3		2.4	25.3		24.4	39	SILT
1.0	139	371		145	273		15.7	17	0	0.88	8.7	4.4		1.7	9.9		10.5	23	SILT
1.2	64	236		73	138		15.7	20	0	0.89	3.7	2.3		0.92	2.6		3.4	9	SILT
1.4	83	238		93	140		15.7	23	0	0.51	4.0	1.6		0.99	3.0		2.6	12	SILTY CLAY
1.6	96	268		105	170		15.7	26	0	0.62	4.0	2.3		0.99	3.0		3.5	14	CLAYEY SILT
1.8	70	244		79	146		15.7	29	0	0.85	2.7	2.3		0.72	1.6		2.7	9	SILT
2.0	88	244		98	146		15.7	31	1	0.50	3.1	1.7		0.80	2.0		2.2	12	SILTY CLAY
2.2	132	314		140	216		15.7	33	3	0.55	4.2	2.6		1.0	3.2		4.2	18	SILTY CLAY
2.4	98	269		107	171		15.7	34	5	0.63	3.0	2.2		0.79	1.9		2.8	12	CLAYEY SILT
2.6	98	254		108	156		15.7	35	7	0.48	2.9	1.7		0.76	1.8		2.1	12	SILTY CLAY
2.8	42	204		51	106		15.7	36	9	1.28	1.2	1.9					1.6		SANDY SILT
3.0	93	333		98	235		15.7	37	11	1.56	2.3	4.7					5.2		SANDY SILT
3.2	207	554		207	456		16.7	39	13	1.28	5.0	8.6					15.8		SANDY SILT
3.4	156	401		161	303		15.7	40	15	0.97	3.7	4.9		0.92	2.6		7.4	19	SILT
3.6	147	353		154	255		15.7	41	17	0.73	3.3	3.5		0.86	2.2		4.9	17	CLAYEY SILT
3.8	193	404		200	306		15.7	42	19	0.58	4.3	3.7		1.0	3.3		6.0	24	SILTY CLAY
4.0	139	360		145	262		15.7	43	21	0.93	2.9	4.0		0.76	1.8		5.1	15	SILT
4.2	133	320		141	222		15.7	45	23	0.68	2.7	2.8		0.71	1.6		3.2	14	CLAYEY SILT
4.4	133	347		140	249		15.7	46	25	0.95	2.5	3.8		0.67	1.4		4.2	13	SILT
4.6	175	406		181	308		15.7	47	26	0.82	3.3	4.4		0.85	2.2		6.1	19	SILT
4.8	197	460		201	362		16.7	48	28	0.93	3.6	5.6		0.91	2.5		8.2	22	SILT
5.0	225	411		233	313		15.7	50	30	0.39	4.1	2.8		1.0	3.1		4.4	27	SILTY CLAY
5.2	277	495		284	397		16.7	51	32	0.45	5.0	3.9		1.2	4.1		7.0	35	SILTY CLAY
5.4	249	432		257	334		15.7	52	34	0.34	4.3	2.7		1.0	3.3		4.3	30	SILTY CLAY
5.6	258	432		267	334		15.7	53	36	0.29	4.3	2.3		1.0	3.3		3.8	31	CLAY
5.8	234	401		243	303		15.7	54	38	0.29	3.8	2.1		0.94	2.7		3.1	26	CLAY
6.0	246	433		254	335		15.7	56	40	0.38	3.8	2.8		0.96	2.8		4.3	28	SILTY CLAY
6.2	268	512		273	414		16.7	57	42	0.61	4.1	4.9		1.0	3.0		7.7	30	CLAYEY SILT
6.4	305	521		312	423		16.7	58	44	0.42	4.6	3.9		1.1	3.7		6.6	36	SILTY CLAY
6.6	285	471		293	373		15.7	60	46	0.32	4.2	2.8		1.0	3.1		4.4	33	CLAY
6.8	292	478		300	380		15.7	61	48	0.32	4.2	2.8		1.0	3.1		4.4	33	CLAY
7.0	327	510		335	412		16.7	62	50	0.27	4.6	2.7		1.1	3.7		4.5	39	CLAY
7.2	332	519		340	421		16.7	63	52	0.28	4.6	2.8		1.1	3.6		4.8	39	CLAY
7.4	354	543		362	445		16.7	65	54	0.27	4.8	2.9		1.1	3.9		5.0	42	CLAY
7.6	388	592		395	494		16.7	66	56	0.29	5.1	3.4		1.2	4.4		6.2	47	CLAY
7.8	422	693		426	595		16.7	67	58	0.46	5.5	5.9		1.2	4.8		11.0	52	SILTY CLAY
8.0	398	602		405	504		16.7	69	60	0.29	5.0	3.4		1.2	4.2		6.1	48	CLAY
8.2	423	663		429	565		16.7	70	62	0.37	5.2	4.7		1.2	4.5		8.7	51	SILTY CLAY
8.4	417	721		419	623		16.7	71	64	0.57	5.0	7.1		1.2	4.2		12.6	49	SILTY CLAY
8.6	634	1056		630	958		17.7	73	66	0.58	7.8	11.4		1.6	8.3		25.5	87	SILTY CLAY

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT008 DESCRIPTION
8.8	464	910		459	812		17.7	74	68	0.90	5.3	12.2		1.2	4.5		22.7	55	SILT
9.0	396	939		386	841		17.7	76	70	1.44	4.2	15.8					26.0		SANDY SILT
9.2	287	754		281	656		16.7	78	72	1.79	2.7	13.0					16.4		SANDY SILT
9.4	291	560		295	462		16.7	79	74	0.75	2.8	5.8		0.74	1.7		7.0	27	CLAYEY SILT
9.6	462	710		467	612		16.7	80	76	0.37	4.9	5.0		1.1	4.0		8.9	54	SILTY CLAY
9.8	473	762		476	664		17.7	82	77	0.47	4.9	6.5		1.1	4.0		11.5	55	SILTY CLAY
10.0	399	766		398	668		17.7	83	79	0.85	3.8	9.4		0.95	2.8		14.3	41	SILT
10.2	489	1411		460	1313		18.6	85	81	2.25	4.5	29.6				37	52.1		SILTY SAND
10.4	414	998		402	900		17.7	87	83	1.56	3.7	17.3					26.6		SANDY SILT
10.6	202	912		184	814		17.7	88	85	6.39	1.1	21.9				29	18.6		SAND
10.8	492	855		491	757		17.7	90	87	0.66	4.5	9.2		1.1	3.6		15.5	54	CLAYEY SILT
11.0	534	854		536	756		17.7	91	89	0.49	4.9	7.7		1.1	4.0		13.5	61	SILTY CLAY
11.2	546	913		545	815		17.7	93	91	0.59	4.9	9.4		1.1	4.0		16.5	62	SILTY CLAY
11.4	388	984		376	886		18.6	94	93	1.81	3.0	17.7				34	24.0		SILTY SAND
11.6	680	972		683	874		17.7	96	95	0.33	6.1	6.6		1.3	5.7		13.2	85	CLAY
11.8	875	1442		864	1344		19.1	98	97	0.63	7.8	16.7		1.6	8.5		37.5	119	CLAYEY SILT
12.0	1117	1685		1106	1587		18.6	100	99	0.48	10.1	16.7		1.8	12.6		41.9	166	SILTY CLAY
12.2	926	1421		919	1323		18.6	101	101	0.49	8.1	14.0		1.6	8.8		32.0	127	SILTY CLAY
12.4	845	1857		812	1759		19.1	103	103	1.34	6.9	32.9					70.1		SANDY SILT
12.6	667	992		668	894		17.7	105	105	0.40	5.4	7.8		1.2	4.7		14.6	79	SILTY CLAY
12.8	1334	1990		1319	1892		18.6	107	107	0.47	11.4	19.9		2.0	15.1		52.1	206	SILTY CLAY
13.0	1467	2117		1452	2019		18.6	108	109	0.42	12.4	19.7		2.1	17.3		53.2	233	SILTY CLAY
13.2	1789	2474		1772	2376		20.1	110	111	0.36	15.1	21.0		2.4	23.4		60.5	303	SILTY CLAY
13.4	1695	2416		1676	2318		20.1	112	113	0.41	13.9	22.3		2.2	20.7		62.7	279	SILTY CLAY
13.6	1225	1886		1209	1788		18.6	114	115	0.53	9.6	20.1		1.8	11.5		49.3	178	SILTY CLAY
13.8	976	1484		968	1386		18.6	116	117	0.49	7.3	14.5		1.5	7.6		31.7	130	SILTY CLAY
14.2	1573	3293		1505	3195		20.6	120	121	1.22	11.6	58.7					154.8		SANDY SILT
14.4	1627	3331		1559	3233		20.6	122	123	1.16	11.8	58.1		2.0	16.0		154.3	246	SILT
14.6	459	1039		448	941		17.7	124	125	1.53	2.6	17.1					20.6		SANDY SILT
14.8	675	1613		646	1515		19.1	125	127	1.67	4.1	30.2					50.0		SANDY SILT
15.0	976	1582		963	1484		19.1	127	129	0.62	6.6	18.1		1.4	6.4		37.4	124	CLAYEY SILT
15.2	652	918		656	820		17.7	129	130	0.31	4.1	5.7		1.0	3.0		9.0	69	CLAY
15.4	670	959		673	861		17.7	131	132	0.35	4.1	6.5		1.0	3.1		10.4	71	SILTY CLAY
15.6	751	1189		747	1091		17.7	132	134	0.56	4.6	12.0		1.1	3.7		20.4	83	SILTY CLAY
15.8	767	1082		769	984		17.7	134	136	0.34	4.7	7.5		1.1	3.8		12.9	86	SILTY CLAY
16.0	706	1059		706	961		17.7	135	138	0.45	4.2	8.9		1.0	3.2		14.2	75	SILTY CLAY
16.2	706	970		710	872		17.7	137	140	0.28	4.2	5.6		1.0	3.1		9.0	75	CLAY
16.4	672	938		676	840		17.7	139	142	0.31	3.9	5.7		0.96	2.8		8.7	69	CLAY
16.6	746	1057		748	959		17.7	140	144	0.35	4.3	7.3		1.0	3.3		12.0	80	SILTY CLAY
16.8	788	1047		793	949		17.7	142	146	0.24	4.6	5.4		1.1	3.6		9.2	87	CLAY
17.0	947	1325		946	1227		17.7	143	148	0.35	5.6	9.8		1.3	4.9		18.5	113	SILTY CLAY
17.2	1109	1590		1102	1492		18.6	145	150	0.41	6.6	13.5		1.4	6.4		28.0	141	SILTY CLAY
17.4	963	1331		962	1233		17.7	147	152	0.33	5.5	9.4		1.2	4.9		17.8	115	SILTY CLAY
17.6	943	1294		943	1196		17.7	148	154	0.32	5.3	8.8		1.2	4.6		16.3	111	CLAY
17.8	854	1186		855	1088		17.7	150	156	0.33	4.7	8.1		1.1	3.8		13.9	95	SILTY CLAY
18.0	727	1040		729	942		17.7	151	158	0.37	3.8	7.4		0.94	2.7		11.1	74	SILTY CLAY
18.2	755	1140		753	1042		17.7	153	160	0.49	3.9	10.0		0.96	2.8		15.3	77	SILTY CLAY
18.4	797	1113		799	1015		17.7	154	162	0.34	4.1	7.5		1.0	3.1		11.9	84	SILTY CLAY
18.6	733	1168		729	1070		17.7	156	164	0.60	3.6	11.8		0.91	2.5		17.3	72	CLAYEY SILT
18.8	835	1187		835	1089		17.7	158	166	0.38	4.2	8.8		1.0	3.2		14.3	89	SILTY CLAY
19.0	780	1060		784	962		17.7	159	168	0.29	3.9	6.2		0.96	2.8		9.5	80	CLAY
19.2	776	1035		781	937		17.7	161	170	0.26	3.8	5.4		0.95	2.7		8.2	79	CLAY
19.4	1137	1676		1128	1578		18.6	162	172	0.47	5.9	15.6		1.3	5.4		30.6	138	SILTY CLAY
19.6	1947	3185		1903	3087		20.6	164	174	0.69	10.5	41.1		1.9	13.4		104.8	288	CLAYEY SILT
19.8	1546	2184		1532	2086		18.6	166	176	0.41	8.2	19.2		1.6	9.0		44.1	212	SILTY CLAY
20.0	963	1292		964	1194		17.7	168	178	0.29	4.7	8.0		1.1	3.8		13.7	107	CLAY
20.2	943	1330		941	1232		17.7	170	180	0.38	4.5	10.1		1.1	3.5		17.0	103	SILTY CLAY
20.4	1154	1659		1146	1561		18.6	171	181	0.43	5.6	14.4		1.3	5.0		27.5	138	SILTY CLAY
20.6	1908	2524		1895	2426		20.1	173	183	0.31	9.9	18.4		1.8	12.1		45.9	281	CLAY

DMT009	LEGEND	INTERPRETED PARAMETERS	GENERAL PARAMETERS
25 MAR 2024	Z = Depth Below Ground Level	Phi = Safe floor value of Friction Angle	DeltaA = 15 kPa
McMillan Drilling	Po,P1,P2 = Corrected A,B,C readings	Ko = In situ earth press. coeff.	DeltaB = 40 kPa
ENGEO	Id = Material Index	M = Constrained modulus (at Sigma')	GammaTop = 17.0 kN/m^3
302219	Ed = Dilatometer Modulus	Cu = Undrained shear strength	FactorEd = 34.7
Pukekohe Park	Ud = Pore Press. Index = (P2-Uo)/(Po-Uo)	Ocr = Overconsolidation ratio	Zm = 0.0 kPa
1769997.38mE, 5879224.40mN NZTM	Gamma = Bulk unit weight	(OCR = 'relative OCR'- generally	Zabs = 0.0 m
	Sigma' = Effective overb. stress	realistic. If accurate independent OCR	Zw = 5.4 m
	Uo = Pore pressure	available, apply suitable factor)	

WaterTable at 5.40 m
Reduction formulae according to Marchetti, ASCE Geot.Jnl.Mar. 1980, Vol.109, 299-321; Phi according to TC16 ISSMGE, 2001

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT009 DESCRIPTION
0.2	277	529		282	489		16.7	3	0	0.73	83.0	7.2		6.0	>99.9		32.3	79	CLAYEY SILT
0.4	287	705		284	665		17.7	7	0	1.34	42.1	13.2					51.1		SANDY SILT
0.6	130	455		132	415		17.7	10	0	2.16	12.8	9.8				42	26.9		SILTY SAND
0.8	136	432		139	392		17.7	14	0	1.82	10.1	8.8				41	22.0		SILTY SAND
1.0	258	802		249	762		18.6	17	0	2.07	14.3	17.8				42	50.6		SILTY SAND
1.2	405	878		399	838		17.7	21	0	1.10	19.0	15.2		2.7	33.5		47.3	77	SILT
1.4	454	984		445	944		17.7	25	0	1.12	18.1	17.3		2.6	31.2		53.0	85	SILT
1.6	613	1189		602	1149		19.1	28	0	0.91	21.4	19.0		2.9	40.5		61.1	120	SILT
1.8	362	779		359	739		17.7	32	0	1.06	11.2	13.2		2.0	14.8		34.4	61	SILT
2.0	473	1151		457	1111		17.7	35	0	1.43	12.9	22.7					62.2		SANDY SILT
2.2	765	1619		740	1579		19.1	39	0	1.13	19.0	29.1		2.7	33.5		90.4	143	SILT
2.4	1187	3022		1113	2982		20.6	43	0	1.68	26.0	64.9					220.8		SANDY SILT
2.6	1438	3182		1369	3142		20.6	47	0	1.30	29.1	61.5					216.2		SANDY SILT
2.8	291	596		294	556		16.7	51	0	0.89	5.7	9.1		1.3	5.2		17.7	42	SILT
3.0	252	427		261	387		16.7	54	0	0.48	4.8	4.4		1.1	3.9		7.6	36	SILTY CLAY
3.2	411	1102		394	1062		17.7	58	0	1.69	6.8	23.2					49.5		SANDY SILT
3.4	631	1642		598	1602		19.1	61	0	1.68	9.8	34.8					86.3		SANDY SILT
3.6	519	1397		493	1357		19.1	65	0	1.75	7.6	30.0					67.0		SANDY SILT
3.8	514	1199		497	1159		17.7	69	0	1.33	7.2	23.0					50.1		SANDY SILT
4.0	512	1090		501	1050		17.7	72	0	1.10	6.9	19.1		1.4	6.9		40.7	75	SILT
4.2	511	1083		500	1043		17.7	76	0	1.09	6.6	18.8		1.4	6.4		39.3	74	SILT
4.4	326	656		327	616		17.7	80	0	0.88	4.1	10.0		1.0	3.1		16.1	43	SILT
4.6	333	614		337	574		16.7	83	0	0.70	4.1	8.2		0.99	3.0		13.0	44	CLAYEY SILT
4.8	214	431		221	391		16.7	86	0	0.77	2.6	5.9		0.68	1.5		6.6	26	CLAYEY SILT
5.0	286	487		294	447		16.7	90	0	0.52	3.3	5.3		0.84	2.2		7.2	37	SILTY CLAY
5.2	222	409		230	369		16.7	93	0	0.60	2.5	4.8		0.66	1.4		5.1	27	CLAYEY SILT
5.4	254	451		262	411		16.7	96	0	0.57	2.7	5.2		0.72	1.6		6.0	31	SILTY CLAY
5.6	276	518		282	478		16.7	98	2	0.70	2.9	6.8		0.75	1.8		8.4	34	CLAYEY SILT
5.8	288	591		291	551		16.7	99	4	0.91	2.9	9.0		0.76	1.8		11.3	35	SILT
6.0	287	639		287	599		16.7	101	6	1.11	2.8	10.8		0.74	1.7		13.4	34	SILT
6.2	286	504		293	464		16.7	102	8	0.60	2.8	5.9		0.74	1.7		7.1	34	CLAYEY SILT
6.4	262	488		268	448		16.7	103	10	0.69	2.5	6.2		0.67	1.4		6.8	30	CLAYEY SILT
6.6	208	433		215	393		16.7	105	12	0.88	1.9	6.2		0.53	0.95		5.3	22	SILT
6.8	243	485		249	445		16.7	106	14	0.84	2.2	6.8		0.60	1.2		6.7	27	SILT
7.0	245	514		249	474		16.7	107	16	0.96	2.2	7.8		0.59	1.1		7.6	26	SILT
7.2	280	554		284	514		16.7	109	18	0.86	2.4	8.0		0.66	1.4		8.6	31	SILT
7.4	469	749		473	709		17.7	110	20	0.52	4.1	8.2		1.0	3.1		13.0	60	SILTY CLAY
7.6	341	556		348	516		16.7	112	22	0.51	2.9	5.8		0.77	1.8		7.2	39	SILTY CLAY
7.8	481	808		482	768		17.7	113	24	0.62	4.1	9.9		1.0	3.0		15.6	60	CLAYEY SILT
8.0	412	684		416	644		17.7	115	26	0.58	3.4	7.9		0.87	2.3		11.0	49	SILTY CLAY
8.2	402	744		403	704		17.7	116	27	0.80	3.2	10.5		0.83	2.1		14.2	47	SILT
8.4	341	571		347	531		16.7	118	29	0.58	2.7	6.4		0.72	1.6		7.4	38	SILTY CLAY
8.6	383	720		384	680		17.7	119	31	0.84	3.0	10.3		0.78	1.8		13.1	43	SILT

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT009 DESCRIPTION
8.8	398	678		402	638		17.7	121	33	0.64	3.1	8.2		0.80	1.9		10.5	45	CLAYEY SILT
9.0	407	661		412	621		17.7	122	35	0.55	3.1	7.3		0.80	2.0		9.4	46	SILTY CLAY
9.2	382	643		387	603		16.7	124	37	0.62	2.8	7.5		0.74	1.7		9.0	42	CLAYEY SILT
9.4	315	553		321	513		16.7	125	39	0.68	2.2	6.7		0.61	1.2		6.5	32	CLAYEY SILT
9.6	446	655		453	615		16.7	127	41	0.39	3.3	5.6		0.84	2.1		7.6	51	SILTY CLAY
9.8	395	615		402	575		16.7	128	43	0.48	2.8	6.0		0.74	1.7		7.2	43	SILTY CLAY
10.0	428	621		436	581		16.7	129	45	0.37	3.0	5.0		0.79	1.9		6.4	48	SILTY CLAY
10.2	468	722		473	682		17.7	131	47	0.49	3.3	7.3		0.84	2.1		9.8	53	SILTY CLAY
10.4	425	709		429	669		17.7	132	49	0.63	2.9	8.3		0.76	1.8		10.2	46	CLAYEY SILT
10.6	408	676		412	636		17.7	134	51	0.62	2.7	7.8		0.72	1.6		9.0	43	CLAYEY SILT
10.8	405	652		410	612		16.7	135	53	0.56	2.6	7.0		0.70	1.5		7.9	42	SILTY CLAY
11.0	434	748		436	708		17.7	137	55	0.71	2.8	9.4		0.74	1.7		11.3	46	CLAYEY SILT
11.2	462	799		463	759		17.7	138	57	0.73	2.9	10.3		0.77	1.8		12.9	49	CLAYEY SILT
11.4	600	906		602	866		17.7	140	59	0.48	3.9	9.1		0.96	2.8		14.0	71	SILTY CLAY
11.6	676	936		681	896		17.7	142	61	0.35	4.4	7.5		1.1	3.4		12.4	83	SILTY CLAY
11.8	637	943		639	903		17.7	143	63	0.46	4.0	9.1		0.99	3.0		14.3	76	SILTY CLAY
12.0	459	599		470	559		16.7	145	65	0.22	2.8	3.1		0.74	1.7		3.7	48	CLAY
12.2	401	893		394	853		17.7	146	67	1.40	2.2	15.9					16.6		SANDY SILT
12.4	307	576		311	536		16.7	148	69	0.93	1.6	7.8		0.44	<0.8		6.6	25	SILT
12.6	385	659		389	619		16.7	149	71	0.72	2.1	8.0		0.58	1.1		7.4	36	CLAYEY SILT
12.8	348	570		355	530		16.7	150	73	0.62	1.9	6.1		0.51	0.91		5.2	31	CLAYEY SILT
13.0	495	677		504	637		16.7	152	75	0.31	2.8	4.6		0.75	1.7		5.6	51	CLAY
13.2	509	691		518	651		16.7	153	77	0.30	2.9	4.6		0.76	1.8		5.7	53	CLAY
13.4	543	716		552	676		16.7	154	78	0.26	3.1	4.3		0.80	2.0		5.5	58	CLAY
13.6	657	1482		634	1442		19.1	156	80	1.46	3.5	28.1					42.0		SANDY SILT
13.8	591	839		596	799		17.7	158	82	0.39	3.3	7.0		0.84	2.1		9.5	64	SILTY CLAY
14.0	768	1008		774	968		17.7	159	84	0.28	4.3	6.7		1.0	3.3		11.1	92	CLAY
14.2	897	1306		894	1266		18.6	161	86	0.46	5.0	12.9		1.2	4.2		23.1	112	SILTY CLAY
14.4	878	1313		874	1273		18.6	163	88	0.51	4.8	13.8		1.1	4.0		24.3	108	SILTY CLAY
14.6	669	983		671	943		17.7	164	90	0.47	3.5	9.4		0.89	2.4		13.5	74	SILTY CLAY
14.8	797	1174		796	1134		17.7	166	92	0.48	4.2	11.7		1.0	3.2		19.0	93	SILTY CLAY
15.0	855	1224		854	1184		18.6	168	94	0.43	4.5	11.4		1.1	3.6		19.3	103	SILTY CLAY
15.2	916	1327		913	1287		18.6	169	96	0.46	4.8	13.0		1.1	4.0		22.7	112	SILTY CLAY
15.4	893	1311		890	1271		18.6	171	98	0.48	4.6	13.2		1.1	3.7		22.6	107	SILTY CLAY
15.6	1034	1439		1032	1399		18.6	173	100	0.39	5.4	12.8		1.2	4.7		23.8	131	SILTY CLAY
15.8	1162	1972		1139	1932		19.1	175	102	0.76	5.9	27.5		1.3	5.5		54.2	150	CLAYEY SILT
16.0	1484	2334		1459	2294		20.6	176	104	0.62	7.7	29.0		1.6	8.2		64.6	209	CLAYEY SILT
16.2	1538	2352		1515	2312		20.1	179	106	0.57	7.9	27.7		1.6	8.5		62.4	218	SILTY CLAY
16.4	1462	2181		1444	2141		20.1	181	108	0.52	7.4	24.2		1.5	7.7		53.0	204	SILTY CLAY
16.6	833	1574		814	1534		19.1	183	110	1.02	3.9	25.0		0.96	2.8		38.7	91	SILT
16.8	872	1405		863	1365		19.1	185	112	0.67	4.1	17.4		1.0	3.0		27.6	99	CLAYEY SILT
17.0	854	1427		843	1387		19.1	186	114	0.75	3.9	18.9		0.97	2.9		29.2	95	CLAYEY SILT
17.2	795	1557		775	1517		19.1	188	116	1.13	3.5	25.8		0.89	2.4		37.6	83	SILT
17.4	739	1244		731	1204		19.1	190	118	0.77	3.2	16.4		0.83	2.1		22.2	76	CLAYEY SILT
17.6	1017	1927		989	1887		19.1	192	120	1.03	4.5	31.2		1.1	3.6		53.3	117	SILT
17.8	996	2025		962	1985		19.1	194	122	1.22	4.3	35.5					59.5		SANDY SILT
18.0	842	1250		839	1210		18.6	196	124	0.52	3.7	12.9		0.92	2.6		18.9	92	SILTY CLAY
18.2	961	1288		962	1248		18.6	198	126	0.34	4.2	9.9		1.0	3.2		16.1	111	SILTY CLAY
18.4	1054	1759		1037	1719		19.1	199	128	0.75	4.6	23.7		1.1	3.6		40.3	123	CLAYEY SILT
18.6	1008	1503		1001	1463		18.6	201	129	0.53	4.3	16.0		1.0	3.3		26.3	116	SILTY CLAY
18.8	1074	1513		1070	1473		18.6	203	131	0.43	4.6	14.0		1.1	3.7		23.9	127	SILTY CLAY
19.0	943	1356		940	1316		18.6	205	133	0.47	3.9	13.0		0.97	2.9		20.2	105	SILTY CLAY
19.2	1021	1359		1022	1319		18.6	206	135	0.34	4.3	10.3		1.0	3.3		16.8	118	SILTY CLAY
19.4	1028	1385		1028	1345		18.6	208	137	0.36	4.3	11.0		1.0	3.3		17.9	118	SILTY CLAY
19.6	1140	1639		1133	1599		18.6	210	139	0.47	4.7	16.2		1.1	3.8		28.0	136	SILTY CLAY
19.8	1144	1714		1133	1674		18.6	212	141	0.55	4.7	18.8		1.1	3.8		32.3	135	SILTY CLAY
20.0	1044	1460		1041	1420		18.6	214	143	0.42	4.2	13.2		1.0	3.2		21.2	119	SILTY CLAY
20.2	904	1316		901	1276		18.6	215	145	0.50	3.5	13.0		0.89	2.4		18.6	96	SILTY CLAY
20.4	873	1196		875	1156		17.7	217	147	0.39	3.4	9.8		0.86	2.2		13.5	91	SILTY CLAY

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT009 DESCRIPTION
20.6	913	1276		913	1236		18.6	219	149	0.42	3.5	11.2		0.89	2.4		16.0	97	SILTY CLAY
20.8	927	1235		929	1195		17.7	220	151	0.34	3.5	9.2		0.89	2.4		13.2	99	SILTY CLAY
21.0	946	1232		949	1192		17.7	222	153	0.30	3.6	8.4		0.91	2.5		12.2	101	CLAY
21.2	970	1355		969	1315		18.6	224	155	0.43	3.6	12.0		0.92	2.6		17.6	104	SILTY CLAY
21.4	999	1411		996	1371		18.6	225	157	0.45	3.7	13.0		0.93	2.6		19.4	108	SILTY CLAY
21.6	1037	1367		1038	1327		18.6	227	159	0.33	3.9	10.0		0.96	2.8		15.3	114	CLAY
21.8	1078	1422		1079	1382		18.6	229	161	0.33	4.0	10.5		0.99	3.0		16.5	120	SILTY CLAY
22.0	1117	1509		1115	1469		18.6	231	163	0.37	4.1	12.3		1.0	3.1		19.6	126	SILTY CLAY
22.2	1112	1479		1111	1439		18.6	232	165	0.35	4.1	11.4		1.0	3.0		18.0	124	SILTY CLAY
22.4	1180	1601		1177	1561		18.6	234	167	0.38	4.3	13.3		1.0	3.3		21.8	135	SILTY CLAY
22.6	1026	1445		1023	1405		18.6	236	169	0.45	3.6	13.3		0.91	2.5		19.3	109	SILTY CLAY
22.8	926	1392		920	1352		18.6	238	171	0.58	3.2	15.0		0.82	2.0		19.7	92	SILTY CLAY
23.0	1220	1650		1216	1610		18.6	239	173	0.38	4.4	13.7		1.0	3.4		22.5	139	SILTY CLAY
23.2	1222	1632		1219	1592		18.6	241	175	0.36	4.3	12.9		1.0	3.3		21.2	139	SILTY CLAY
23.4	1217	1624		1214	1584		18.6	243	177	0.36	4.3	12.8		1.0	3.3		20.9	138	SILTY CLAY
23.6	1060	1669		1047	1629		19.1	245	179	0.67	3.5	20.2		0.90	2.5		29.1	110	CLAYEY SILT
23.8	1107	1623		1099	1583		18.6	247	181	0.53	3.7	16.8		0.93	2.6		25.0	118	SILTY CLAY
24.0	960	1430		954	1390		18.6	248	182	0.56	3.1	15.1		0.81	2.0		19.7	95	SILTY CLAY
24.2	617	1275		602	1235		17.7	250	184	1.52	1.7	22.0					18.7		SANDY SILT
24.4	742	1694		712	1654		19.1	252	186	1.79	2.1	32.7					33.2		SANDY SILT
24.6	853	1944		816	1904		19.1	254	188	1.73	2.5	37.7					44.3		SANDY SILT
24.8	1126	2786		1061	2746		21.1	255	190	1.94	3.4	58.5				35	87.2		SILTY SAND

DMT010

21 MAR 2024

McMillan Drilling
ENGEO
302219
Pukekohe Park
1770636.23mE, 5879037.86mN NZTM

LEGEND
Z = Depth Below Ground Level
Po,P1,P2 = Corrected A,B,C readings
Id = Material Index
Ed = Dilatometer Modulus
Ud = Pore Press. Index = (P2-Uo)/(Po-Uo)
Gamma = Bulk unit weight
Sigma' = Effective overb. stress
Uo = Pore pressure

INTERPRETED PARAMETERS
Phi = Safe floor value of Friction Angle
Ko = In situ earth press. coeff.
M = Constrained modulus (at Sigma')
Cu = Undrained shear strength
Ocr = Overconsolidation ratio
(OCR = 'relative OCR'- generally realistic. If accurate independent OCR available, apply suitable factor)

GENERAL PARAMETERS
DeltaA = 18 kPa
DeltaB = 38 kPa
GammaTop = 17.0 kN/m^3
FactorEd = 34.7
Zm = 0.0 kPa
Zabs = 0.0 m
Zw = 3.2 m

WaterTable at 3.20 m
Reduction formulae according to Marchetti, ASCE Geot.Jnl.Mar. 1980, Vol.109, 299-321; Phi according to TC16 ISSMGE, 2001

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT010 DESCRIPTION
0.2	301	586		308	548		16.7	3	0	0.78	90.5	8.3		6.3	>99.9		38.3	88	CLAYEY SILT
0.4	542	1265		527	1227		19.1	7	0	1.33	78.2	24.3					108.1		SANDY SILT
0.6	645	1475		624	1437		19.1	11	0	1.30	59.1	28.2					117.9		SANDY SILT
0.8	491	1164		478	1126		17.7	14	0	1.35	33.2	22.5					81.8		SANDY SILT
1.0	396	1037		385	999		17.7	18	0	1.60	21.5	21.3					68.7		SANDY SILT
1.2	522	1246		507	1208		19.1	21	0	1.38	23.6	24.3					80.7		SANDY SILT
1.4	424	1141		409	1103		17.7	25	0	1.70	16.2	24.1					71.2		SANDY SILT
1.6	343	783		342	745		17.7	29	0	1.18	11.9	14.0		2.0	16.1		37.2	59	SILT
1.8	246	577		250	539		16.7	32	0	1.15	7.7	10.0		1.6	8.3		22.5	39	SILT
2.0	162	402		171	364		16.7	36	0	1.13	4.8	6.7		1.1	3.9		11.9	23	SILT
2.2	138	366		147	328		16.7	39	0	1.23	3.8	6.3					9.7		SANDY SILT
2.4	173	392		183	354		16.7	42	0	0.94	4.3	5.9		1.0	3.3		9.8	24	SILT
2.6	131	300		143	262		15.7	46	0	0.83	3.1	4.1		0.81	2.0		5.5	18	SILT
2.8	129	301		141	263		15.7	49	0	0.86	2.9	4.2		0.76	1.8		5.3	17	SILT
3.0	144	365		154	327		16.7	52	0	1.13	3.0	6.0		0.78	1.8		7.8	19	SILT
3.2	70	228		83	190		15.7	55	0	1.29	1.5	3.7					3.2		SANDY SILT
3.4	95	228		109	190		15.7	56	2	0.75	1.9	2.8		0.52	0.92		2.4	12	CLAYEY SILT
3.6	68	181		83	143		15.7	58	4	0.76	1.4	2.1		0.36	<0.8		1.8	8	CLAYEY SILT
3.8	137	301		150	263		15.7	59	6	0.79	2.4	3.9		0.66	1.4		4.2	17	CLAYEY SILT
4.0	152	265		167	227		15.7	60	8	0.38	2.7	2.1		0.71	1.6		2.4	19	SILTY CLAY
4.2	213	357		227	319		15.7	61	10	0.43	3.5	3.2		0.90	2.4		4.6	28	SILTY CLAY
4.4	220	371		233	333		16.7	62	12	0.45	3.6	3.5		0.90	2.5		5.0	28	SILTY CLAY
4.6	244	405		257	367		16.7	64	14	0.45	3.8	3.8		0.95	2.7		5.8	31	SILTY CLAY
4.8	277	409		291	371		16.7	65	16	0.29	4.2	2.8		1.0	3.2		4.5	37	CLAY
5.0	279	391		294	353		15.7	66	18	0.21	4.2	2.0		1.0	3.1		3.3	37	CLAY
5.2	433	1025		424	987		17.7	68	20	1.39	6.0	19.5					39.0		SANDY SILT
5.4	352	1115		335	1077		18.6	69	22	2.37	4.5	25.8				37	45.8		SILTY SAND
5.6	322	465		336	427		16.7	71	24	0.29	4.4	3.2		1.1	3.4		5.3	42	CLAY
5.8	290	457		302	419		16.7	72	26	0.42	3.8	4.0		0.95	2.8		6.1	36	SILTY CLAY
6.0	326	447		341	409		16.7	74	27	0.22	4.2	2.4		1.0	3.2		3.8	42	CLAY
6.2	361	601		370	563		16.7	75	29	0.57	4.5	6.7		1.1	3.6		11.3	46	SILTY CLAY
6.4	236	883		224	845		18.6	76	31	3.21	2.5	21.5				34	28.1		SILTY SAND
6.6	364	543		376	505		16.7	78	33	0.38	4.4	4.5		1.1	3.4		7.4	46	SILTY CLAY
6.8	317	472		330	434		16.7	80	35	0.35	3.7	3.6		0.93	2.6		5.3	38	SILTY CLAY
7.0	437	960		432	922		17.7	81	37	1.24	4.9	17.0					30.5		SANDY SILT
7.2	201	476		208	438		16.7	83	39	1.36	2.0	8.0					7.6		SANDY SILT
7.4	269	788		264	750		18.6	84	41	2.18	2.7	16.9				34	21.5		SILTY SAND
7.6	229	916		215	878		17.7	86	43	3.85	2.0	23.0				32	25.4		SAND
7.8	351	801		349	763		17.7	87	45	1.36	3.5	14.4					21.1		SANDY SILT
8.0	318	536		328	498		16.7	89	47	0.61	3.2	5.9		0.82	2.0		7.8	35	CLAYEY SILT
8.2	307	623		312	585		16.7	90	49	1.04	2.9	9.5		0.77	1.8		12.0	32	SILT
8.4	363	695		367	657		17.7	92	51	0.92	3.5	10.1		0.88	2.3		14.4	40	SILT
8.6	349	680		353	642		16.7	93	53	0.96	3.2	10.0		0.83	2.1		13.7	37	SILT

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT010 DESCRIPTION
8.8	404	888		401	850		17.7	95	55	1.30	3.7	15.6					23.6		SANDY SILT
9.0	380	827		378	789		17.7	96	57	1.28	3.3	14.2					20.3		SANDY SILT
9.2	329	738		329	700		17.7	98	59	1.37	2.8	12.9					16.1		SANDY SILT
9.4	300	571		307	533		16.7	99	61	0.92	2.5	7.8		0.67	1.4		8.6	29	SILT
9.6	331	809		328	771		17.7	101	63	1.67	2.6	15.4					18.9		SANDY SILT
9.8	389	536		402	498		16.7	102	65	0.28	3.3	3.3		0.85	2.2		4.5	42	CLAY
10.0	368	533		381	495		16.7	104	67	0.36	3.0	4.0		0.79	1.9		5.1	38	SILTY CLAY
10.2	375	539		388	501		16.7	105	69	0.36	3.0	3.9		0.79	1.9		5.0	39	SILTY CLAY
10.4	419	576		432	538		16.7	106	71	0.29	3.4	3.7		0.87	2.3		5.1	45	CLAY
10.6	428	584		441	546		16.7	108	73	0.29	3.4	3.6		0.87	2.3		5.1	46	CLAY
10.8	380	577		391	539		16.7	109	75	0.47	2.9	5.1		0.76	1.8		6.3	38	SILTY CLAY
11.0	460	634		472	596		16.7	110	77	0.31	3.6	4.3		0.90	2.5		6.2	50	CLAY
11.2	471	657		482	619		16.7	112	78	0.34	3.6	4.7		0.91	2.5		6.9	52	SILTY CLAY
11.4	482	676		493	638		16.7	113	80	0.35	3.6	5.0		0.92	2.6		7.4	53	SILTY CLAY
11.6	507	705		518	667		16.7	115	82	0.34	3.8	5.2		0.95	2.7		7.8	56	SILTY CLAY
11.8	514	725		524	687		17.7	116	84	0.37	3.8	5.6		0.95	2.7		8.5	57	SILTY CLAY
12.0	449	794		453	756		17.7	117	86	0.83	3.1	10.5		0.81	2.0		13.9	45	SILT
12.2	558	803		567	765		17.7	119	88	0.41	4.0	6.9		0.99	3.0		10.8	63	SILTY CLAY
12.4	618	866		626	828		17.7	121	90	0.38	4.4	7.0		1.1	3.5		11.7	72	SILTY CLAY
12.6	617	892		624	854		17.7	122	92	0.43	4.4	8.0		1.0	3.4		13.1	71	SILTY CLAY
12.8	614	820		625	782		17.7	124	94	0.30	4.3	5.5		1.0	3.3		8.9	71	CLAY
13.0	541	756		551	718		17.7	125	96	0.37	3.6	5.8		0.91	2.5		8.5	58	SILTY CLAY
13.2	501	693		512	655		16.7	127	98	0.34	3.3	5.0		0.84	2.2		6.7	51	SILTY CLAY
13.4	563	865		569	827		17.7	128	100	0.55	3.7	9.0		0.92	2.6		13.2	60	SILTY CLAY
13.6	518	810		524	772		17.7	130	102	0.59	3.3	8.6		0.84	2.1		11.6	52	SILTY CLAY
13.8	575	926		578	888		17.7	131	104	0.65	3.6	10.7		0.91	2.5		15.7	60	CLAYEY SILT
14.0	502	714		512	676		16.7	133	106	0.40	3.1	5.7		0.80	1.9		7.3	50	SILTY CLAY
14.2	497	668		509	630		16.7	134	108	0.30	3.0	4.2		0.78	1.9		5.3	49	CLAY
14.4	450	687		459	649		16.7	136	110	0.54	2.6	6.6		0.69	1.5		7.3	41	SILTY CLAY
14.6	409	680		416	642		16.7	137	112	0.74	2.2	7.8		0.60	1.2		7.6	34	CLAYEY SILT
14.8	417	772		420	734		17.7	138	114	1.03	2.2	10.9		0.60	1.2		10.8	35	SILT
15.0	512	823		517	785		17.7	140	116	0.67	2.9	9.3		0.76	1.8		11.4	48	CLAYEY SILT
15.2	597	851		605	813		17.7	142	118	0.43	3.4	7.2		0.88	2.3		10.1	61	SILTY CLAY
15.4	563	827		571	789		17.7	143	120	0.48	3.1	7.6		0.82	2.0		10.0	56	SILTY CLAY
15.6	537	745		547	707		16.7	145	122	0.37	2.9	5.5		0.77	1.8		6.9	52	SILTY CLAY
15.8	521	769		529	731		17.7	146	124	0.50	2.8	7.0		0.73	1.7		8.3	48	SILTY CLAY
16.0	588	1756		550	1718		19.6	148	126	2.75	2.9	40.5				34	56.6		SILTY SAND
16.2	452	973		447	935		17.7	150	128	1.53	2.1	16.9					17.1		SANDY SILT
16.4	671	2460		602	2422		19.6	151	129	3.85	3.1	63.1				35	94.1		SAND
16.6	671	2299		610	2261		19.6	153	131	3.45	3.1	57.3				35	85.3		SAND
16.8	1150	2964		1080	2926		21.1	155	133	1.95	6.1	64.1				38	130.5		SILTY SAND
17.0	1055	3138		972	3100		21.1	157	135	2.55	5.3	73.9				37	142.7		SILTY SAND
17.2	904	2730		834	2692		19.6	160	137	2.67	4.4	64.5				36	113.6		SILTY SAND
17.4	498	1224		483	1186		18.6	162	139	2.05	2.1	24.4				33	25.8		SILTY SAND
17.6	480	695		490	657		16.7	163	141	0.48	2.1	5.8		0.58	1.1		5.3	39	SILTY CLAY
17.8	545	773		554	735		17.7	165	143	0.44	2.5	6.3		0.67	1.4		6.8	48	SILTY CLAY
18.0	554	932		556	894		17.7	166	145	0.82	2.5	11.7		0.66	1.4		12.7	48	SILT
18.2	686	1526		665	1488		19.1	168	147	1.59	3.1	28.6					39.1		SANDY SILT
18.4	651	1607		624	1569		19.6	170	149	1.99	2.8	32.8				34	42.9		SILTY SAND
18.6	1135	1855		1120	1817		19.1	172	151	0.72	5.6	24.2		1.3	5.1		46.4	138	CLAYEY SILT
18.8	1668	2766		1634	2728		20.6	174	153	0.74	8.5	38.0		1.7	9.6		88.8	234	CLAYEY SILT
19.0	1872	3072		1833	3034		20.6	176	155	0.72	9.5	41.7		1.8	11.5		102.2	273	CLAYEY SILT
19.2	2042	3344		1998	3306		20.6	178	157	0.71	10.3	45.4		1.9	13.0		115.0	305	CLAYEY SILT
19.4	1808	2952		1772	2914		20.6	180	159	0.71	9.0	39.6		1.7	10.4		94.7	258	CLAYEY SILT
19.6	1881	2915		1850	2877		20.6	182	161	0.61	9.3	35.6		1.8	11.0		86.3	273	CLAYEY SILT
19.8	1689	2583		1665	2545		20.1	184	163	0.59	8.1	30.5		1.6	9.0		69.9	235	SILTY CLAY
20.0	1530	2325		1511	2287		20.1	186	165	0.58	7.2	26.9		1.5	7.4		58.3	204	SILTY CLAY
20.2	1469	2327		1447	2289		20.6	189	167	0.66	6.8	29.2		1.4	6.7		61.5	191	CLAYEY SILT
20.4	1124	1714		1115	1676		18.6	191	169	0.59	5.0	19.5		1.2	4.1		34.7	131	SILTY CLAY

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	DMT010 DESCRIPTION
20.6	867	1237		869	1199		17.7	192	171	0.47	3.6	11.4		0.91	2.5		16.7	89	SILTY CLAY
20.8	816	1203		817	1165		17.7	194	173	0.54	3.3	12.1		0.85	2.2		16.5	81	SILTY CLAY
21.0	1057	1582		1052	1544		18.6	196	175	0.56	4.5	17.1		1.1	3.5		28.7	118	SILTY CLAY
21.2	1072	1537		1070	1499		18.6	197	177	0.48	4.5	14.9		1.1	3.6		25.1	120	SILTY CLAY
21.4	1026	1448		1026	1410		18.6	199	179	0.45	4.3	13.3		1.0	3.3		21.7	113	SILTY CLAY
21.6	1013	1511		1009	1473		18.6	201	181	0.56	4.1	16.1		1.0	3.1		25.6	109	SILTY CLAY
21.8	888	1616		872	1578		19.1	203	182	1.02	3.4	24.5		0.87	2.3		34.9	87	SILT
22.0	866	1214		869	1176		17.7	205	184	0.45	3.3	10.6		0.86	2.2		14.7	86	SILTY CLAY
22.2	794	1146		797	1108		17.7	206	186	0.51	3.0	10.8		0.78	1.9		13.5	74	SILTY CLAY
22.4	805	1139		809	1101		17.7	208	188	0.47	3.0	10.1		0.78	1.9		12.8	76	SILTY CLAY
22.6	842	1157		847	1119		17.7	209	190	0.41	3.1	9.4		0.81	2.0		12.4	81	SILTY CLAY
22.8	932	1265		936	1227		17.7	211	192	0.39	3.5	10.1		0.89	2.4		14.5	94	SILTY CLAY
23.0	938	1291		941	1253		17.7	212	194	0.42	3.5	10.8		0.89	2.4		15.5	95	SILTY CLAY
23.2	970	1323		973	1285		18.6	214	196	0.40	3.6	10.8		0.91	2.5		15.8	99	SILTY CLAY
23.4	1040	1414		1042	1376		18.6	216	198	0.40	3.9	11.6		0.97	2.9		17.8	110	SILTY CLAY
23.6	986	1438		984	1400		18.6	217	200	0.53	3.6	14.4		0.91	2.5		21.0	100	SILTY CLAY
23.8	1078	1483		1079	1445		18.6	219	202	0.42	4.0	12.7		0.98	3.0		19.8	115	SILTY CLAY
24.0	1151	1616		1149	1578		18.6	221	204	0.45	4.3	14.9		1.0	3.3		24.3	126	SILTY CLAY
24.2	1107	1566		1105	1528		18.6	223	206	0.47	4.0	14.7		0.99	3.0		23.1	118	SILTY CLAY
24.4	1081	1563		1078	1525		18.6	225	208	0.51	3.9	15.5		0.96	2.8		23.7	113	SILTY CLAY
24.6	1032	1440		1032	1402		18.6	226	210	0.45	3.6	12.8		0.91	2.5		18.8	105	SILTY CLAY
24.8	1017	1403		1019	1365		18.6	228	212	0.43	3.5	12.0		0.90	2.4		17.3	102	SILTY CLAY
25.0	1188	1759		1180	1721		18.6	230	214	0.56	4.2	18.8		1.0	3.2		30.3	128	SILTY CLAY
25.2	1330	1951		1320	1913		18.6	232	216	0.54	4.8	20.6		1.1	3.9		35.8	151	SILTY CLAY
25.4	1222	1789		1214	1751		18.6	233	218	0.54	4.3	18.6		1.0	3.3		30.3	133	SILTY CLAY
25.6	886	1372		882	1334		19.1	235	220	0.68	2.8	15.7		0.74	1.7		18.9	79	CLAYEY SILT
25.8	1078	1736		1066	1698		19.1	237	222	0.75	3.6	21.9		0.90	2.5		31.9	107	CLAYEY SILT
26.0	1190	2039		1168	2001		19.1	239	224	0.88	4.0	28.9		0.98	2.9		45.3	123	SILT
26.2	1218	2194		1190	2156		19.1	241	226	1.00	4.0	33.5		0.99	3.0		53.2	126	SILT
26.4	1182	2065		1159	2027		19.1	243	228	0.93	3.8	30.1		0.95	2.8		46.4	121	SILT
26.6	1139	2215		1106	2177		19.1	244	230	1.22	3.6	37.2					55.4		SANDY SILT
26.8	1184	2234		1152	2196		19.1	246	232	1.13	3.7	36.2		0.94	2.7		55.3	118	SILT
27.0	906	1913		876	1875		19.1	248	233	1.55	2.6	34.6					41.6		SANDY SILT
27.2	911	1616		897	1578		19.1	250	235	1.03	2.6	23.6		0.70	1.5		27.8	78	SILT
27.4	684	1799		649	1761		19.6	252	237	2.70	1.6	38.6				31	34.4		SILTY SAND
27.6	638	1742		604	1704		18.6	254	239	3.02	1.4	38.2				30	32.5		SILTY SAND
27.8	395	1461		363	1423		17.7	256	241	8.75	0.5	36.8					31.3		SAND
28.0	478	1737		436	1699		18.6	257	243	6.56	0.7	43.8				26	37.3		SAND
28.2	513	1729		473	1691		18.6	259	245	5.35	0.9	42.3				27	35.9		SAND
28.4	504	1539		473	1501		18.6	261	247	4.55	0.9	35.7				27	30.3		SAND
28.6	881	1780		857	1742		19.1	262	249	1.46	2.3	30.7					33.2		SANDY SILT
28.8	651	1240		642	1202		17.7	264	251	1.43	1.5	19.4					16.5		SANDY SILT
29.0	705	1706		676	1668		19.6	266	253	2.35	1.6	34.4				31	29.3		SILTY SAND
29.2	752	1610		730	1572		19.1	268	255	1.77	1.8	29.2					25.1		SANDY SILT
29.4	905	1991		871	1953		19.1	270	257	1.76	2.3	37.5					41.1		SANDY SILT
29.6	691	1620		665	1582		18.6	272	259	2.26	1.5	31.8				30	27.0		SILTY SAND
29.8	723	1537		703	1499		18.6	273	261	1.80	1.6	27.6				31	23.5		SILTY SAND
30.0	760	1528		742	1490		17.7	275	263	1.56	1.7	25.9					22.1		SANDY SILT

sCPTu014 - Tabular data: Vs, Go, Vs Repeatability

Each Vs value in the 'Vs Repeatability' column corresponds to a distinct energization.

Z	Vs	Go	Rho	Vs Repeatability	Var Coeff.
[m]	[m/s]	[MPa]	[kg/m^3]	[m/s]	[%]
1.00	169	49.5	1733	167,172,167	1.73
1.50	159	43.8	1733	172,154,150	7.37
2.00	489	414	1733	488,492,486	0.63
2.50	150	39.0	1733	148,151,150	1.05
3.00	105	19.1	1733	106,105,105	0.67
3.50	91	14.4	1733	90,91,91	0.78
4.00	64	7.1	1733	64,64,64	0.00
4.50	73	9.2	1733	74,73,73	0.97
5.00	72	9.0	1733	72,72,72	0.00
5.50	81	11.4	1733	81,81,81	0.00
6.00	73	9.2	1733	73,74,73	0.97
6.50	71	8.7	1733	71,71,72	1.00
7.00	74	9.5	1733	73,77,73	3.17
7.50	85	12.5	1733	85,87,82	3.00
8.00	90	14.0	1733	90,90,91	0.79
8.50	78	10.5	1733	78,77,78	0.91
9.00	77	10.3	1733	76,77,77	0.92
9.50	76	10.0	1733	76,76,76	0.00
10.00	77	10.3	1733	77,77,78	0.92
10.50	79	10.8	1733	79,80,77	2.00
11.00	84	12.2	1733	84,83,84	0.84
11.50	82	11.7	1733	82,82,82	0.00
12.00	106	19.5	1733	105,107,106	0.94

sCPTu015 - Tabular data: Vs, Go, Vs Repeatability

Each Vs value in the 'Vs Repeatability' column corresponds to a distinct energization.

Z	Vs	Go	Rho	Vs Repeatability	Var Coeff.
[m]	[m/s]	[MPa]	[kg/m^3]	[m/s]	[%]
1.00	179	55.5	1733	182,174,181	2.44
1.50	99	17.0	1733	99,100,99	0.71
2.00	127	28.0	1733	126,127,128	0.79
2.50	160	44.4	1733	160,160,159	0.44
3.00	115	22.9	1733	115,113,116	1.37
3.50	90	14.0	1733	87,92,91	2.94
4.00	64	7.1	1733	64,63,64	1.10
4.50	79	10.8	1733	79,78,79	0.90
5.00	83	11.9	1733	81,81,88	4.89
5.50	43	3.2	1733	43,44,43	1.64
6.00	62	6.7	1733	63,62,62	1.14
6.50	98	16.6	1733	99,98,98	0.72
7.00	74	9.5	1733	75,72,74	2.14
7.50	60	6.2	1733	60,60,60	0.00
8.00	63	6.9	1733	63,63,63	0.00
8.50	48	4.0	1733	47,48,49	2.08
9.00	47	3.8	1733	46,47,47	1.50
11.00	272	128	1733	256,286,274	5.55
11.50	203	71.4	1733	213,196,200	4.38
12.00	210	76.4	1733	218,201,212	4.11
12.50	284	140	1733	276,285,290	2.50
13.00	172	51.3	1733	172,172,171	0.41
13.50	247	106	1733	239,252,249	2.76
14.00	149	38.5	1733	150,148,149	0.67
14.50	236	96.5	1733	239,232,238	1.61
15.00	249	107	1733	249,242,255	2.62
15.50	287	143	1733	282,274,304	5.41
16.00	337	197	1733	339,337,335	0.59
16.50	177	54.3	1733	174,179,177	1.44
17.00	188	61.2	1733	188,189,188	0.38
17.50	371	239	1733	390,331,391	9.26
18.00	224	87.0	1733	221,218,234	3.80
18.50	145	36.4	1733	146,148,140	2.89
19.00	267	124	1733	296,250,254	9.55
19.50	213	78.6	1733	213,211,215	0.94
20.00	174	52.5	1733	174,173,174	0.41
20.50	270	126	1733	269,266,275	1.70
21.00	212	77.9	1733	207,213,215	1.97
21.50	227	89.3	1733	226,229,227	0.70
22.00	262	119	1733	263,263,261	0.47
22.50	248	107	1733	250,248,246	0.81
23.00	218	82.4	1733	221,223,209	3.48
23.50	288	144	1733	306,281,277	5.46
24.00	237	97.3	1733	234,230,248	3.99
24.50	296	152	1733	312,314,262	9.95

25.00	307	163	1733	313,285,322	6.29
25.50	220	83.9	1733	216,231,212	4.56
26.00	225	87.7	1733	223,225,226	0.70
26.50	317	174	1733	304,333,314	4.65
27.00	346	207	1733	362,338,338	4.00
27.50	207	74.3	1733	207,210,205	1.23
28.00	280	136	1733	280,267,293	4.64
28.50	358	222	1733	356,363,356	1.13
29.00	307	163	1733	314,308,300	2.29
29.50	325	183	1733	326,325,325	0.22

sCPTu016 - Tabular data: Vs, Go, Vs Repeatability

Each Vs value in the 'Vs Repeatability' column corresponds to a distinct energization.

Z	Vs	Go	Rho	Vs Repeatability	Var Coeff.
[m]	[m/s]	[MPa]	[kg/m^3]	[m/s]	[%]
1.00	220	83.9	1733	204,211,245	9.97
1.50	63	6.9	1733	67,56,65	9.32
2.00	44	3.4	1733	43,44,45	2.27
2.50	38	2.5	1733	38,38,39	1.86
3.00	59	6.0	1733	58,59,59	1.20
3.50	52	4.7	1733	49,53,53	4.51
4.00	128	28.4	1733	129,124,130	2.53
4.50	148	38.0	1733	157,137,151	6.94
5.00	95	15.6	1733	86,99,101	8.58
5.50	74	9.5	1733	72,75,76	2.87
6.00	57	5.6	1733	57,57,58	1.24
6.50	60	6.2	1733	59,60,61	1.67
7.00	61	6.4	1733	53,64,65	10.94
7.50	56	5.4	1733	55,57,56	1.79
8.00	57	5.6	1733	60,55,56	4.64
8.50	102	18.0	1733	103,102,101	0.98
9.00	67	7.8	1733	65,67,68	2.36
9.50	57	5.6	1733	54,58,58	4.11
10.00	81	11.4	1733	81,81,81	0.00
10.50	88	13.4	1733	88,88,88	0.00
11.00	87	13.1	1733	87,88,87	0.81
11.50	110	21.0	1733	111,111,109	1.11
12.00	92	14.7	1733	92,92,92	0.00
12.50	99	17.0	1733	98,101,98	1.75
13.00	131	29.7	1733	132,129,133	1.62

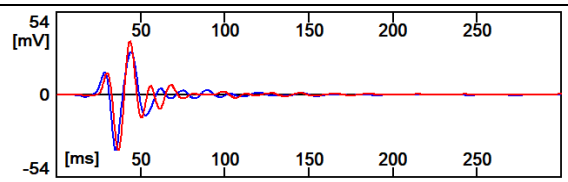
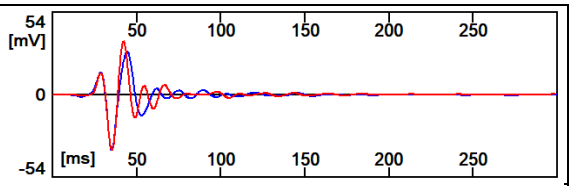
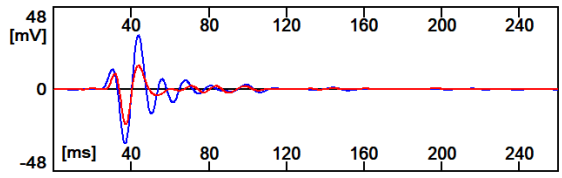
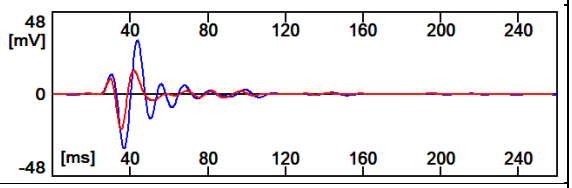
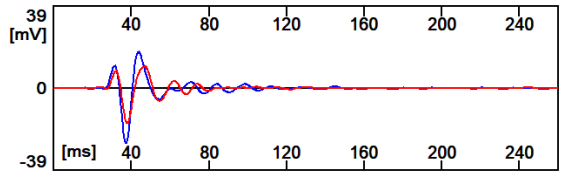
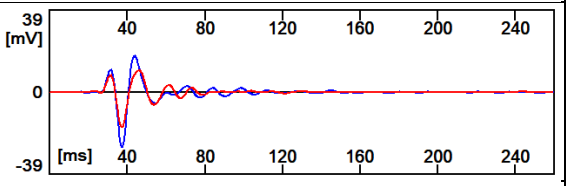
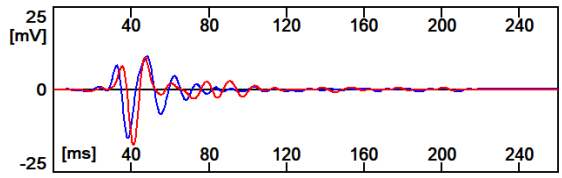
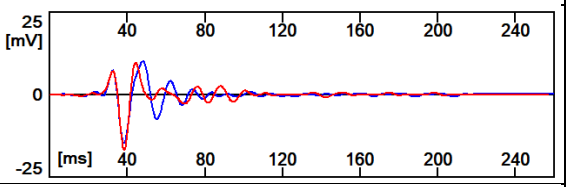
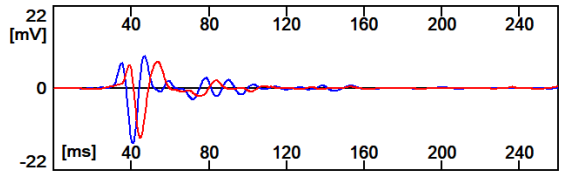
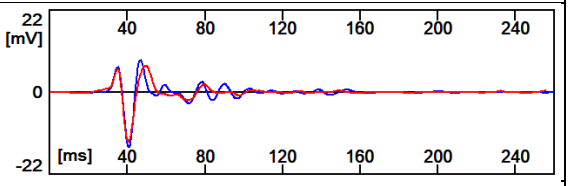
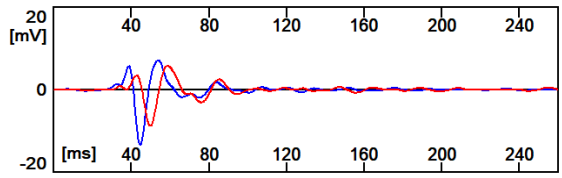
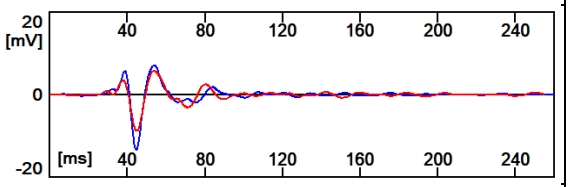
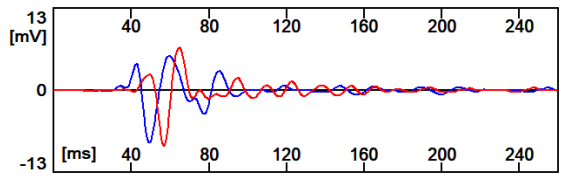
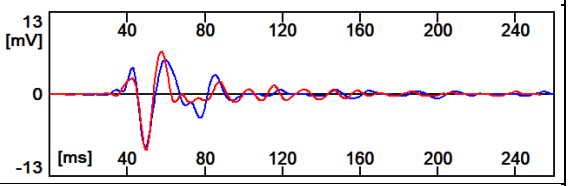
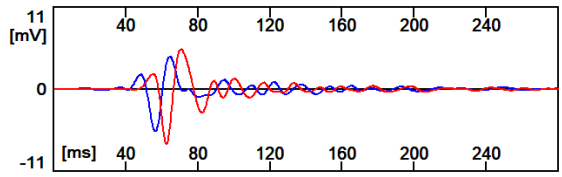
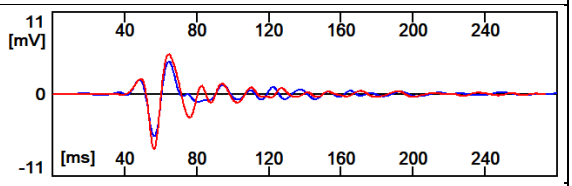
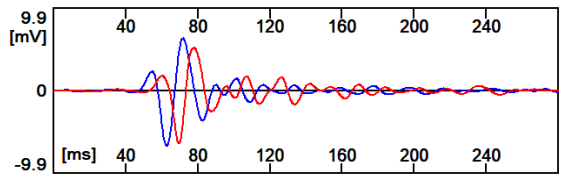
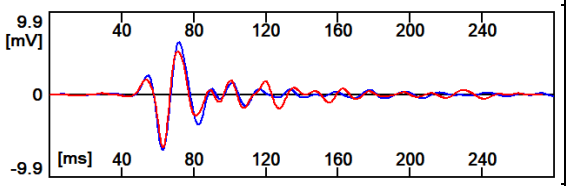
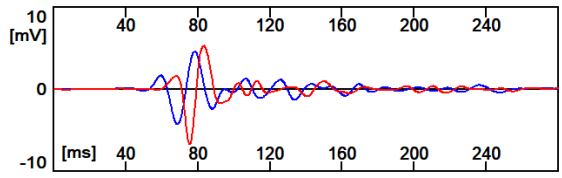
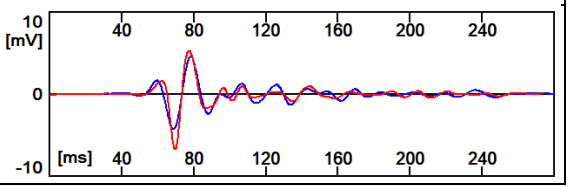
sCPTu017 - Tabular data: Vs, Go, Vs Repeatability

Each Vs value in the 'Vs Repeatability' column corresponds to a distinct energization.

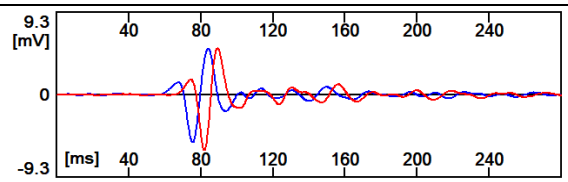
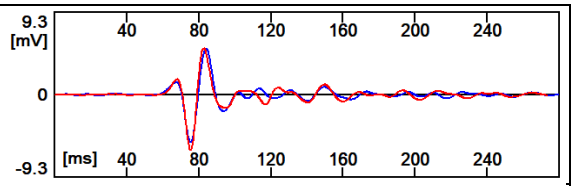
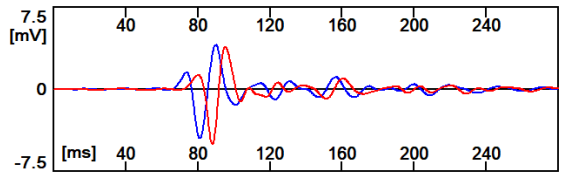
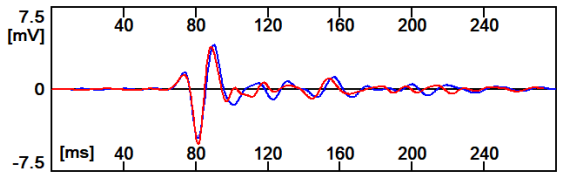
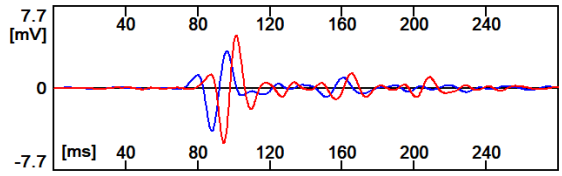
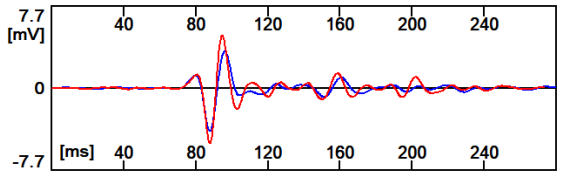
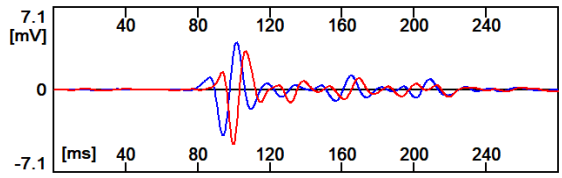
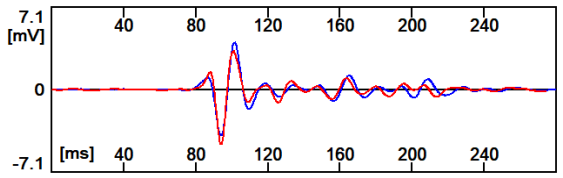
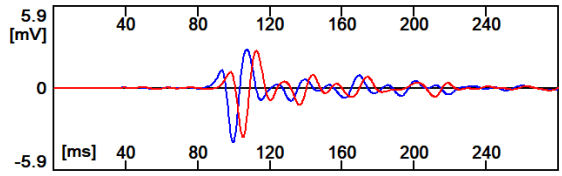
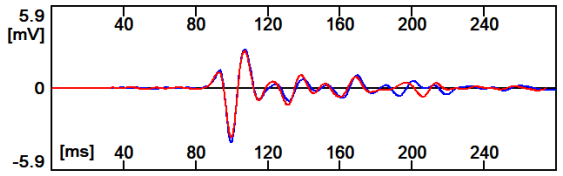
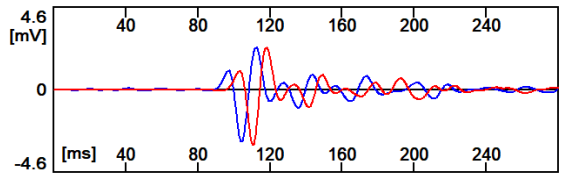
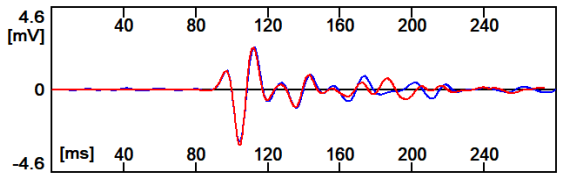
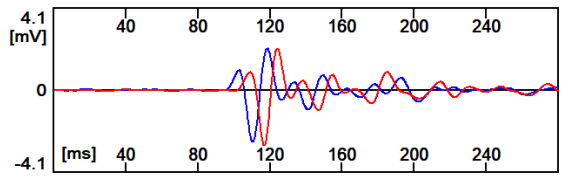
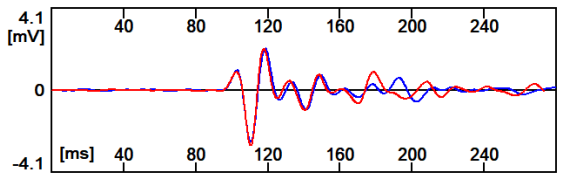
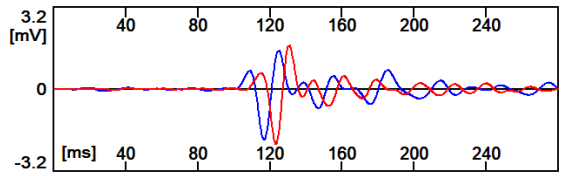
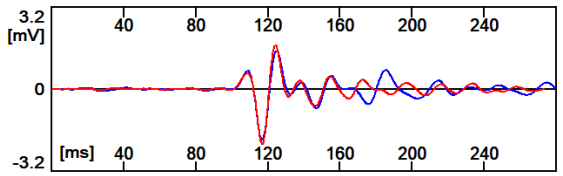
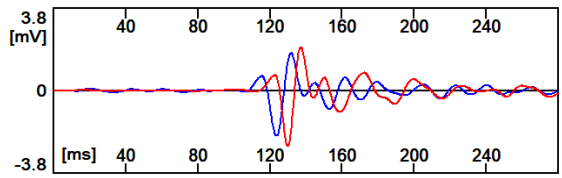
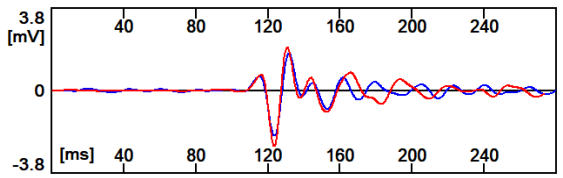
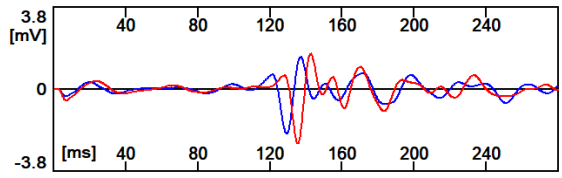
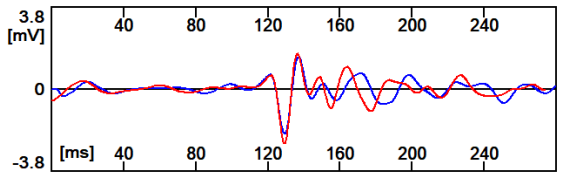
Z	Vs	Go	Rho	Vs Repeatability	Var Coeff.
[m]	[m/s]	[MPa]	[kg/m^3]	[m/s]	[%]
2.00	602	628	1733	594,573,640	5.69
2.50	483	404	1733	484,482,483	0.21
3.00	254	112	1733	253,255,254	0.39
3.50	237	97.3	1733	238,236,236	0.52
4.00	233	94.1	1733	231,234,233	0.68
4.50	215	80.1	1733	216,215,215	0.33
5.00	219	83.1	1733	218,219,220	0.46
5.50	182	57.4	1733	181,182,182	0.39
6.00	166	47.8	1733	168,166,165	0.95
6.50	163	46.0	1733	163,162,164	0.61
7.00	144	35.9	1733	144,143,144	0.49
7.50	156	42.2	1733	156,156,157	0.45
8.00	172	51.3	1733	172,172,172	0.00
8.50	150	39.0	1733	151,150,149	0.67
9.00	212	77.9	1733	210,211,215	1.25
9.50	218	82.4	1733	219,219,216	0.79
10.00	233	94.1	1733	233,233,232	0.30
10.50	230	91.7	1733	230,229,231	0.43
11.00	233	94.1	1733	233,232,233	0.30
11.50	181	56.8	1733	181,181,182	0.39
12.00	218	82.4	1733	219,217,218	0.46
12.50	198	67.9	1733	198,198,198	0.00
13.00	209	75.7	1733	208,210,209	0.48
13.50	211	77.2	1733	213,211,210	0.75
14.00	225	87.7	1733	226,225,224	0.44
14.50	219	83.1	1733	219,220,218	0.46
15.00	234	94.9	1733	232,235,234	0.68
15.50	192	63.9	1733	191,193,193	0.64
16.00	232	93.3	1733	234,230,233	0.91
16.50	191	63.2	1733	192,190,190	0.64
17.00	190	62.6	1733	190,190,189	0.37
17.50	281	137	1733	280,284,278	1.10
18.00	159	43.8	1733	159,159,160	0.44
18.50	241	101	1733	242,242,239	0.72
19.00	239	99.0	1733	240,237,239	0.66
19.50	197	67.3	1733	197,198,197	0.36
20.00	258	115	1733	258,259,258	0.27
20.50	225	87.7	1733	226,224,224	0.54
21.00	289	145	1733	295,289,284	1.91
21.50	279	135	1733	280,278,279	0.36
22.00	282	138	1733	279,283,284	0.94
22.50	257	114	1733	259,255,256	0.83
23.00	238	98.2	1733	238,238,237	0.30
23.50	248	107	1733	246,248,251	1.03
24.00	215	80.1	1733	216,216,214	0.57

24.50	218	82.4	1733	218,217,219	0.46

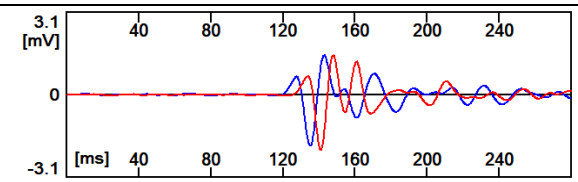
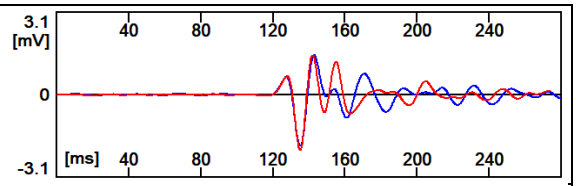
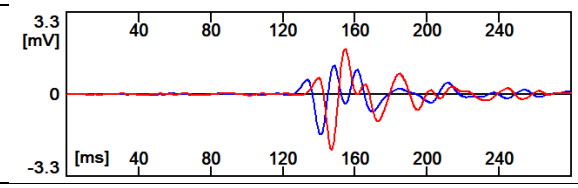
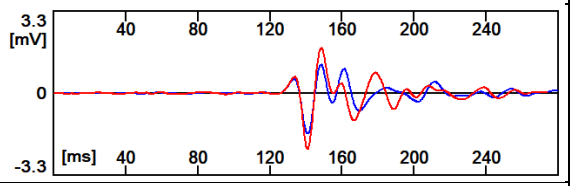
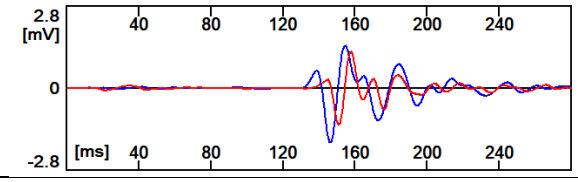
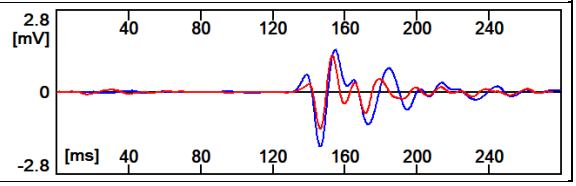
sCPTu014 - Vs

	RECORDED	RE-PHASED
Z = 1.00 m Ds = 0.24 m Dt = 1.45 ms Vs = 167 m/s 20 MAR 2024 8:59:28		
Z = 1.50 m Ds = 0.32 m Dt = 1.85 ms Vs = 172 m/s 20 MAR 2024 9:00:59		
Z = 2.00 m Ds = 0.37 m Dt = 0.76 ms Vs = 488 m/s 20 MAR 2024 9:03:29		
Z = 2.50 m Ds = 0.41 m Dt = 2.73 ms Vs = 148 m/s 20 MAR 2024 9:04:31		
Z = 3.00 m Ds = 0.43 m Dt = 4.04 ms Vs = 106 m/s 20 MAR 2024 9:07:24		
Z = 3.50 m Ds = 0.44 m Dt = 4.94 ms Vs = 90 m/s 20 MAR 2024 9:08:28		
Z = 4.00 m Ds = 0.46 m Dt = 7.14 ms Vs = 64 m/s 20 MAR 2024 9:10:39		
Z = 4.50 m Ds = 0.46 m Dt = 6.30 ms Vs = 74 m/s 20 MAR 2024 9:11:51		
Z = 5.00 m Ds = 0.47 m Dt = 6.54 ms Vs = 72 m/s 20 MAR 2024 9:14:53		
Z = 5.50 m Ds = 0.48 m Dt = 5.90 ms Vs = 81 m/s 20 MAR 2024 9:15:59		

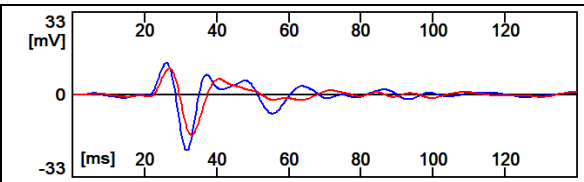
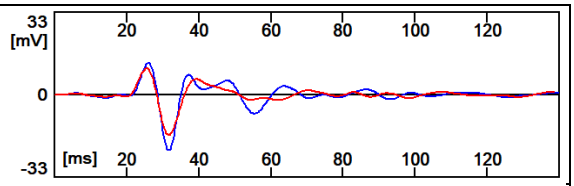
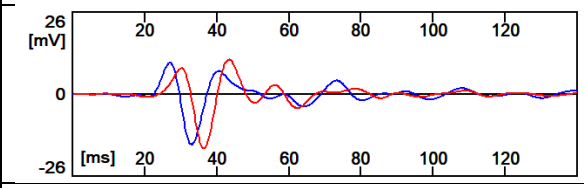
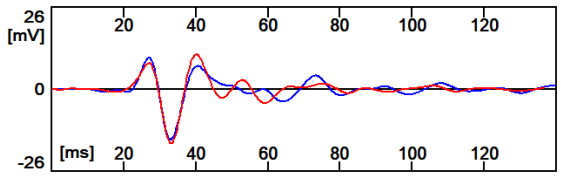
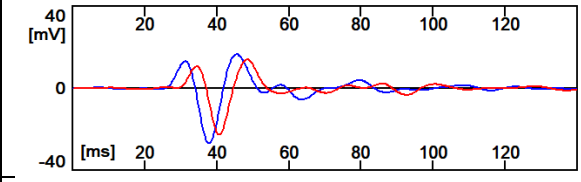
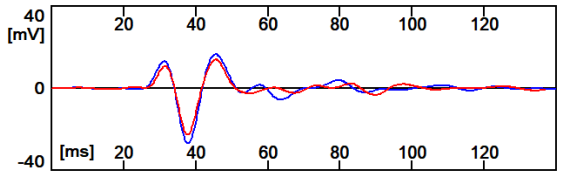
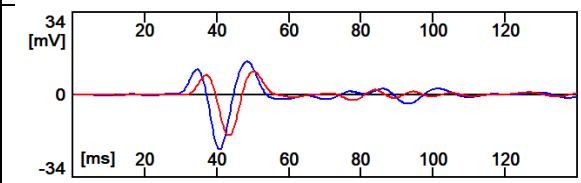
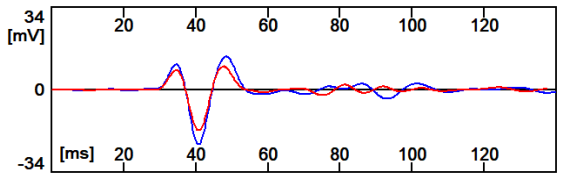
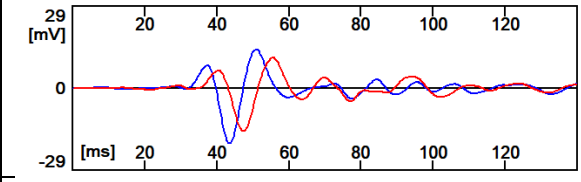
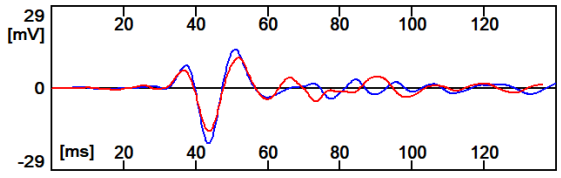
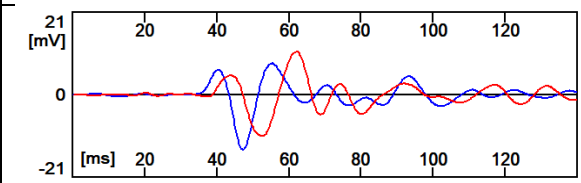
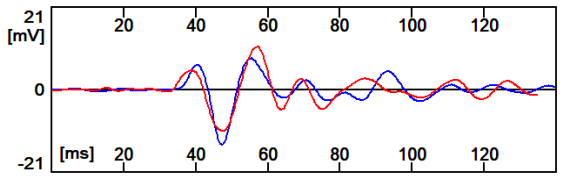
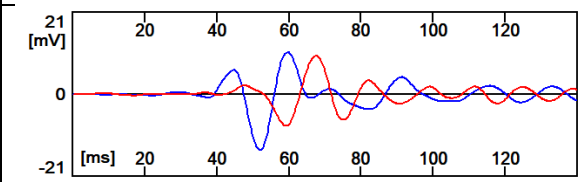
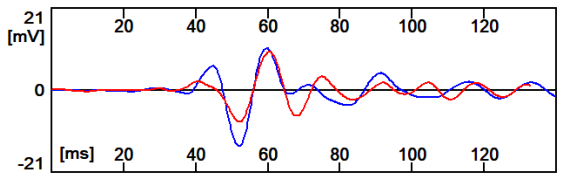
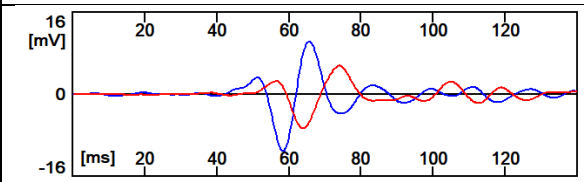
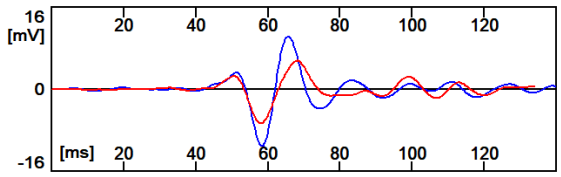
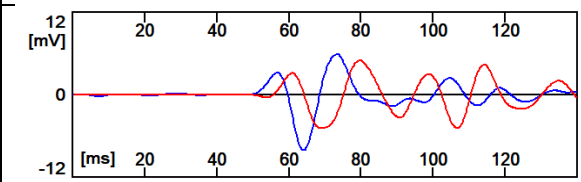
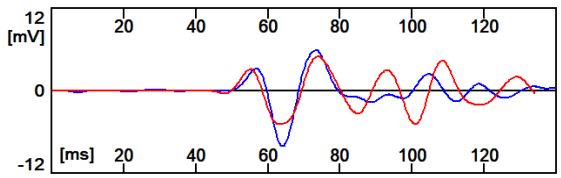
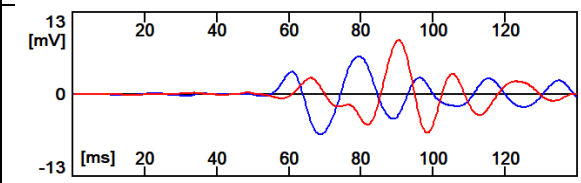
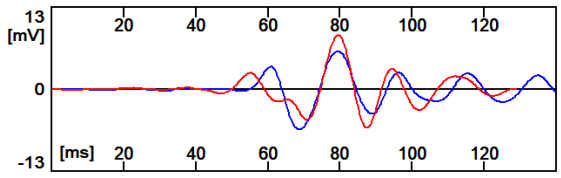
sCPTu014 - Vs

	RECORDED	RE-PHASED
Z = 6.00 m Ds = 0.48 m Dt = 6.54 ms Vs = 73 m/s 20 MAR 2024 9:18:11		
Z = 6.50 m Ds = 0.48 m Dt = 6.78 ms Vs = 71 m/s 20 MAR 2024 9:19:18		
Z = 7.00 m Ds = 0.48 m Dt = 6.62 ms Vs = 73 m/s 20 MAR 2024 9:23:09		
Z = 7.50 m Ds = 0.49 m Dt = 5.74 ms Vs = 85 m/s 20 MAR 2024 9:24:19		
Z = 8.00 m Ds = 0.49 m Dt = 5.42 ms Vs = 90 m/s 20 MAR 2024 9:28:13		
Z = 8.50 m Ds = 0.49 m Dt = 6.30 ms Vs = 78 m/s 20 MAR 2024 9:29:40		
Z = 9.00 m Ds = 0.49 m Dt = 6.42 ms Vs = 76 m/s 20 MAR 2024 9:32:07		
Z = 9.50 m Ds = 0.49 m Dt = 6.50 ms Vs = 76 m/s 20 MAR 2024 9:33:19		
Z = 10.00 m Ds = 0.49 m Dt = 6.38 ms Vs = 77 m/s 20 MAR 2024 9:35:39		
Z = 10.50 m Ds = 0.49 m Dt = 6.26 ms Vs = 79 m/s 20 MAR 2024 9:36:59		

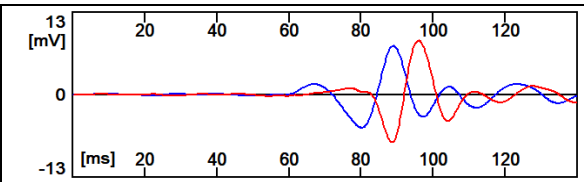
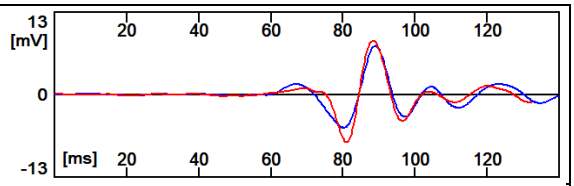
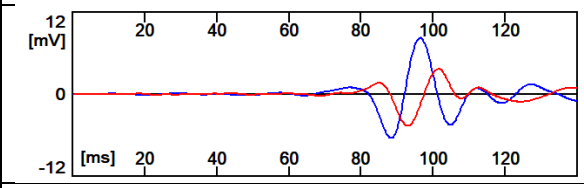
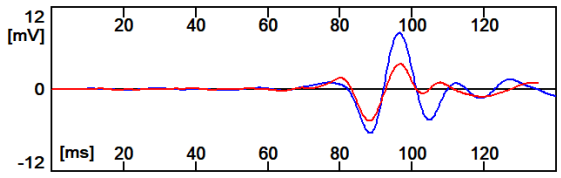
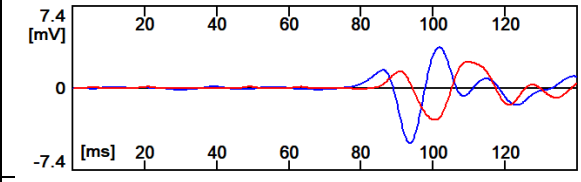
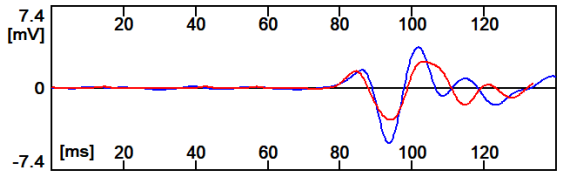
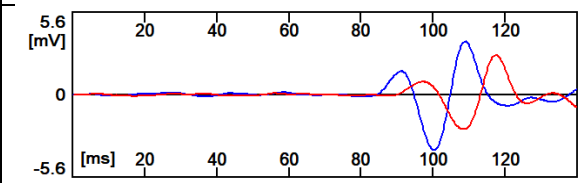
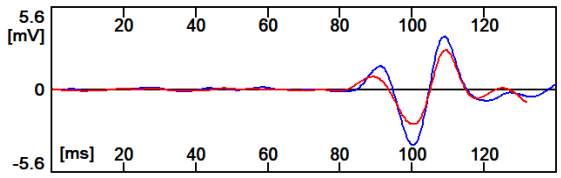
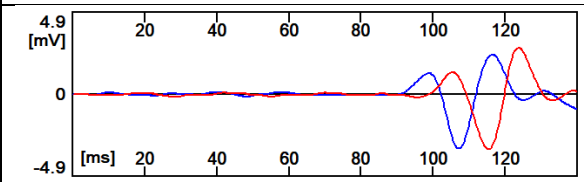
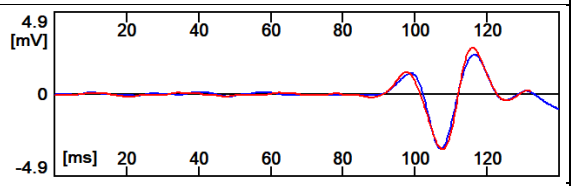
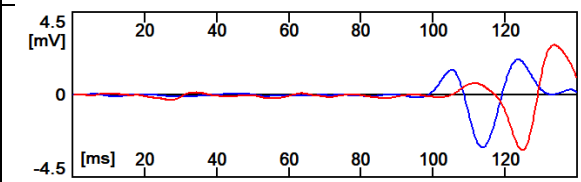
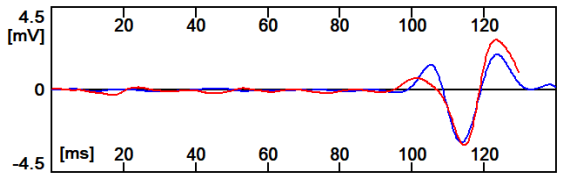
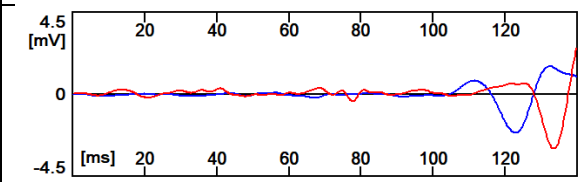
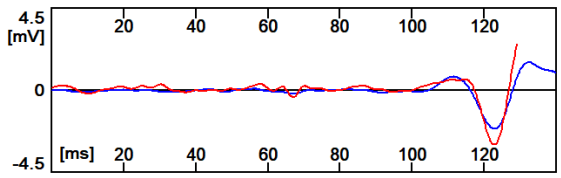
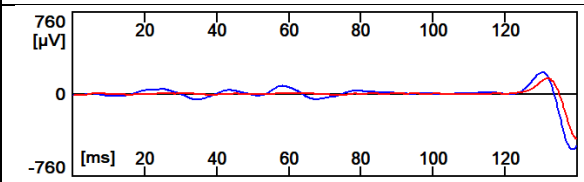
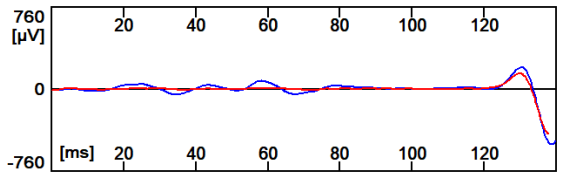
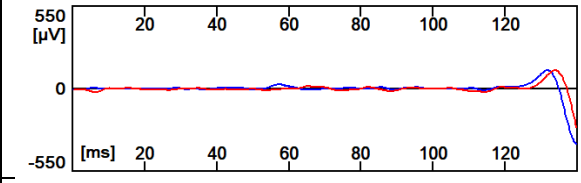
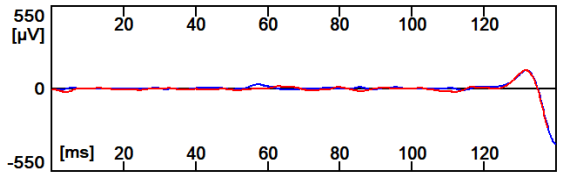
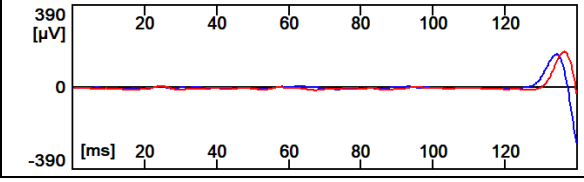
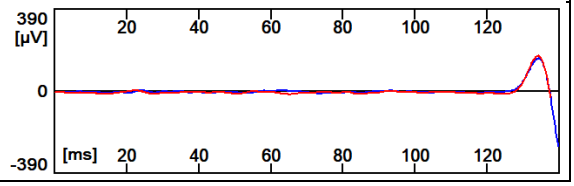
sCPTu014 - Vs

	RECORDED	RE-PHASED
Z = 11.00 m **Ds = 0.49 m** **Dt = 5.90 ms** **Vs = 84 m/s** **20 MAR 2024** **9:41:35**		
Z = 11.50 m **Ds = 0.49 m** **Dt = 6.06 ms** **Vs = 82 m/s** **20 MAR 2024** **9:43:18**		
Z = 12.00 m **Ds = 0.49 m** **Dt = 4.70 ms** **Vs = 105 m/s** **20 MAR 2024** **9:45:38**		

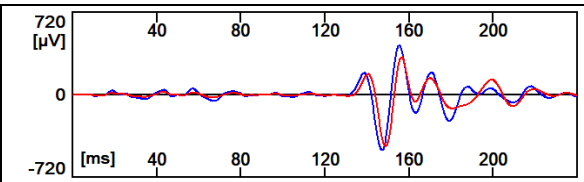
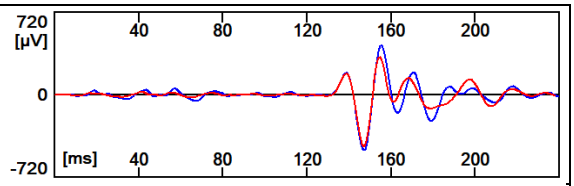
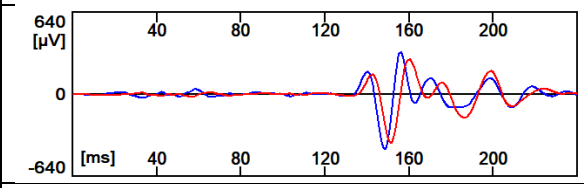
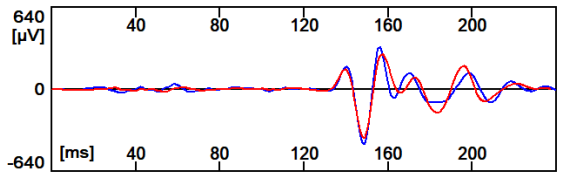
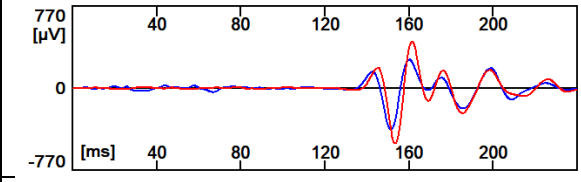
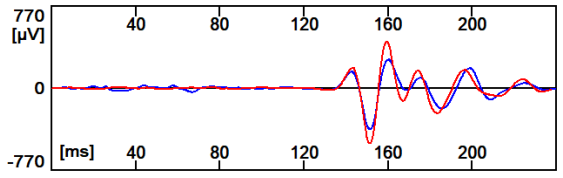
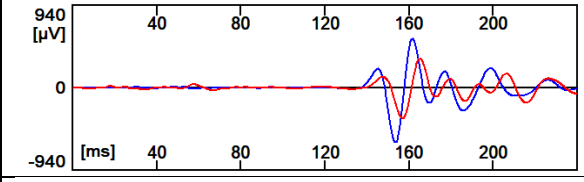
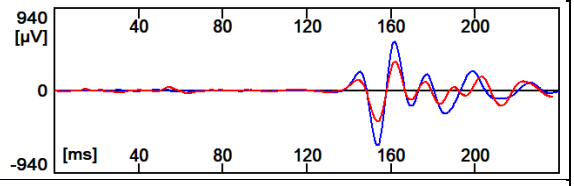
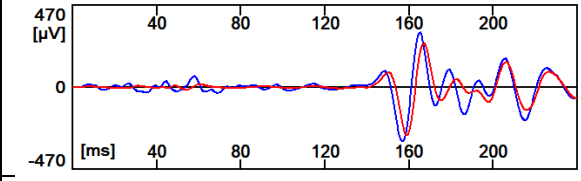
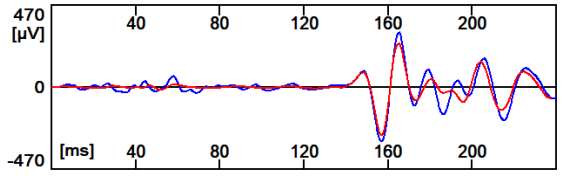
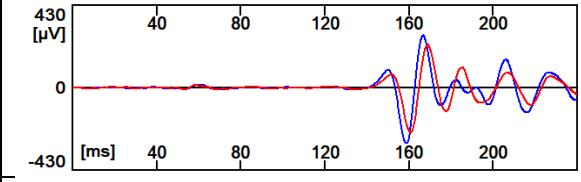
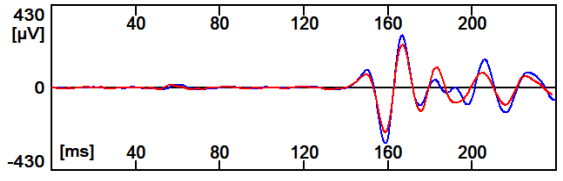
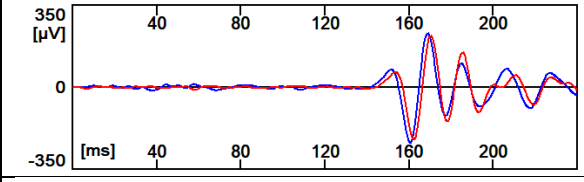
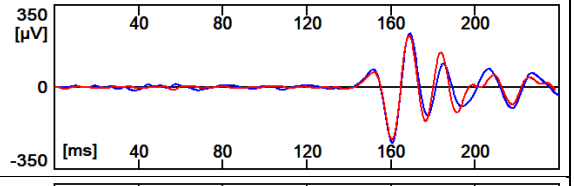
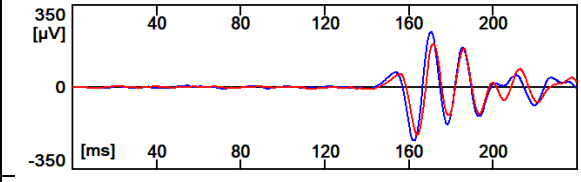
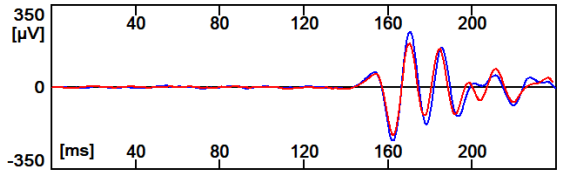
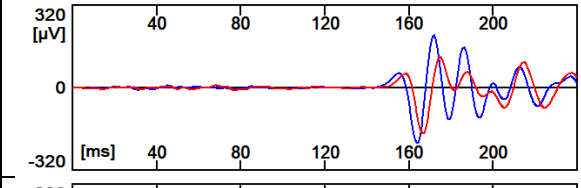
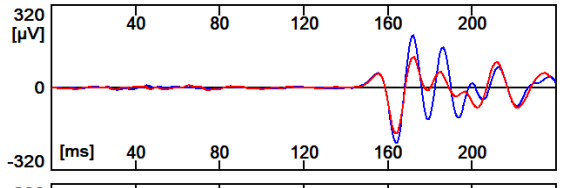
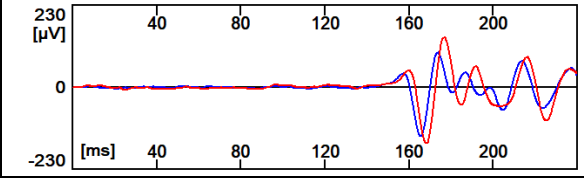
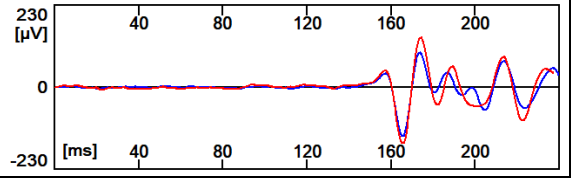
sCPTu015 - Vs

	RECORDED	RE-PHASED
Z = 1.00 m Ds = 0.24 m Dt = 1.33 ms Vs = 182 m/s 18 MAR 2024 13:54:58		
Z = 1.50 m Ds = 0.32 m Dt = 3.21 ms Vs = 99 m/s 18 MAR 2024 13:56:13		
Z = 2.00 m Ds = 0.37 m Dt = 2.94 ms Vs = 126 m/s 18 MAR 2024 14:05:14		
Z = 2.50 m Ds = 0.41 m Dt = 2.53 ms Vs = 160 m/s 18 MAR 2024 14:06:36		
Z = 3.00 m Ds = 0.43 m Dt = 3.73 ms Vs = 115 m/s 18 MAR 2024 14:08:19		
Z = 3.50 m Ds = 0.44 m Dt = 5.10 ms Vs = 87 m/s 18 MAR 2024 14:09:24		
Z = 4.00 m Ds = 0.46 m Dt = 7.14 ms Vs = 64 m/s 18 MAR 2024 14:11:21		
Z = 4.50 m Ds = 0.46 m Dt = 5.90 ms Vs = 79 m/s 18 MAR 2024 14:12:22		
Z = 5.00 m Ds = 0.47 m Dt = 5.78 ms Vs = 81 m/s 18 MAR 2024 14:14:38		
Z = 5.50 m Ds = 0.48 m Dt = 10.94 ms Vs = 43 m/s 18 MAR 2024 14:15:42		

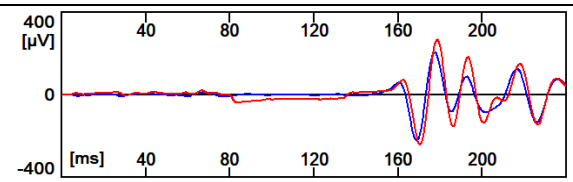
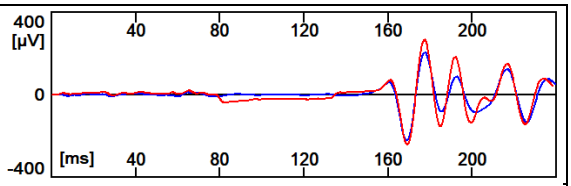
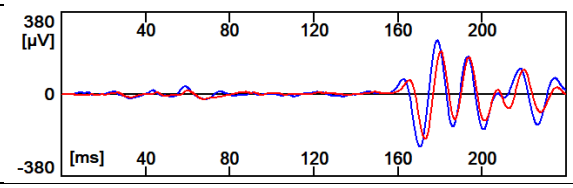
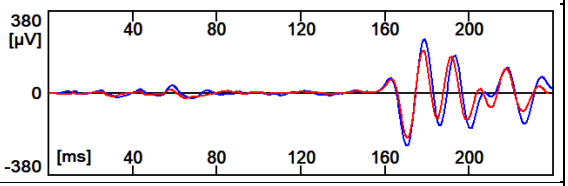
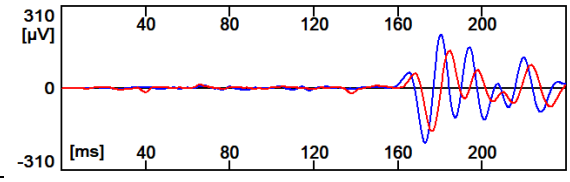
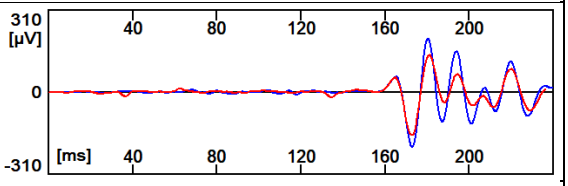
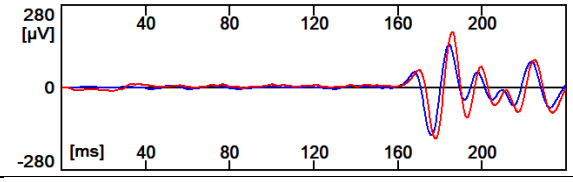
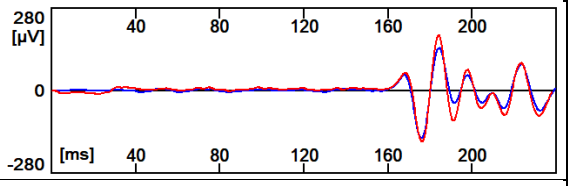
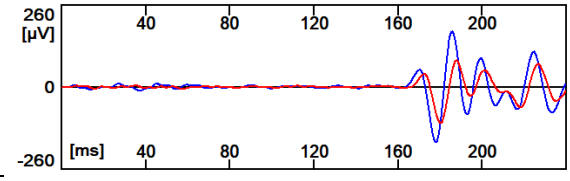
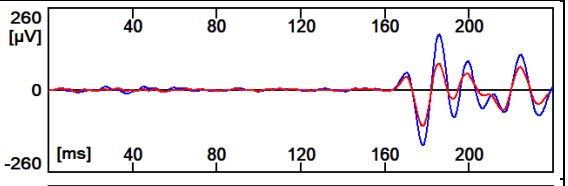
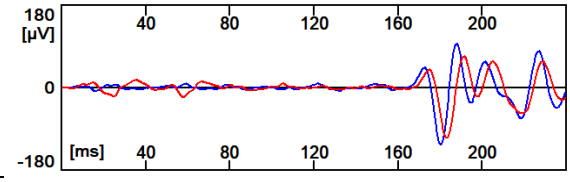
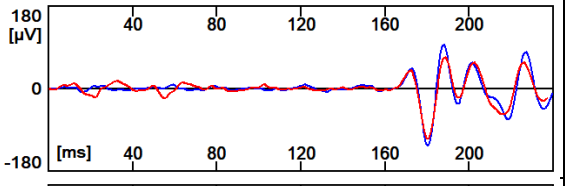
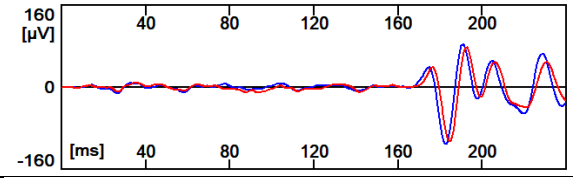
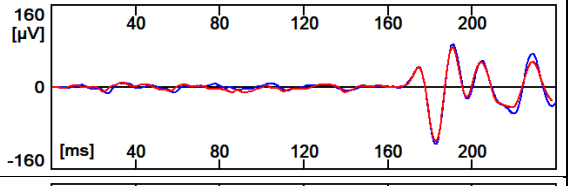
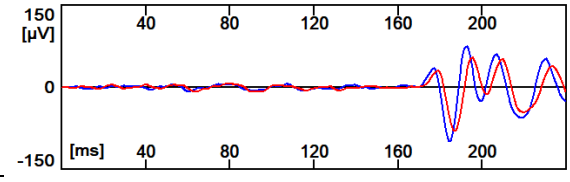
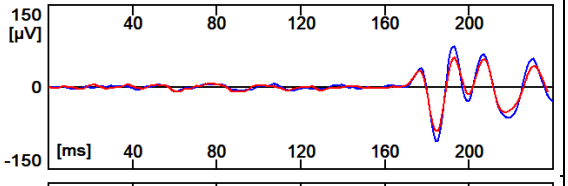
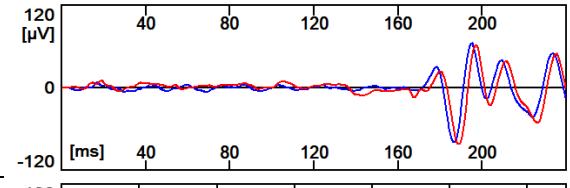
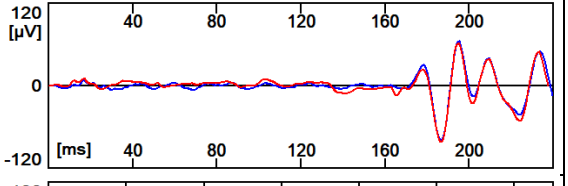
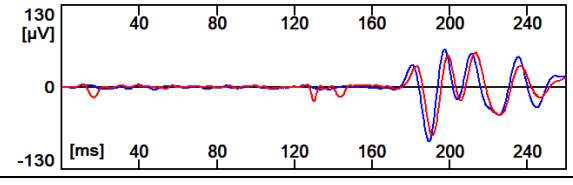
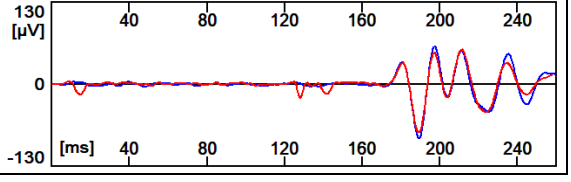
sCPTu015 - Vs

	RECORDED	RE-PHASED
Z = 6.00 m Ds = 0.48 m Dt = 7.62 ms Vs = 63 m/s 18 MAR 2024 14:17:44		
Z = 6.50 m Ds = 0.48 m Dt = 4.86 ms Vs = 99 m/s 18 MAR 2024 14:18:29		
Z = 7.00 m Ds = 0.48 m Dt = 6.46 ms Vs = 75 m/s 18 MAR 2024 14:20:40		
Z = 7.50 m Ds = 0.49 m Dt = 8.14 ms Vs = 60 m/s 18 MAR 2024 14:21:29		
Z = 8.00 m Ds = 0.49 m Dt = 7.78 ms Vs = 63 m/s 18 MAR 2024 14:23:32		
Z = 8.50 m Ds = 0.49 m Dt = 10.30 ms Vs = 47 m/s 18 MAR 2024 14:24:35		
Z = 9.00 m Ds = 0.49 m Dt = 10.70 ms Vs = 46 m/s 18 MAR 2024 14:26:47		
Z = 11.00 m Ds = 0.49 m Dt = 1.93 ms Vs = 256 m/s 18 MAR 2024 14:36:33		
Z = 11.50 m Ds = 0.49 m Dt = 2.32 ms Vs = 213 m/s 18 MAR 2024 14:37:38		
Z = 12.00 m Ds = 0.49 m Dt = 2.27 ms Vs = 218 m/s 18 MAR 2024 14:39:51		

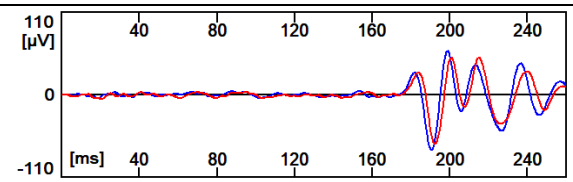
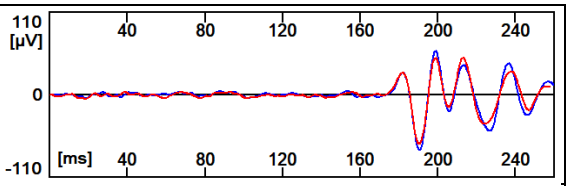
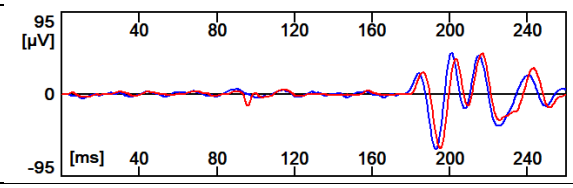
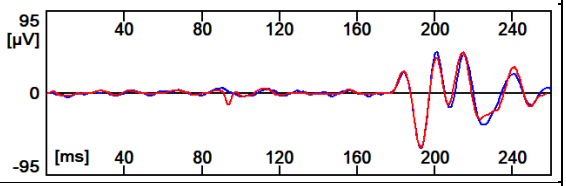
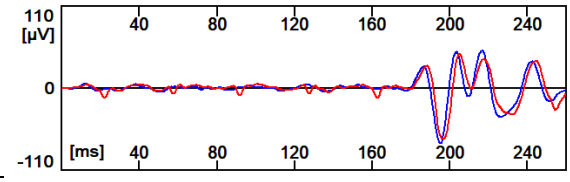
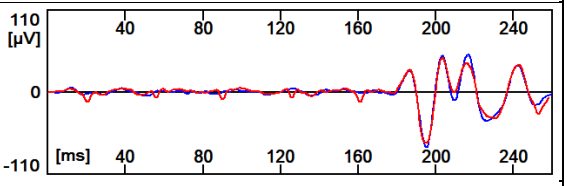
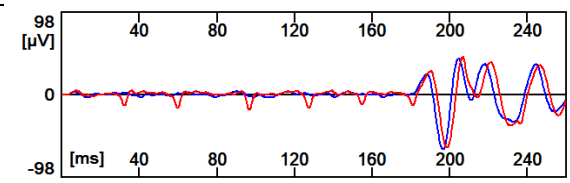
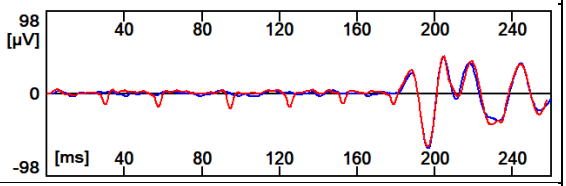
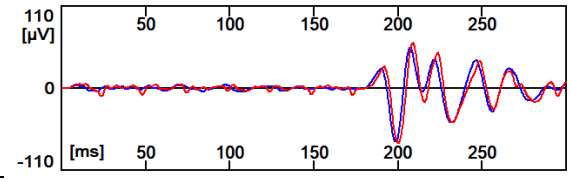
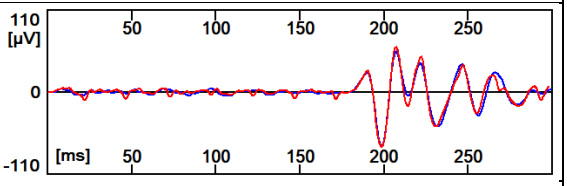
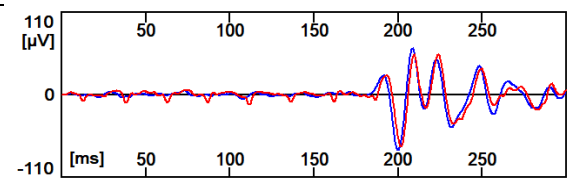
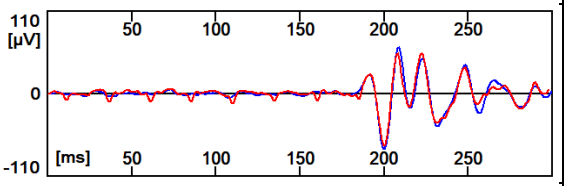
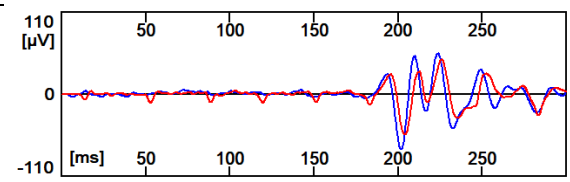
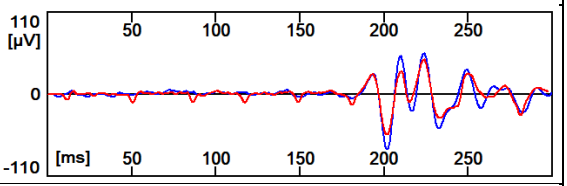
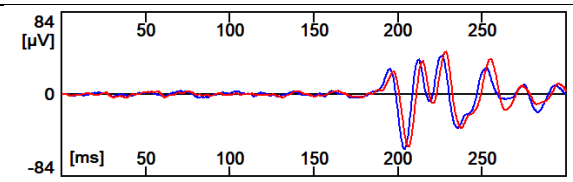
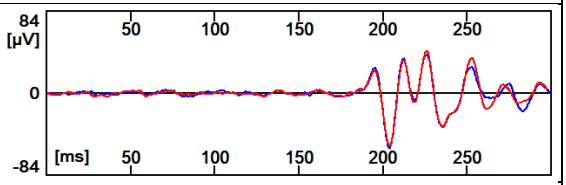
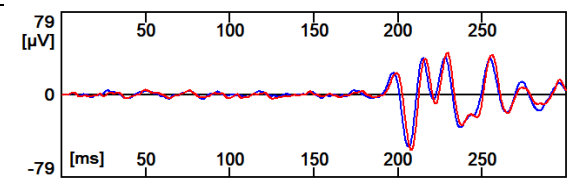
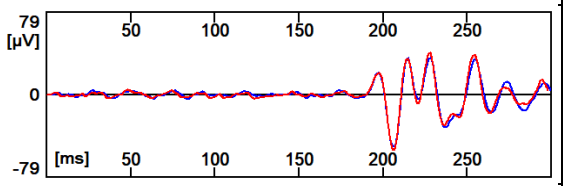
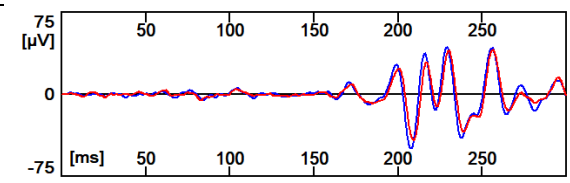
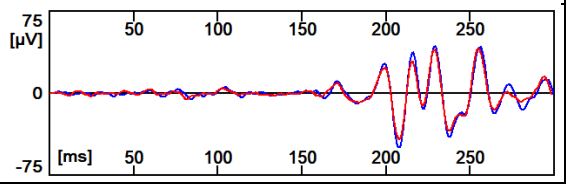
sCPTu015 - Vs

	RECORDED	RE-PHASED
Z = 12.50 m Ds = 0.49 m Dt = 1.79 ms Vs = 276 m/s 18 MAR 2024 14:44:59		
Z = 13.00 m Ds = 0.50 m Dt = 2.89 ms Vs = 172 m/s 18 MAR 2024 14:47:23		
Z = 13.50 m Ds = 0.50 m Dt = 2.07 ms Vs = 239 m/s 18 MAR 2024 14:49:22		
Z = 14.00 m Ds = 0.50 m Dt = 3.30 ms Vs = 150 m/s 18 MAR 2024 14:50:24		
Z = 14.50 m Ds = 0.50 m Dt = 2.08 ms Vs = 239 m/s 18 MAR 2024 14:52:37		
Z = 15.00 m Ds = 0.50 m Dt = 2.00 ms Vs = 249 m/s 18 MAR 2024 14:53:53		
Z = 15.50 m Ds = 0.50 m Dt = 1.76 ms Vs = 282 m/s 18 MAR 2024 15:02:25		
Z = 16.00 m Ds = 0.50 m Dt = 1.46 ms Vs = 339 m/s 18 MAR 2024 15:03:24		
Z = 16.50 m Ds = 0.50 m Dt = 2.86 ms Vs = 174 m/s 18 MAR 2024 15:05:26		
Z = 17.00 m Ds = 0.50 m Dt = 2.65 ms Vs = 188 m/s 18 MAR 2024 15:07:36		

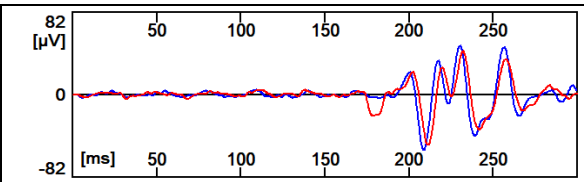
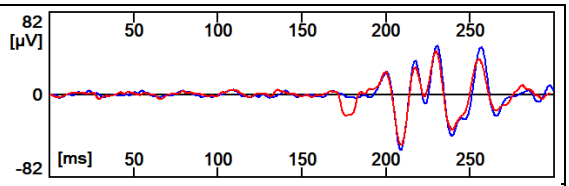
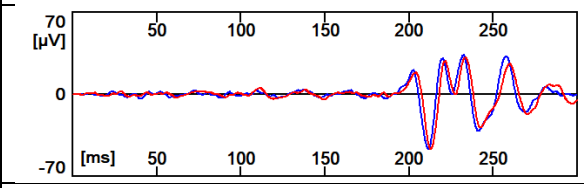
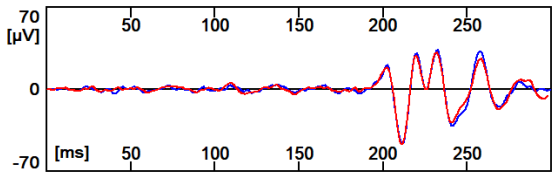
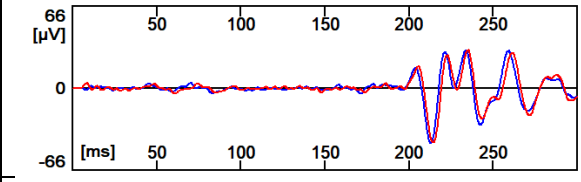
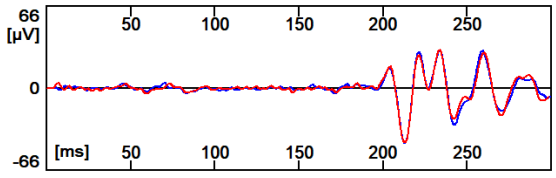
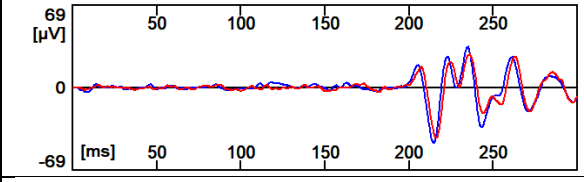
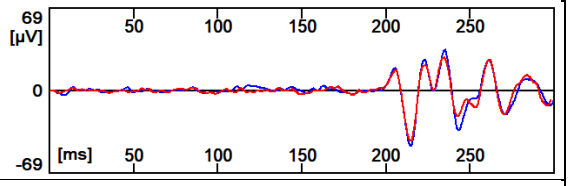
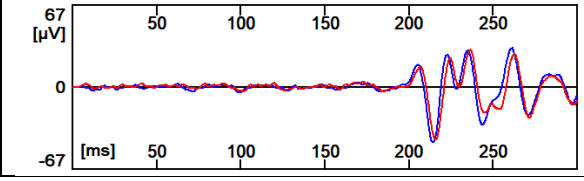
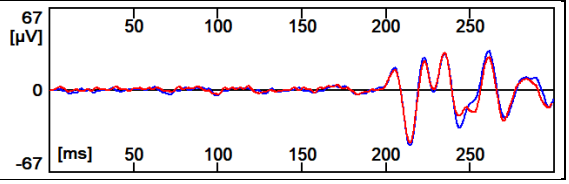
sCPTu015 - Vs

	RECORDED	RE-PHASED
Z = 17.50 m Ds = 0.50 m Dt = 1.28 ms Vs = 390 m/s 18 MAR 2024 15:10:43		
Z = 18.00 m Ds = 0.50 m Dt = 2.25 ms Vs = 221 m/s 18 MAR 2024 15:11:43		
Z = 18.50 m Ds = 0.50 m Dt = 3.40 ms Vs = 146 m/s 18 MAR 2024 15:16:51		
Z = 19.00 m Ds = 0.50 m Dt = 1.68 ms Vs = 296 m/s 18 MAR 2024 15:18:18		
Z = 19.50 m Ds = 0.50 m Dt = 2.34 ms Vs = 213 m/s 18 MAR 2024 15:20:36		
Z = 20.00 m Ds = 0.50 m Dt = 2.86 ms Vs = 174 m/s 18 MAR 2024 15:21:39		
Z = 20.50 m Ds = 0.50 m Dt = 1.85 ms Vs = 269 m/s 18 MAR 2024 15:23:44		
Z = 21.00 m Ds = 0.50 m Dt = 2.41 ms Vs = 207 m/s 18 MAR 2024 15:24:53		
Z = 21.50 m Ds = 0.50 m Dt = 2.20 ms Vs = 226 m/s 18 MAR 2024 15:27:22		
Z = 22.00 m Ds = 0.50 m Dt = 1.89 ms Vs = 263 m/s 18 MAR 2024 15:29:57		

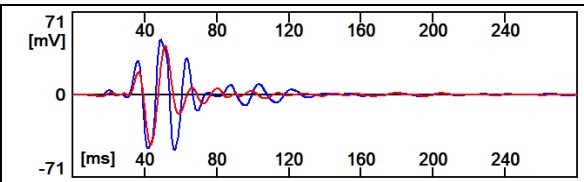
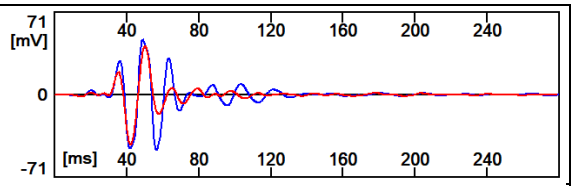
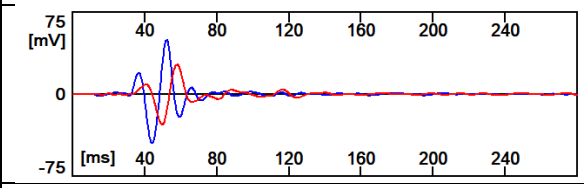
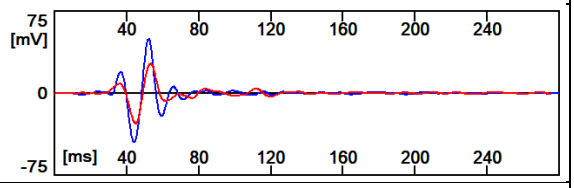
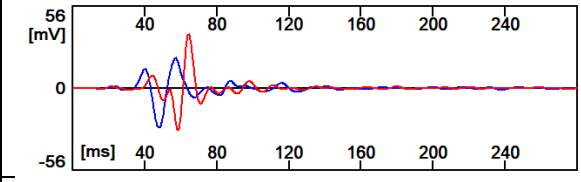
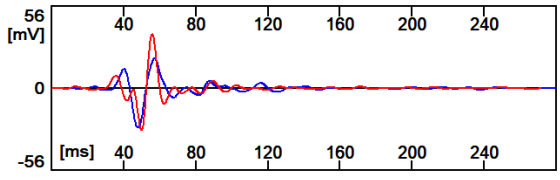
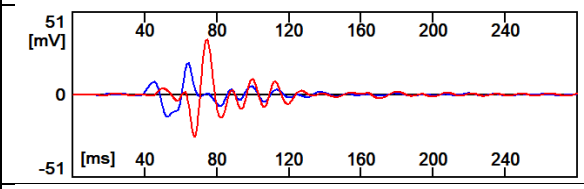
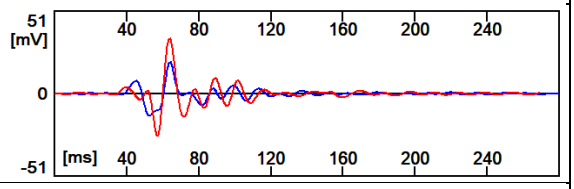
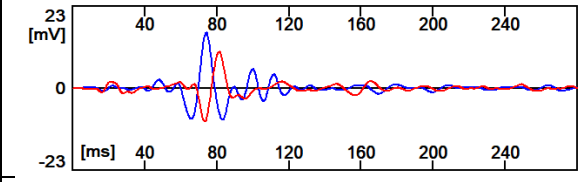
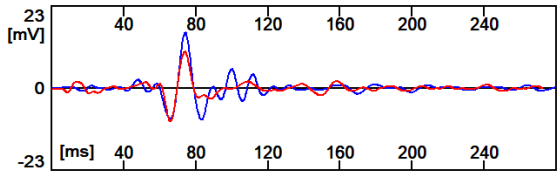
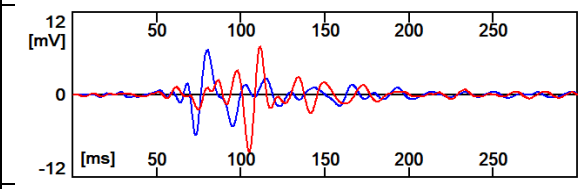
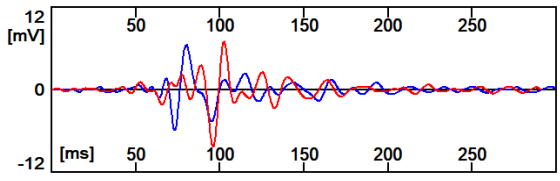
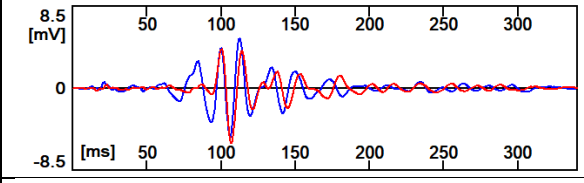
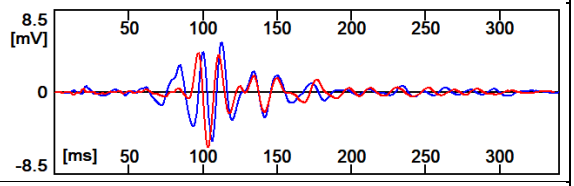
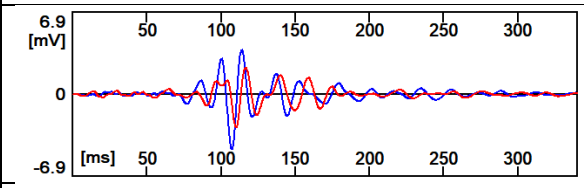
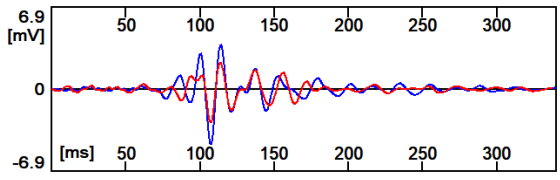
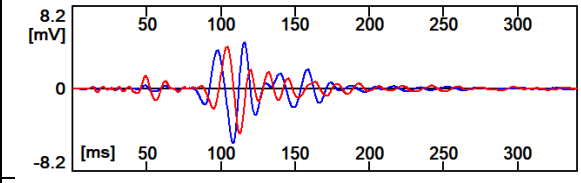
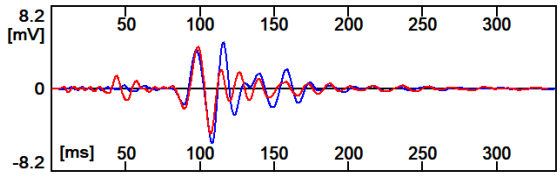
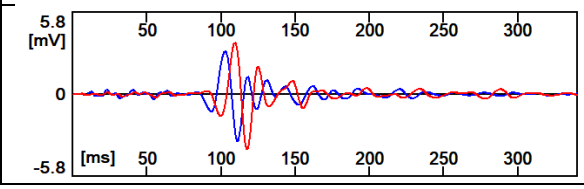
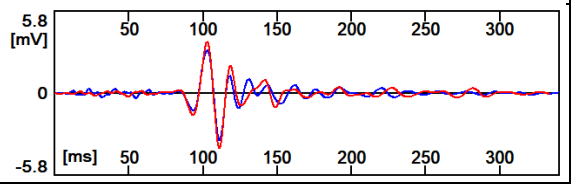
sCPTu015 - Vs

	RECORDED	RE-PHASED
Z = 22.50 m Ds = 0.50 m Dt = 2.00 ms Vs = 250 m/s 18 MAR 2024 15:32:41		
Z = 23.00 m Ds = 0.50 m Dt = 2.25 ms Vs = 221 m/s 18 MAR 2024 15:33:38		
Z = 23.50 m Ds = 0.50 m Dt = 1.63 ms Vs = 306 m/s 18 MAR 2024 15:36:04		
Z = 24.00 m Ds = 0.50 m Dt = 2.13 ms Vs = 234 m/s 18 MAR 2024 15:37:02		
Z = 24.50 m Ds = 0.50 m Dt = 1.60 ms Vs = 312 m/s 18 MAR 2024 15:39:36		
Z = 25.00 m Ds = 0.50 m Dt = 1.59 ms Vs = 313 m/s 18 MAR 2024 15:41:05		
Z = 25.50 m Ds = 0.50 m Dt = 2.31 ms Vs = 216 m/s 18 MAR 2024 15:44:10		
Z = 26.00 m Ds = 0.50 m Dt = 2.24 ms Vs = 223 m/s 18 MAR 2024 15:45:30		
Z = 26.50 m Ds = 0.50 m Dt = 1.64 ms Vs = 304 m/s 18 MAR 2024 15:47:50		
Z = 27.00 m Ds = 0.50 m Dt = 1.38 ms Vs = 362 m/s 18 MAR 2024 15:48:56		

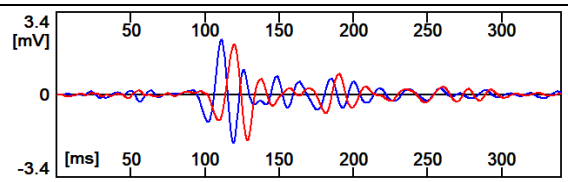
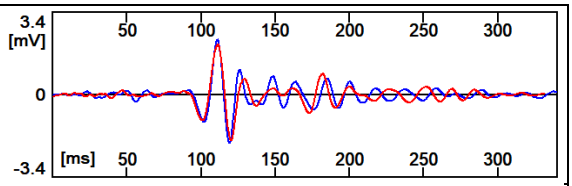
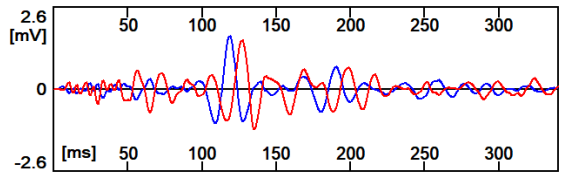
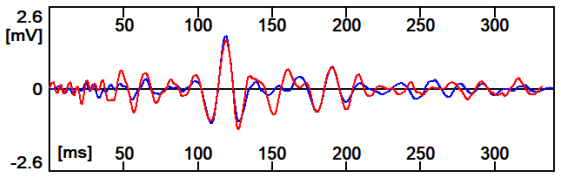
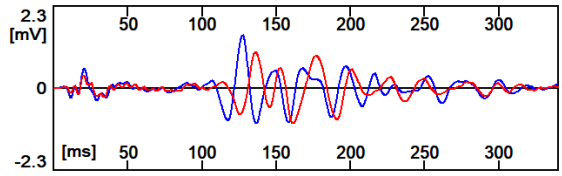
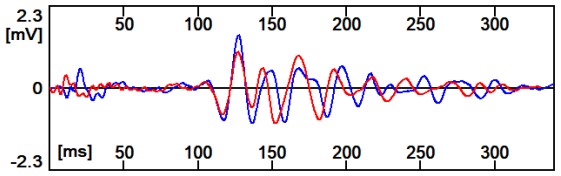
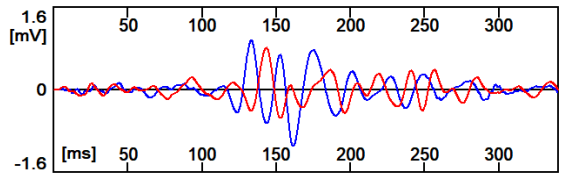
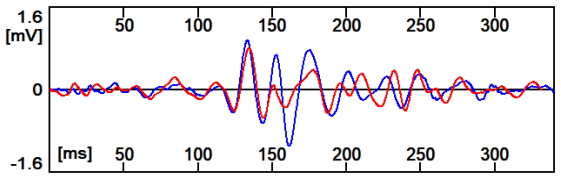
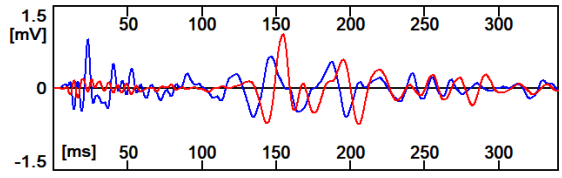
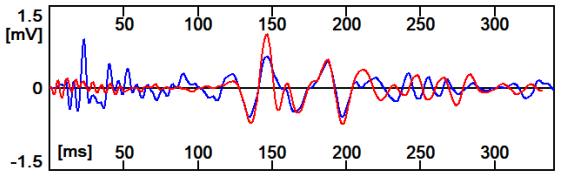
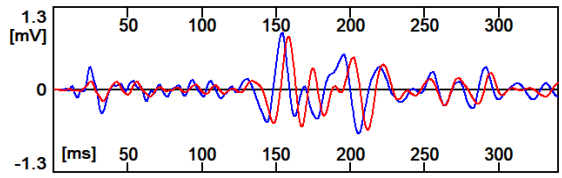
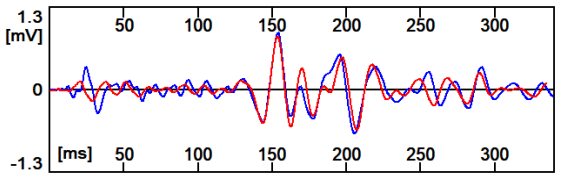
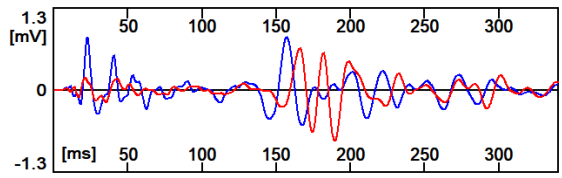
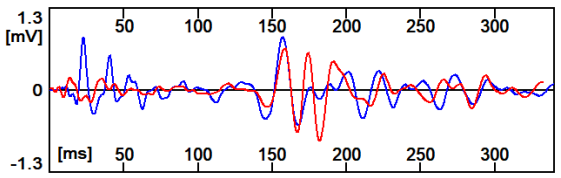
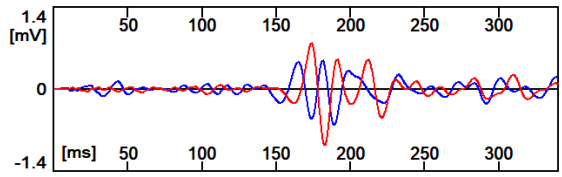
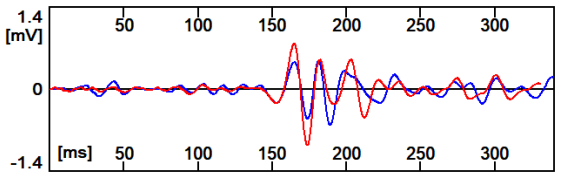
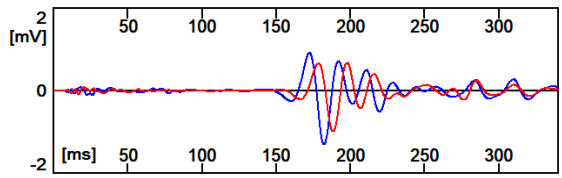
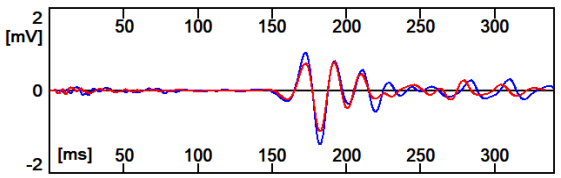
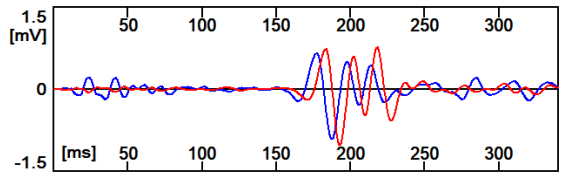
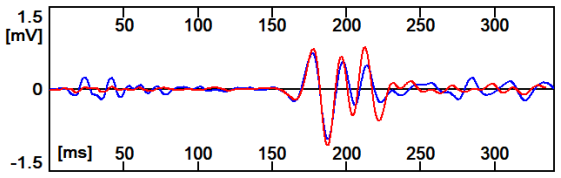
sCPTu015 - Vs

	RECORDED	RE-PHASED
Z = 27.50 m Ds = 0.50 m Dt = 2.42 ms Vs = 207 m/s 18 MAR 2024 15:51:06		
Z = 28.00 m Ds = 0.50 m Dt = 1.78 ms Vs = 280 m/s 18 MAR 2024 15:52:12		
Z = 28.50 m Ds = 0.50 m Dt = 1.40 ms Vs = 356 m/s 18 MAR 2024 15:54:32		
Z = 29.00 m Ds = 0.50 m Dt = 1.59 ms Vs = 314 m/s 18 MAR 2024 15:56:11		
Z = 29.50 m Ds = 0.50 m Dt = 1.53 ms Vs = 326 m/s 18 MAR 2024 15:56:58		

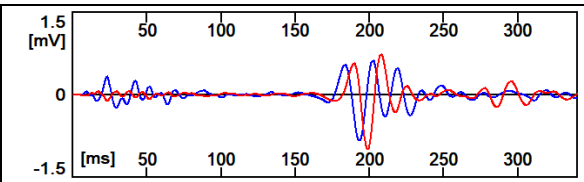
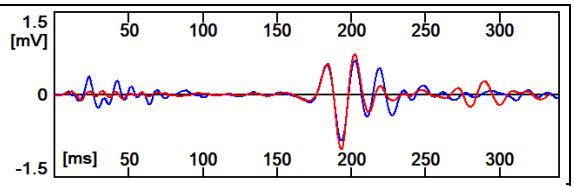
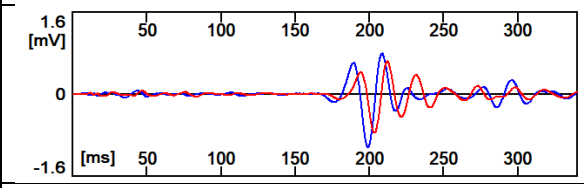
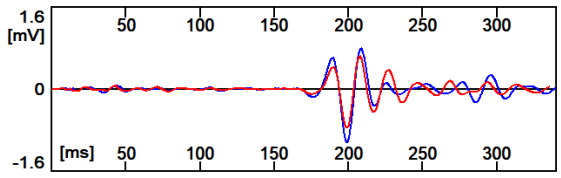
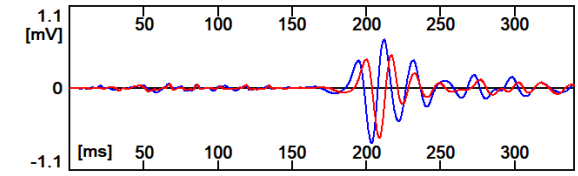
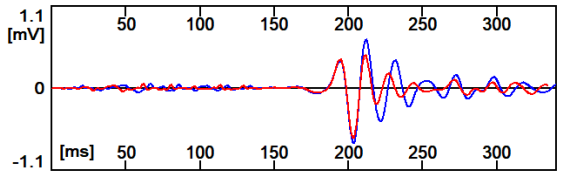
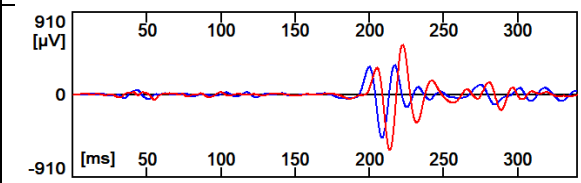
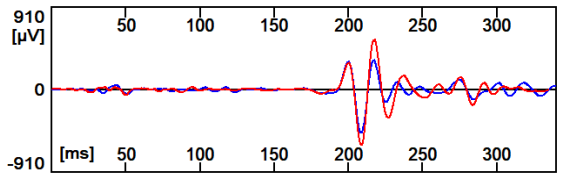
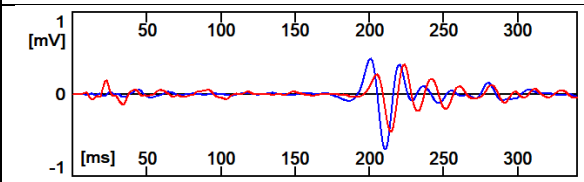
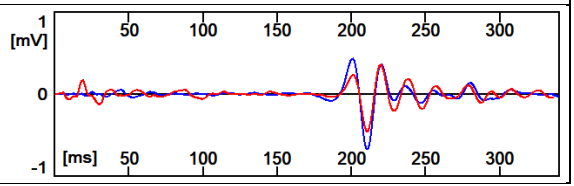
sCPTu016 - Vs

	RECORDED	RE-PHASED
Z = 1.00 m Ds = 0.24 m Dt = 1.18 ms Vs = 204 m/s 27 MAR 2024 7:48:56		
Z = 1.50 m Ds = 0.32 m Dt = 4.74 ms Vs = 67 m/s 27 MAR 2024 7:50:08		
Z = 2.00 m Ds = 0.37 m Dt = 8.62 ms Vs = 43 m/s 27 MAR 2024 7:52:25		
Z = 2.50 m Ds = 0.41 m Dt = 10.66 ms Vs = 38 m/s 27 MAR 2024 7:53:27		
Z = 3.00 m Ds = 0.43 m Dt = 7.38 ms Vs = 58 m/s 27 MAR 2024 7:56:13		
Z = 3.50 m Ds = 0.44 m Dt = 8.98 ms Vs = 49 m/s 27 MAR 2024 7:57:31		
Z = 4.00 m Ds = 0.46 m Dt = 3.52 ms Vs = 129 m/s 27 MAR 2024 8:00:20		
Z = 4.50 m Ds = 0.46 m Dt = 2.95 ms Vs = 157 m/s 27 MAR 2024 8:01:46		
Z = 5.00 m Ds = 0.47 m Dt = 5.46 ms Vs = 86 m/s 27 MAR 2024 8:03:46		
Z = 5.50 m Ds = 0.48 m Dt = 6.58 ms Vs = 72 m/s 27 MAR 2024 8:05:06		

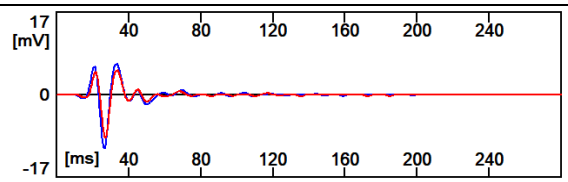
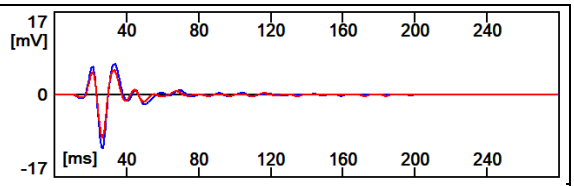
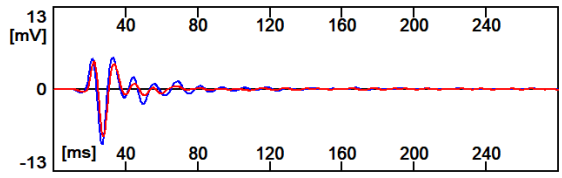
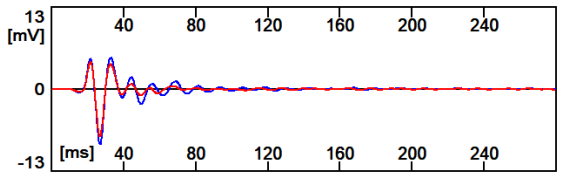
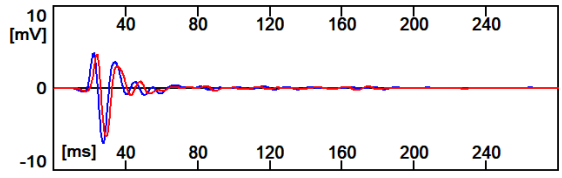
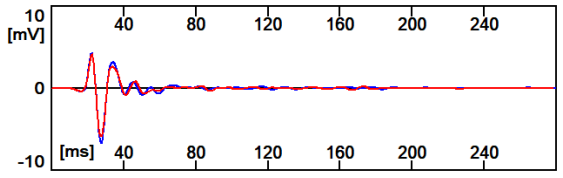
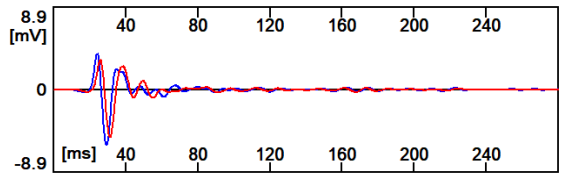
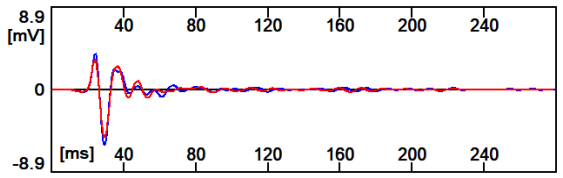
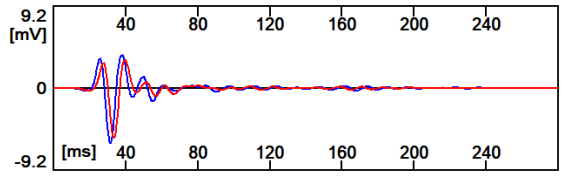
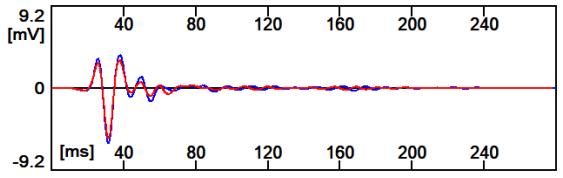
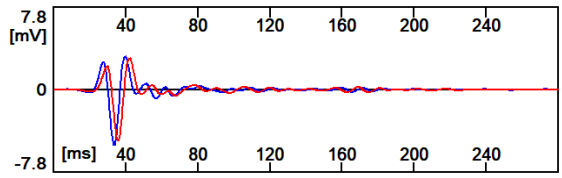
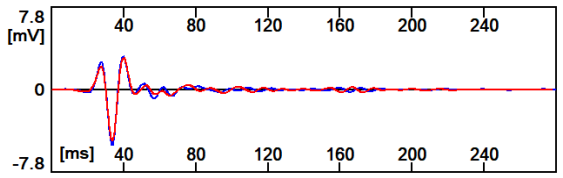
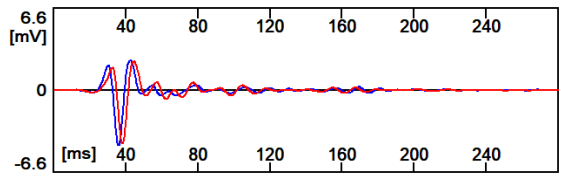
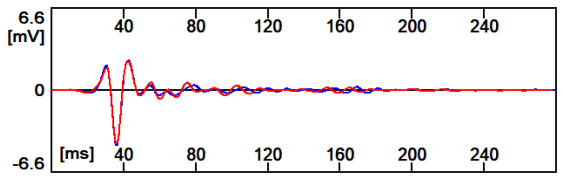
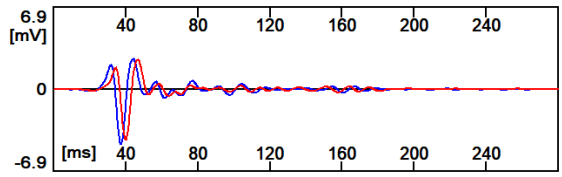
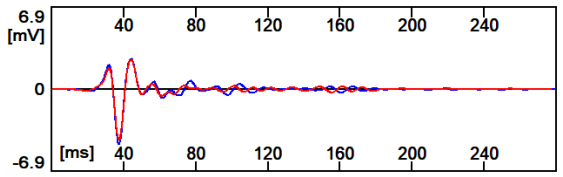
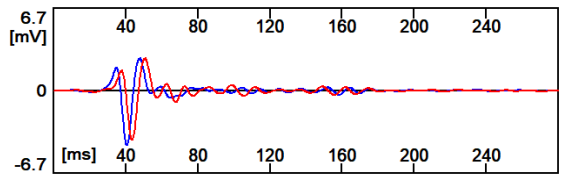
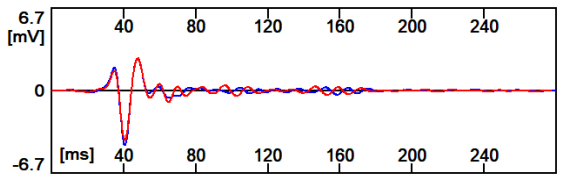
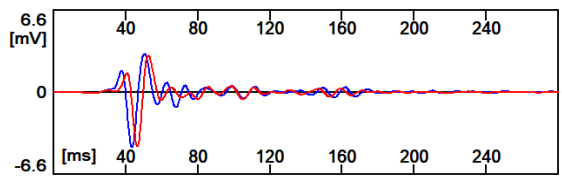
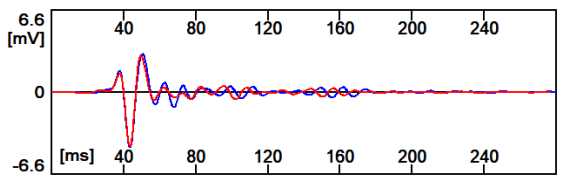
sCPTu016 - Vs

	RECORDED	RE-PHASED
Z = 6.00 m Ds = 0.48 m Dt = 8.42 ms Vs = 57 m/s 27 MAR 2024 8:07:06		
Z = 6.50 m Ds = 0.48 m Dt = 8.18 ms Vs = 59 m/s 27 MAR 2024 8:08:24		
Z = 7.00 m Ds = 0.48 m Dt = 9.18 ms Vs = 53 m/s 27 MAR 2024 8:10:42		
Z = 7.50 m Ds = 0.49 m Dt = 8.82 ms Vs = 55 m/s 27 MAR 2024 8:12:29		
Z = 8.00 m Ds = 0.49 m Dt = 8.10 ms Vs = 60 m/s 27 MAR 2024 8:15:10		
Z = 8.50 m Ds = 0.49 m Dt = 4.74 ms Vs = 103 m/s 27 MAR 2024 8:17:13		
Z = 9.00 m Ds = 0.49 m Dt = 7.50 ms Vs = 65 m/s 27 MAR 2024 8:20:00		
Z = 9.50 m Ds = 0.49 m Dt = 9.02 ms Vs = 54 m/s 27 MAR 2024 8:21:23		
Z = 10.00 m Ds = 0.49 m Dt = 6.06 ms Vs = 81 m/s 27 MAR 2024 8:23:56		
Z = 10.50 m Ds = 0.49 m Dt = 5.58 ms Vs = 88 m/s 27 MAR 2024 8:25:13		

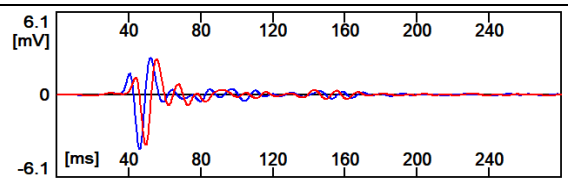
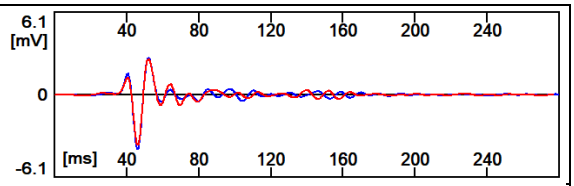
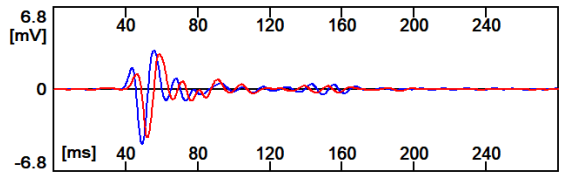
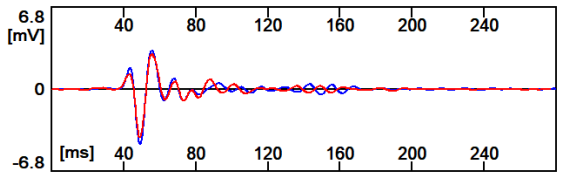
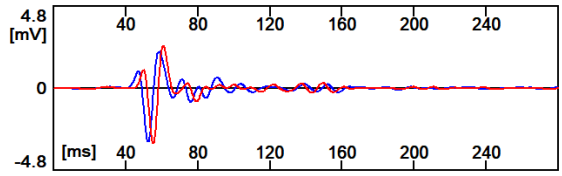
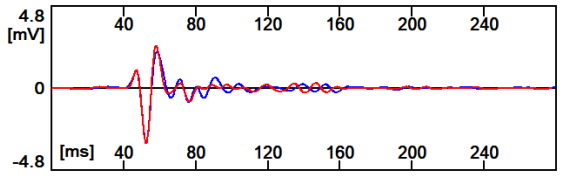
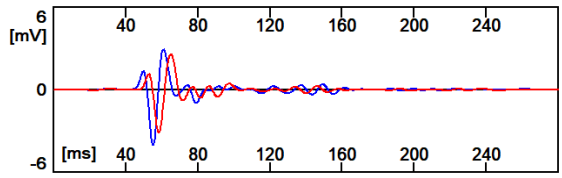
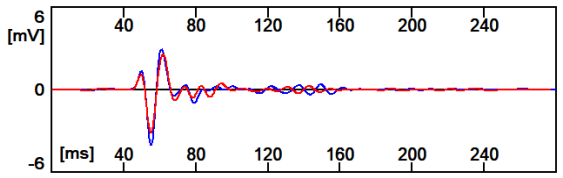
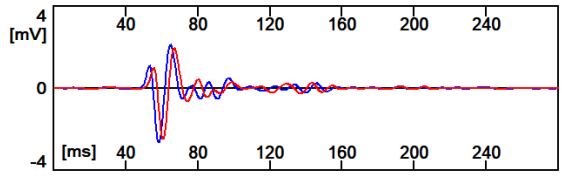
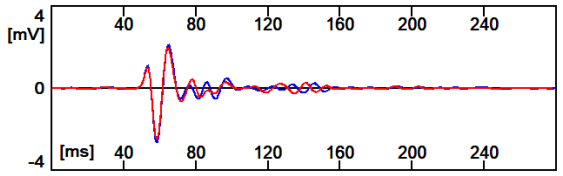
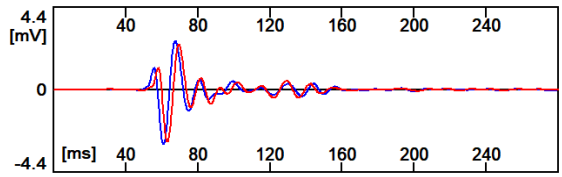
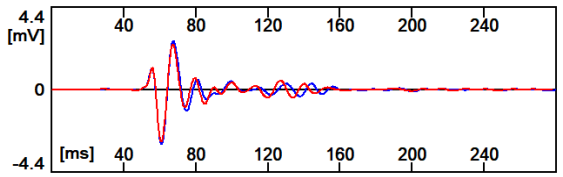
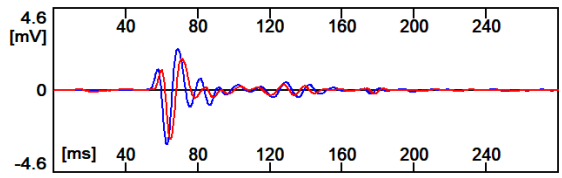
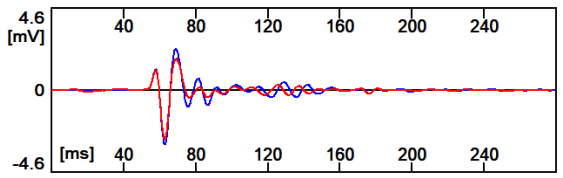
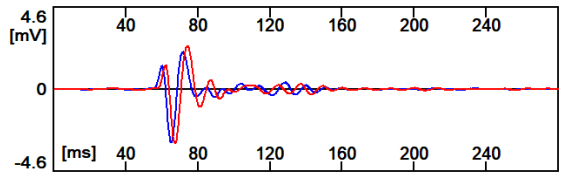
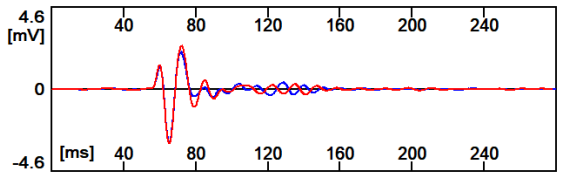
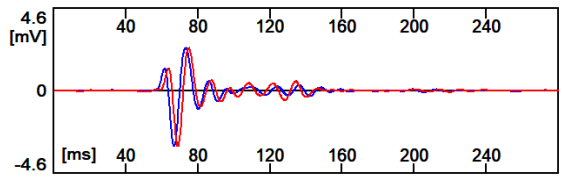
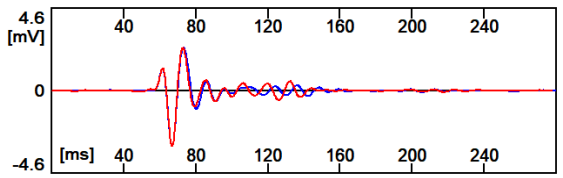
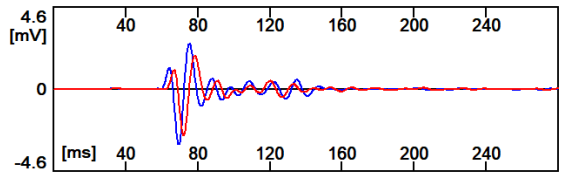
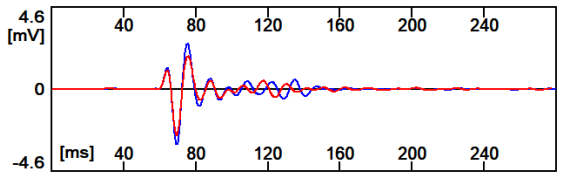
sCPTu016 - Vs

	RECORDED	RE-PHASED
Z = 11.00 m Ds = 0.49 m Dt = 5.66 ms Vs = 87 m/s 27 MAR 2024 8:27:38		
Z = 11.50 m Ds = 0.49 m Dt = 4.47 ms Vs = 111 m/s 27 MAR 2024 8:29:04		
Z = 12.00 m Ds = 0.49 m Dt = 5.38 ms Vs = 92 m/s 27 MAR 2024 8:31:30		
Z = 12.50 m Ds = 0.49 m Dt = 5.06 ms Vs = 98 m/s 27 MAR 2024 8:32:45		
Z = 13.00 m Ds = 0.50 m Dt = 3.75 ms Vs = 132 m/s 27 MAR 2024 8:34:26		

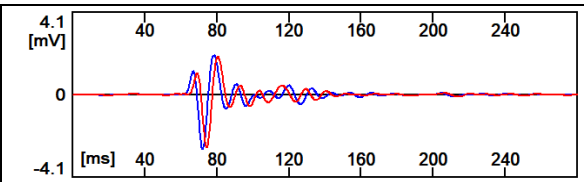
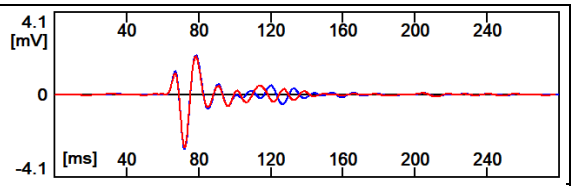
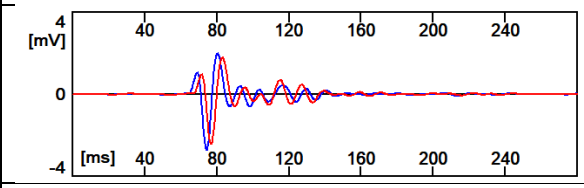
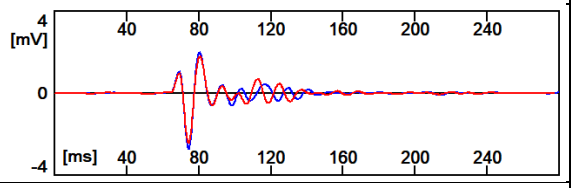
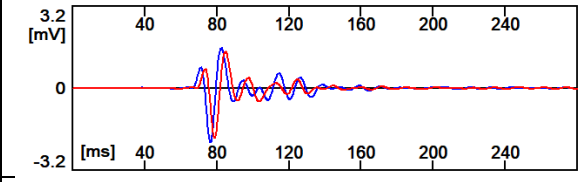
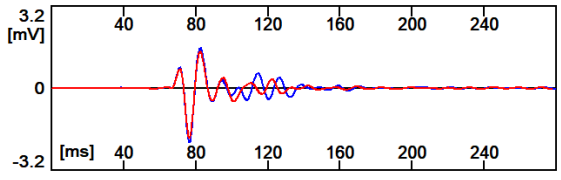
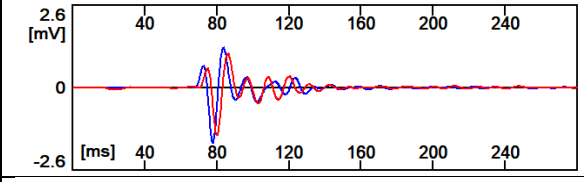
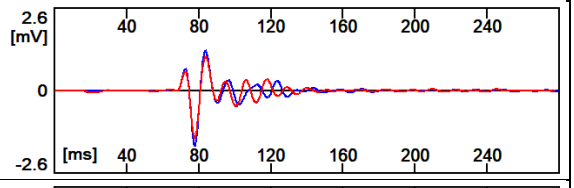
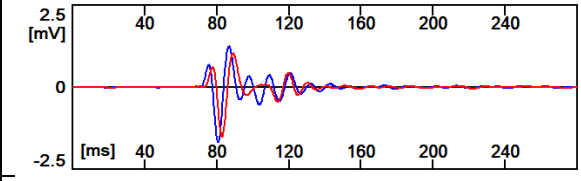
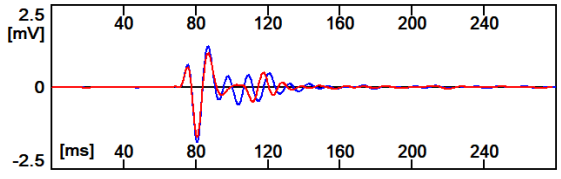
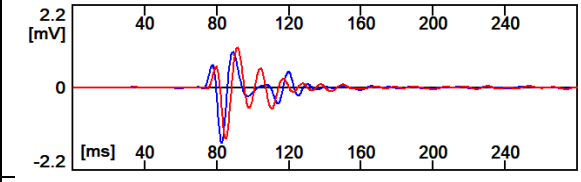
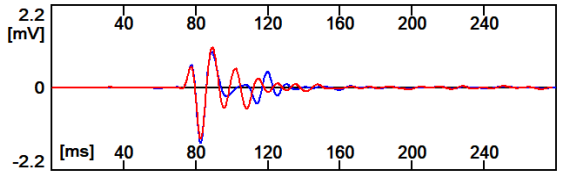
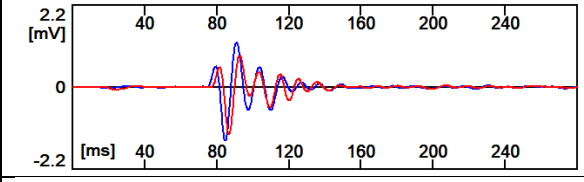
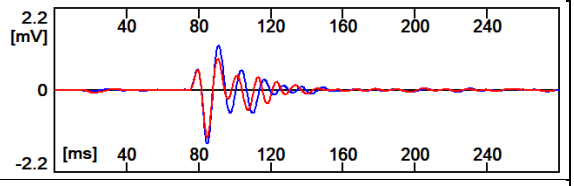
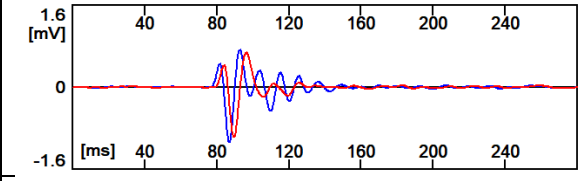
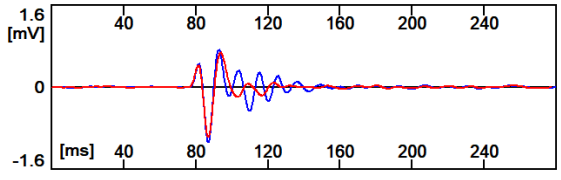
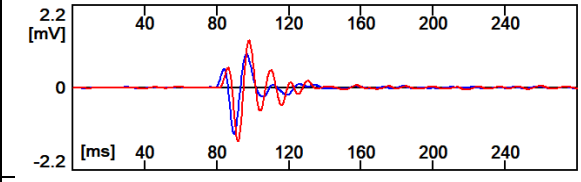
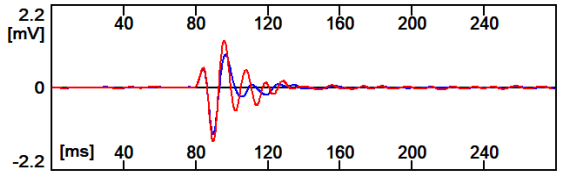
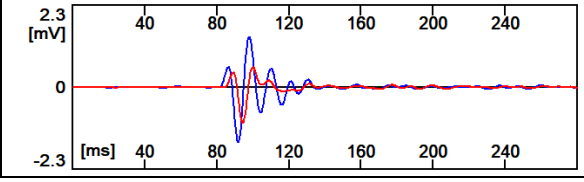
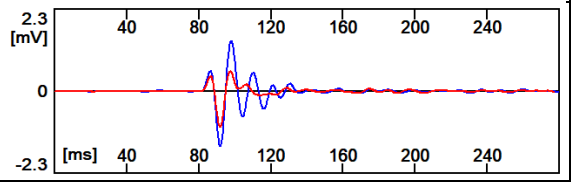
sCPTu017 - Vs

	RECORDED	RE-PHASED
Z = 2.00 m Ds = 0.37 m Dt = 0.62 ms Vs = 594 m/s 20 MAR 2024 13:26:04		
Z = 2.50 m Ds = 0.41 m Dt = 0.84 ms Vs = 484 m/s 20 MAR 2024 13:27:43		
Z = 3.00 m Ds = 0.43 m Dt = 1.69 ms Vs = 253 m/s 20 MAR 2024 13:31:49		
Z = 3.50 m Ds = 0.44 m Dt = 1.87 ms Vs = 238 m/s 20 MAR 2024 13:33:08		
Z = 4.00 m Ds = 0.46 m Dt = 1.97 ms Vs = 231 m/s 20 MAR 2024 13:41:03		
Z = 4.50 m Ds = 0.46 m Dt = 2.15 ms Vs = 216 m/s 20 MAR 2024 13:42:13		
Z = 5.00 m Ds = 0.47 m Dt = 2.16 ms Vs = 218 m/s 20 MAR 2024 13:44:20		
Z = 5.50 m Ds = 0.48 m Dt = 2.63 ms Vs = 181 m/s 20 MAR 2024 13:46:05		
Z = 6.00 m Ds = 0.48 m Dt = 2.86 ms Vs = 168 m/s 20 MAR 2024 13:49:23		
Z = 6.50 m Ds = 0.48 m Dt = 2.96 ms Vs = 163 m/s 20 MAR 2024 13:50:20		

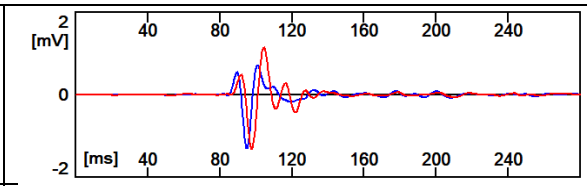
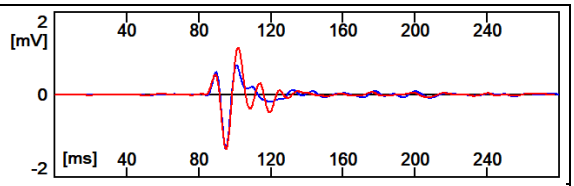
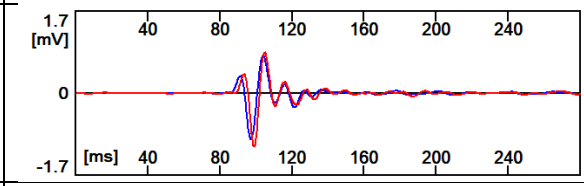
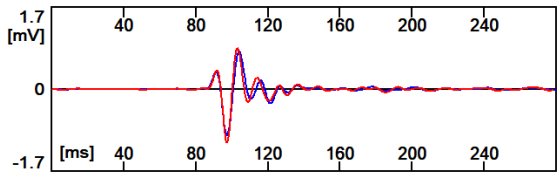
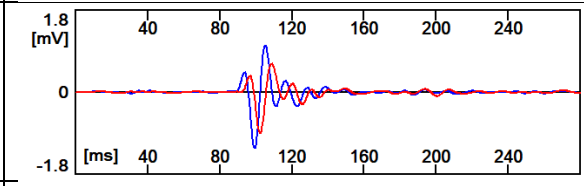
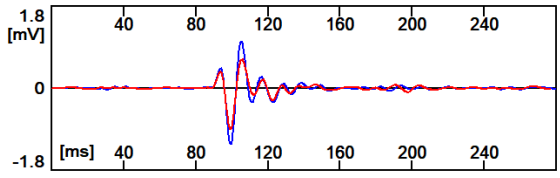
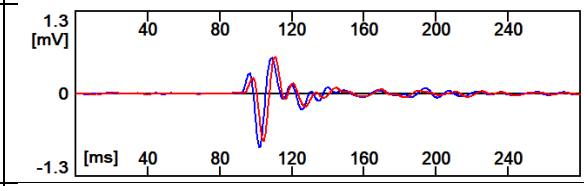
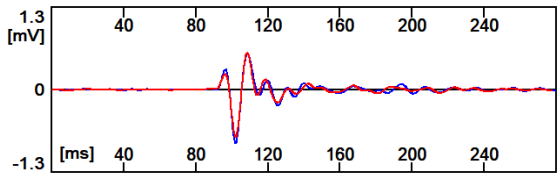
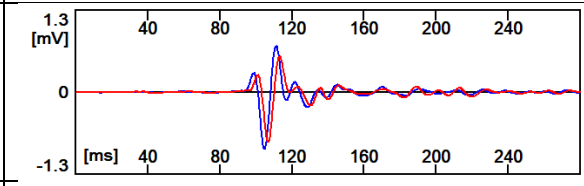
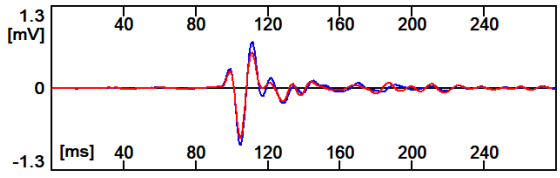
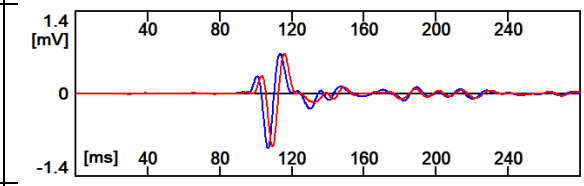
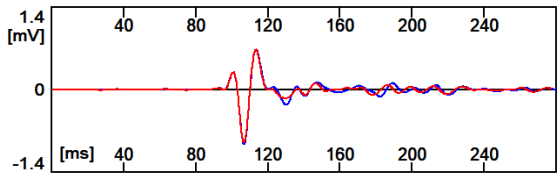
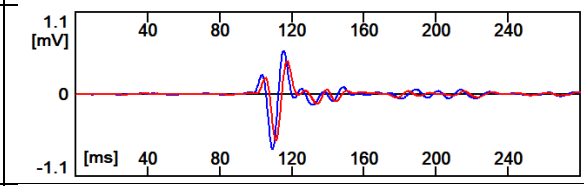
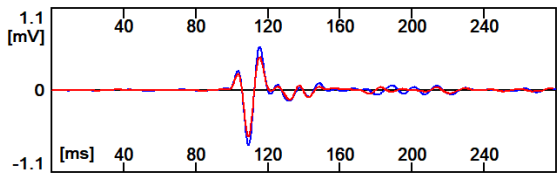
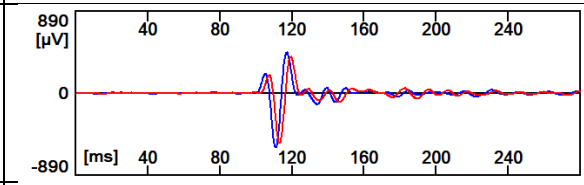
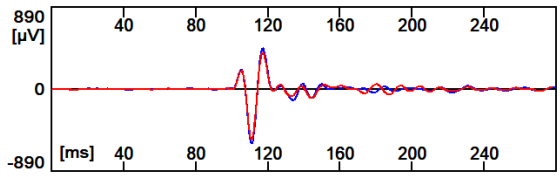
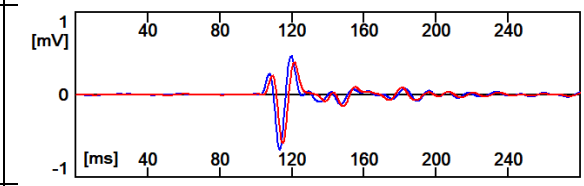
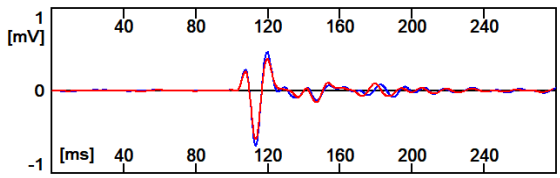
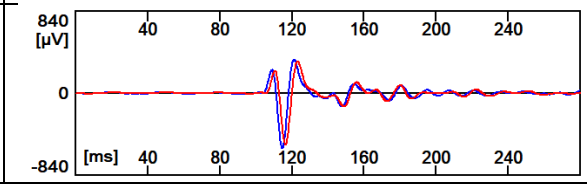
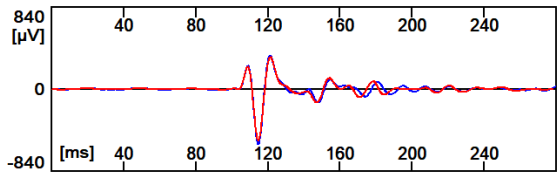
sCPTu017 - Vs

	RECORDED	RE-PHASED
Z = 7.00 m Ds = 0.48 m Dt = 3.36 ms Vs = 144 m/s 20 MAR 2024 13:57:36		
Z = 7.50 m Ds = 0.49 m Dt = 3.12 ms Vs = 156 m/s 20 MAR 2024 13:58:41		
Z = 8.00 m Ds = 0.49 m Dt = 2.83 ms Vs = 172 m/s 20 MAR 2024 14:01:22		
Z = 8.50 m Ds = 0.49 m Dt = 3.25 ms Vs = 151 m/s 20 MAR 2024 14:04:45		
Z = 9.00 m Ds = 0.49 m Dt = 2.33 ms Vs = 210 m/s 20 MAR 2024 14:08:08		
Z = 9.50 m Ds = 0.49 m Dt = 2.24 ms Vs = 219 m/s 20 MAR 2024 14:09:19		
Z = 10.00 m Ds = 0.49 m Dt = 2.12 ms Vs = 233 m/s 20 MAR 2024 14:14:12		
Z = 10.50 m Ds = 0.49 m Dt = 2.14 ms Vs = 230 m/s 20 MAR 2024 14:15:07		
Z = 11.00 m Ds = 0.49 m Dt = 2.12 ms Vs = 233 m/s 20 MAR 2024 14:17:06		
Z = 11.50 m Ds = 0.49 m Dt = 2.73 ms Vs = 181 m/s 20 MAR 2024 14:17:55		

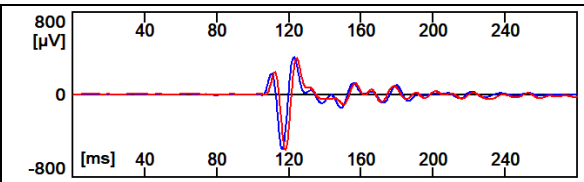
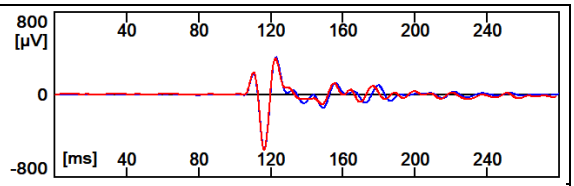
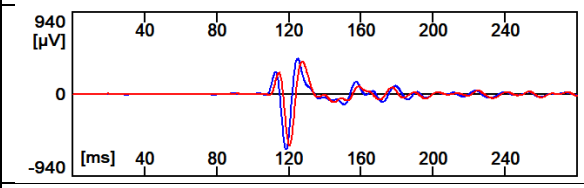
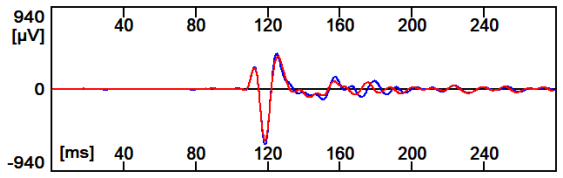
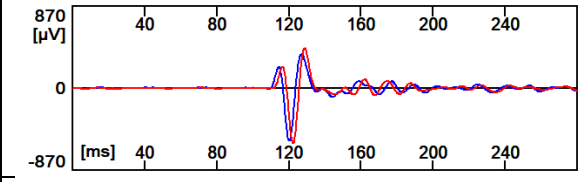
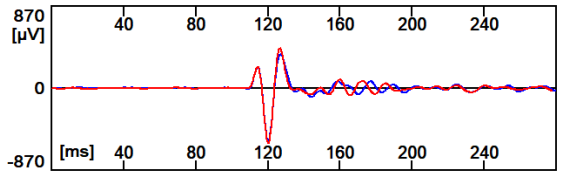
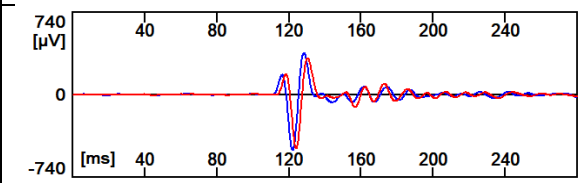
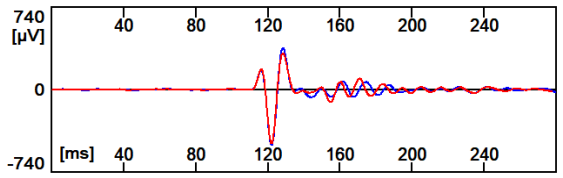
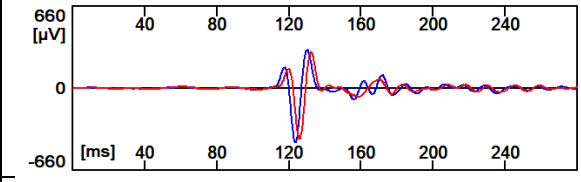
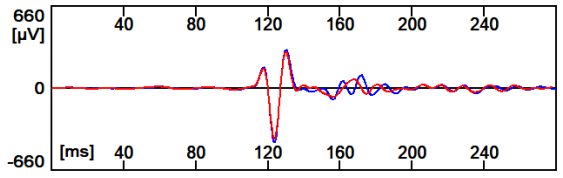
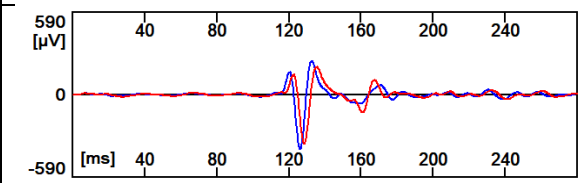
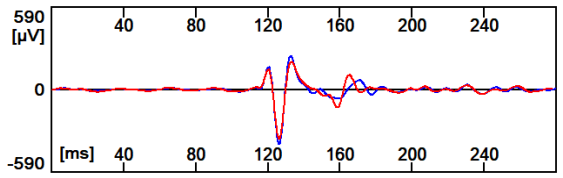
sCPTu017 - Vs

	RECORDED	RE-PHASED
Z = 12.00 m Ds = 0.49 m Dt = 2.25 ms Vs = 219 m/s 20 MAR 2024 14:19:44		
Z = 12.50 m Ds = 0.49 m Dt = 2.50 ms Vs = 198 m/s 20 MAR 2024 14:23:22		
Z = 13.00 m Ds = 0.50 m Dt = 2.38 ms Vs = 208 m/s 20 MAR 2024 14:25:33		
Z = 13.50 m Ds = 0.50 m Dt = 2.33 ms Vs = 213 m/s 20 MAR 2024 14:38:41		
Z = 14.00 m Ds = 0.50 m Dt = 2.19 ms Vs = 226 m/s 20 MAR 2024 14:40:34		
Z = 14.50 m Ds = 0.50 m Dt = 2.26 ms Vs = 219 m/s 20 MAR 2024 14:41:47		
Z = 15.00 m Ds = 0.50 m Dt = 2.14 ms Vs = 232 m/s 20 MAR 2024 14:43:45		
Z = 15.50 m Ds = 0.50 m Dt = 2.59 ms Vs = 191 m/s 20 MAR 2024 14:44:32		
Z = 16.00 m Ds = 0.50 m Dt = 2.12 ms Vs = 234 m/s 20 MAR 2024 14:46:27		
Z = 16.50 m Ds = 0.50 m Dt = 2.59 ms Vs = 192 m/s 20 MAR 2024 14:47:47		

sCPTu017 - Vs

	RECORDED	RE-PHASED
Z = 17.00 m Ds = 0.50 m Dt = 2.62 ms Vs = 190 m/s 20 MAR 2024 14:50:07		
Z = 17.50 m Ds = 0.50 m Dt = 1.78 ms Vs = 280 m/s 20 MAR 2024 14:50:58		
Z = 18.00 m Ds = 0.50 m Dt = 3.13 ms Vs = 159 m/s 20 MAR 2024 14:52:49		
Z = 18.50 m Ds = 0.50 m Dt = 2.06 ms Vs = 242 m/s 20 MAR 2024 14:53:43		
Z = 19.00 m Ds = 0.50 m Dt = 2.08 ms Vs = 240 m/s 20 MAR 2024 14:57:12		
Z = 19.50 m Ds = 0.50 m Dt = 2.52 ms Vs = 197 m/s 20 MAR 2024 14:58:26		
Z = 20.00 m Ds = 0.50 m Dt = 1.93 ms Vs = 258 m/s 20 MAR 2024 15:00:30		
Z = 20.50 m Ds = 0.50 m Dt = 2.20 ms Vs = 226 m/s 20 MAR 2024 15:01:21		
Z = 21.00 m Ds = 0.50 m Dt = 1.69 ms Vs = 295 m/s 20 MAR 2024 15:03:20		
Z = 21.50 m Ds = 0.50 m Dt = 1.78 ms Vs = 280 m/s 20 MAR 2024 15:04:17		

sCPTu017 - Vs

	RECORDED	RE-PHASED
Z = 22.00 m Ds = 0.50 m Dt = 1.78 ms Vs = 279 m/s 20 MAR 2024 15:06:26		
Z = 22.50 m Ds = 0.50 m Dt = 1.93 ms Vs = 259 m/s 20 MAR 2024 15:07:29		
Z = 23.00 m Ds = 0.50 m Dt = 2.09 ms Vs = 238 m/s 20 MAR 2024 15:09:39		
Z = 23.50 m Ds = 0.50 m Dt = 2.03 ms Vs = 246 m/s 20 MAR 2024 15:10:35		
Z = 24.00 m Ds = 0.50 m Dt = 2.31 ms Vs = 216 m/s 20 MAR 2024 15:13:17		
Z = 24.50 m Ds = 0.50 m Dt = 2.29 ms Vs = 218 m/s 20 MAR 2024 15:14:18		

APPENDIX 5:

Laboratory Testing

Babbage Geotechnical Laboratory
Level 4
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E-mail

P O Box 2027
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64-9-367 4954
wec@babbage.co.nz

Please reply to: W.E. Campton

ENGEO LTD.
PO Box 33-1527
Takapuna
Auckland 0740

Attention: **RHYS BRIDGES**

Job Number: 66273#L
BGL Registration Number: 3064
Checked by: WEC

10th April 2024

ATTERBERG LIMITS & LINEAR SHRINKAGE TESTING

Dear Sir,

Re: PUKEKOHE PARK

Your Reference: 25208.000.001
Report Number: 66273#L/AL Pukekohe Park

The following report presents the results of Atterberg Limits & Linear Shrinkage testing at BGL of soil samples delivered to this laboratory on the 25th of March 2024. Test results are summarised below, with page 3 showing where the samples plot on the Unified Soil Classification System (Casagrande) Chart. Test standards used were:

Water Content:	NZS4402:1986:Test 2.1
Liquid Limit:	NZS4402:1986:Test 2.2
Plastic Limit:	NZS4402:1986:Test 2.3
Plasticity Index:	NZS4402:1986:Test 2.4
Linear Shrinkage:	NZS4402:1986:Test 2.6

Borehole Number	Sample Number	Depth (m)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Linear Shrinkage (%)*
HA01	BAG	0.80 – 1.10	76.2	97	48	49	17
HA05	BAG	0.10 – 0.50	58.2	114 ◆	58 ◆	56 ◆	26 ◆
HA07	BAG	3.40 – 3.70	63.1	94	60	34	24
HA13	BAG	0.40 – 0.80	153	146	93	53	14
HA17	BAG	0.50 – 1.20	149	243	115	128	38

The amount of shrinkage of the sample as a percentage of the original sample length.

◆ = ***The soil fraction passing a 425μm sieve was used for the liquid limit, plastic limit & linear shrinkage tests.***

Borehole Number	Sample Number	Depth (m)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Linear Shrinkage (%)*
HA28	BAG	3.50 – 4.00	77.8	93	52	41	16
HA31	BAG	2.70 – 3.20	51.1	96	35	61	19
HA32	BAG	0.80 – 1.20	49.6	111	55	56	25
HA34	BAG	2.10 – 2.80	83.7	115	50	65	23
HA35	BAG	0.90 – 1.20	76	112	45	67	24

****The amount of shrinkage of the sample as a percentage of the original sample length.***

◆ = ***The soil fraction passing a 425μm sieve was used for the liquid limit, plastic limit & linear shrinkage tests.***

The whole soils were used for the water content tests (the soils were in a natural state), and for the liquid limit, plastic limit & linear shrinkage tests without a diamond beside them. The soil fractions passing a 0.425mm sieve were used for the liquid limit, plastic limit & linear shrinkage tests with a diamond (◆) beside them. The soils were wet up and dried where required for the liquid limit, plastic limit & linear shrinkage tests.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. Test 2.2: liquid limit, test 2.3: plastic limit, and test 2.6: linear shrinkage are reported to the nearest whole number.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
Key Technical Person
Assistant Laboratory Manager
Babbage Geotechnical Laboratory

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TESTING LABORATORY
№ 126

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. This report may not be reproduced except in full & with written approval from BGL.

Babbage Geotechnical Laboratory

Project: PUKEKOHE PARK

DETERMINATION OF THE LIQUID LIMIT, PLASTIC LIMIT & THE PLASTICITY INDEX

Test Methods: NZS4402: 1986: Test 2.2, Test 2.3 and Test 2.4

Tested By:	WC / JL / SG	March / April 2024
Compiled By:	JF	10/04/2024
Checked By:	JF	10/04/2024

SUMMARY OF TESTING

Borehole Number	Sample Number	Depth (m)	Liquid Limit	Plastic Limit	Plasticity Index	Soil Classification Based on USCS Chart Below
HA01	BAG	0.80 - 1.10	97	48	49	MH
HA05	BAG	0.10 - 0.50	114	58	56	MH
HA07	BAG	3.40 - 3.70	94	60	34	MH
HA13	BAG	0.40 - 0.80	146	93	53	MH
HA17	BAG	0.50 - 1.20	243	115	128	MH (plots off chart)
HA28	BAG	3.50 - 4.00	93	52	41	MH
HA31	BAG	2.70 - 3.20	96	35	61	CH
HA32	BAG	0.80 - 1.20	111	55	56	MH
HA34	BAG	2.10 - 2.80	115	50	65	MH
HA35	BAG	0.90 - 1.20	112	45	67	CH / MH

The chart below & soil classification terminology is taken from ASTM D2487-17^{e1} "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)", April 2020, & is based on the classification scheme developed by A. Casagrande in the 1940's (Casagrande, A., 1948: Classification and identification of soil. Transactions of the American Society of Civil Engineers, v. 113, p. 901-930). The chart below & the soil classification given in the table above are included for your information only, and are not included in the IANZ endorsement for this report.

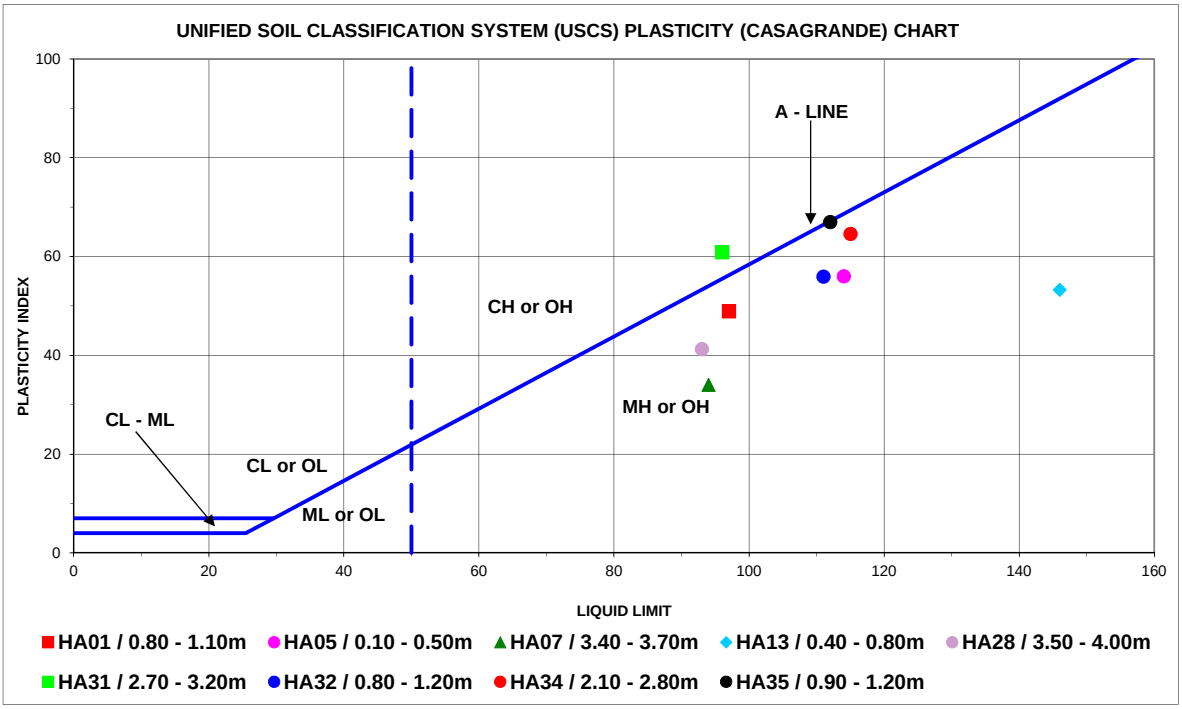

CHART LEGEND

CL = CLAY, low plasticity ('lean' clay)
CH = CLAY, high plasticity ('fat' clay)
OL = ORGANIC CLAY or ORGANIC SILT, low liquid limit
OH = ORGANIC CLAY or ORGANIC SILT, high liquid limit
ML = SILT, low liquid limit
MH = SILT, high liquid limit ('elastic silt')
CL - ML = SILTY CLAY

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Please reply to: W.E. Campton

ENGEO LTD.
PO Box 33-1527
Takapuna
Auckland 0740

Attention: **RHYS BRIDGES**

Job Number: 66273#L
BGL Registration Number: 3064
Checked by: JF

26th March 2024

ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

Re: PUKEKOHE PARK
Your Reference: 25208.000.001
Report Number: 66273#L/CONSOL Pukekohe Park MBH01 7.50 – 8.00m

Borehole No: MBH01 Sample No: TUBE Depth: 7.50 – 8.00m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 15th of March 2024. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give both the $\sqrt{T_{90}}$ and T_{50} values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

Water Content:	NZS4402:1986:Test 2.1
One Dimensional Consolidation:	NZS4402:1986:Test 7.1

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of m_v shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m^3 was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation (c_v's), and coefficients of volume compressibility (m_v's) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

Note that the Coefficient of Secondary Compression (C_{sec}) and the Coefficient of Permeability (k) values reported on page 5 have been calculated based on the methods described in "Manual of Soil Laboratory Testing Volume 2: Permeability, Shear Strength & Compressibility Tests" by K.H. Head & R.J. Epps, 3rd Edition, 2011. The Coefficient of Permeability values were calculated using the c_v(log) values determined in the test. The reporting of these figures is not part of NZS4402:1986:Test 7.1, therefore these figures are not part of the IANZ endorsement for this report.

Sample Description (***not part of BGL IANZ Accreditation***)

MBH01 / TUBE / 7.50 – 8.00m:

SAND, fine to coarse, silty, non-plastic, speckled brown, light grey & dark grey, very moist.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
Key Technical Person
Laboratory Manager
Babbage Geotechnical Laboratory

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№ 126

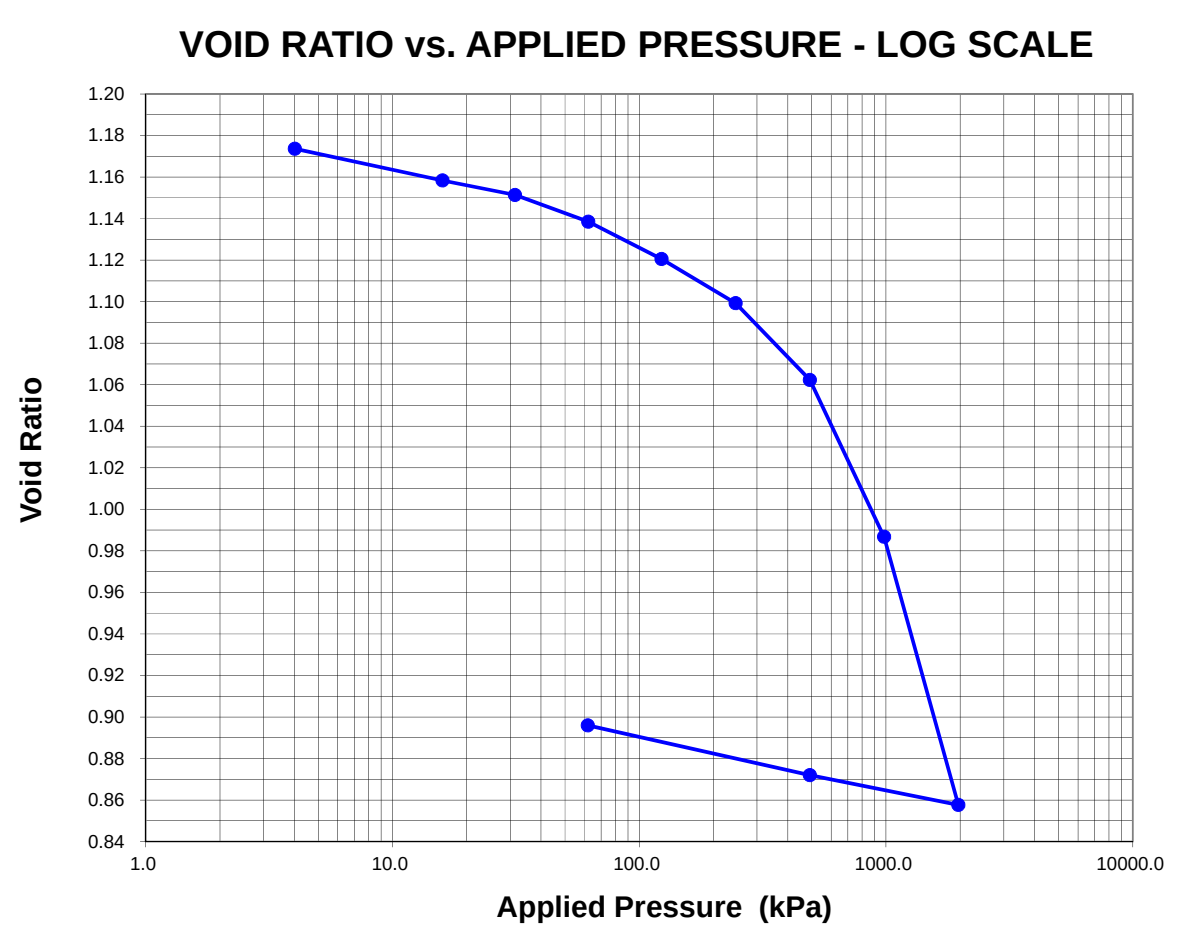
BGL Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
	66273#L	3064	3	5	Issue Date:	July 2022
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	26-Mar-24
	Checked By:	JF	26-Mar-24

Borehole No: MBH01 **Sample No:** TUBE **Depth:** 7.50 - 8.00m



SAMPLE HISTORY & PREPARATION

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

TEST DETAILS

Consol machine number:	3		Surface area of sample top:	1998	mm^2
Consol ring number:	3b		Sample mass:	70.270	g
Sample diameter:	50.44	mm	Initial bulk density:	1.76	t/m^3
Sample height:	19.96	mm	Assumed solid density of soil particles:	2.65	t/m^3

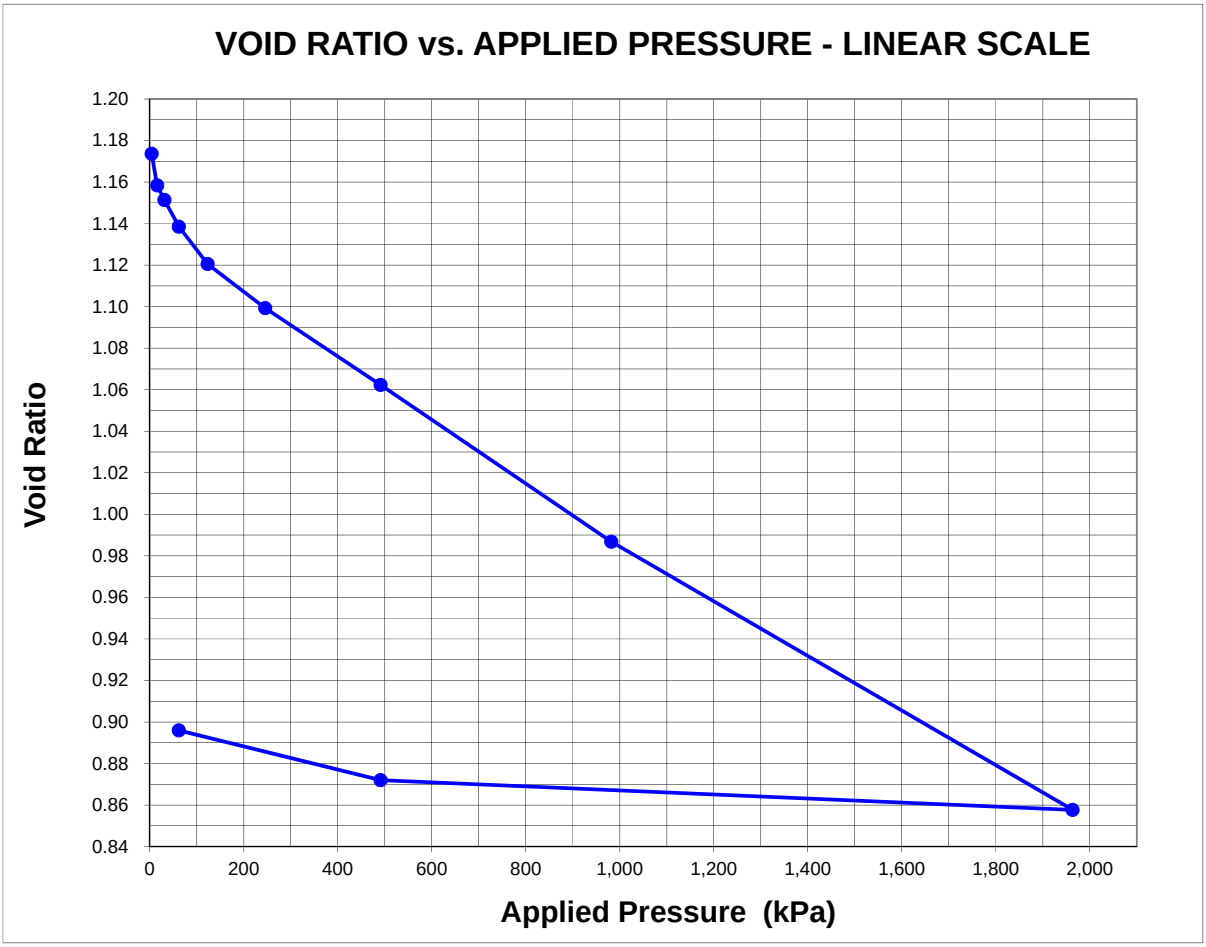
Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
	66273#L	3064	4	5	Issue Date:	July 2022
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	26-Mar-24
	Checked By:	JF	26-Mar-24

Borehole No: MBH01 **Sample No:** TUBE **Depth:** 7.50 - 8.00m



PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING

BGL Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
	66273#L	3064	5	5	Issue Date:	July 2022
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	26-Mar-24
	Checked By:	JF	26-Mar-24

Borehole No: MBH01 **Sample No:** TUBE **Depth:** 7.50 - 8.00m

Applied Pressure	Incremental Deflection	Sample Height	Compression Ratio	Height of Voids	Void Ratio	Coefficient of Volume Compressibility m_v	Coefficient of Consolidation - c_v (log time)	Coefficient of Consolidation - c_v (sqrt time)
kPa	mm	mm		mm	e	m^2/MN	m^2/year	m^2/year
4.0	0.000	19.960	1.000	10.777	1.174			
16.0	0.140	19.820	0.993	10.637	1.158	0.59	52	49
31.4	0.064	19.755	0.990	10.573	1.151	0.21	27	22
62.1	0.118	19.638	0.984	10.455	1.139	0.19	51	30
123.2	0.165	19.472	0.976	10.290	1.121	0.14	40	35
245.9	0.195	19.277	0.966	10.094	1.099	0.082	33	25
491.3	0.339	18.938	0.949	9.755	1.062	0.072	29	24
982.1	0.694	18.244	0.914	9.061	0.987	0.075	37	28
1963.6	1.186	17.058	0.855	7.876	0.858	0.066	32	26
491.3	-0.132	17.190	0.861	8.007	0.872		BACKLOAD 1	
61.9	-0.220	17.410	0.872	8.227	0.896		BACKLOAD 2	

Coefficient of Secondary Compression - C_{sec}	
Applied Pressure	C_{sec}
16.0	0.001
31.4	0.001
62.1	0.001
123.2	0.001
245.9	0.001
491.3	0.002
982.1	0.004
1963.6	0.005

Coefficient of Permeability - k	
Applied Pressure	k (m/s)
16.0	9.5E-09
31.4	1.8E-09
62.1	3.1E-09
123.2	1.7E-09
245.9	8.4E-10
491.3	6.5E-10
982.1	8.7E-10
1963.6	6.6E-10

	INITIAL	FINAL
Mass of dry sample (g)	48.62	48.62
Height of sample (mm)	19.960	17.058 (after consolidation) 17.410 (after rebound)
Water Content (%)	44.5	36.9
Dry Density (t/m^3)	1.22	1.43
Height of soil particles (mm)	9.183	9.183
Void Ratio	1.174	0.858 (after consolidation) 0.896 (after rebound)
Degree of saturation (%)	-	-

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Please reply to: W.E. Campton

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Auckland 0740

Attention: **RHYS BRIDGES**

Job Number: 66273#L
BGL Registration Number: 3064
Checked by: WEC

11th April 2024

ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

Re: PUKEKOHE PARK
Your Reference: 25208.000.001
Report Number: 66273#L/CONSOL Pukekohe Park MBH02 4.50 – 5.00m

Borehole No: MBH02 Sample No: TUBE Depth: 4.50 – 5.00m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 25th of March 2024. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give both the $\sqrt{T_{90}}$ and T_{50} values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

Water Content:	NZS4402:1986:Test 2.1
One Dimensional Consolidation:	NZS4402:1986:Test 7.1

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of m_v shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m^3 was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation (c_v's), and coefficients of volume compressibility (m_v's) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

Note that the Coefficient of Secondary Compression (C_{sec}) and the Coefficient of Permeability (k) values reported on page 5 have been calculated based on the methods described in "Manual of Soil Laboratory Testing Volume 2: Permeability, Shear Strength & Compressibility Tests" by K.H. Head & R.J. Epps, 3rd Edition, 2011. The Coefficient of Permeability values were calculated using the c_v(log) values determined in the test. The reporting of these figures is not part of NZS4402:1986:Test 7.1, therefore these figures are not part of the IANZ endorsement for this report.

Sample Description (***not part of BGL IANZ Accreditation***)

MBH02 / TUBE / 4.50 – 5.00m:

CLAY, fine sandy, firm to stiff, slightly plastic to non-plastic, yellowish brown with black organic inclusions, very moist, low density, sensitive.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
Key Technical Person
Laboratory Manager
Babbage Geotechnical Laboratory

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№ 126

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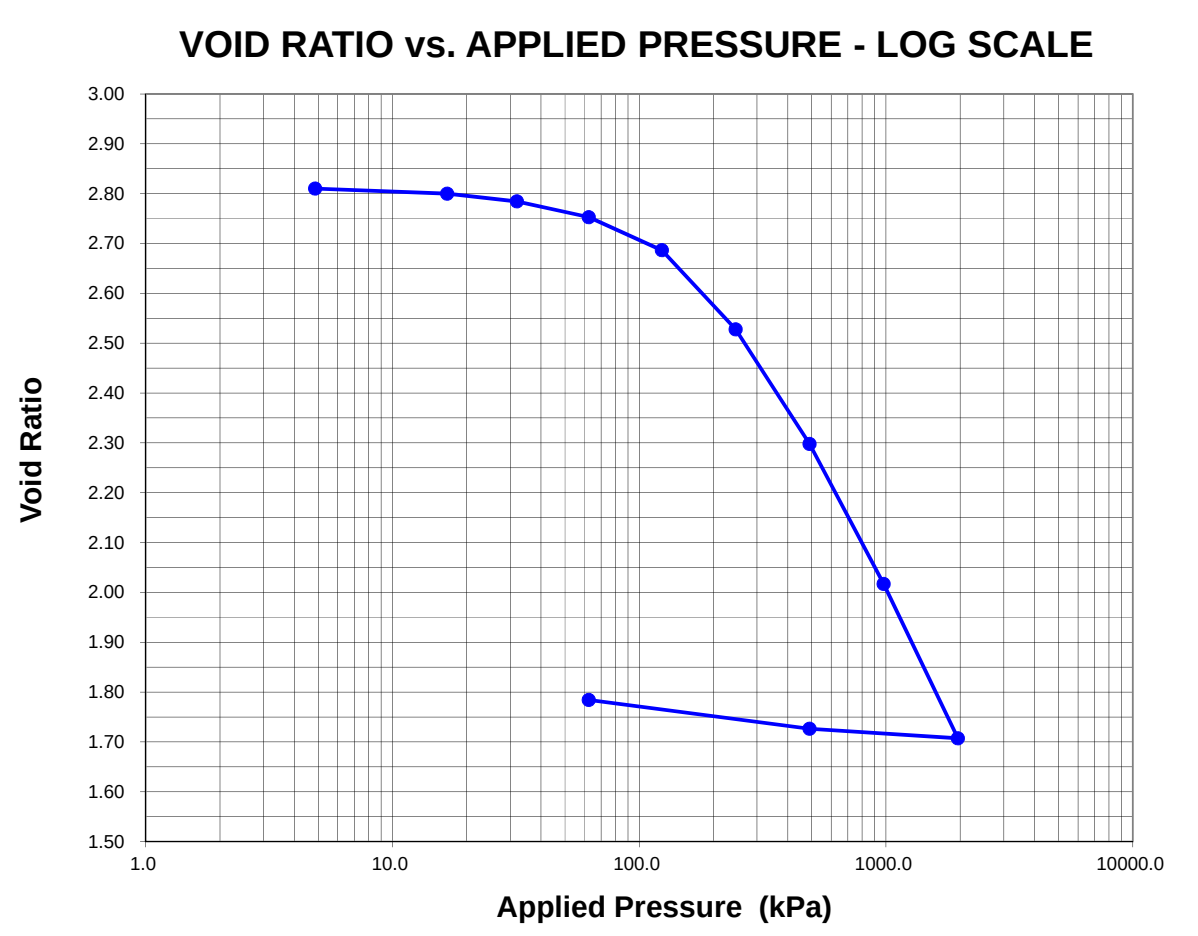
PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	10-Apr-24
	Checked By:	JF	11-Apr-24

Borehole No: MBH02 **Sample No:** TUBE **Depth:** 4.50 - 5.00m



SAMPLE HISTORY & PREPARATION

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

TEST DETAILS

Consol machine number:	2		Surface area of sample top:	2007	mm^2
Consol ring number:	2b		Sample mass:	55.005	g
Sample diameter:	50.55	mm	Initial bulk density:	1.37	t/m^3
Sample height:	19.94	mm	Assumed solid density of soil particles:	2.65	t/m^3

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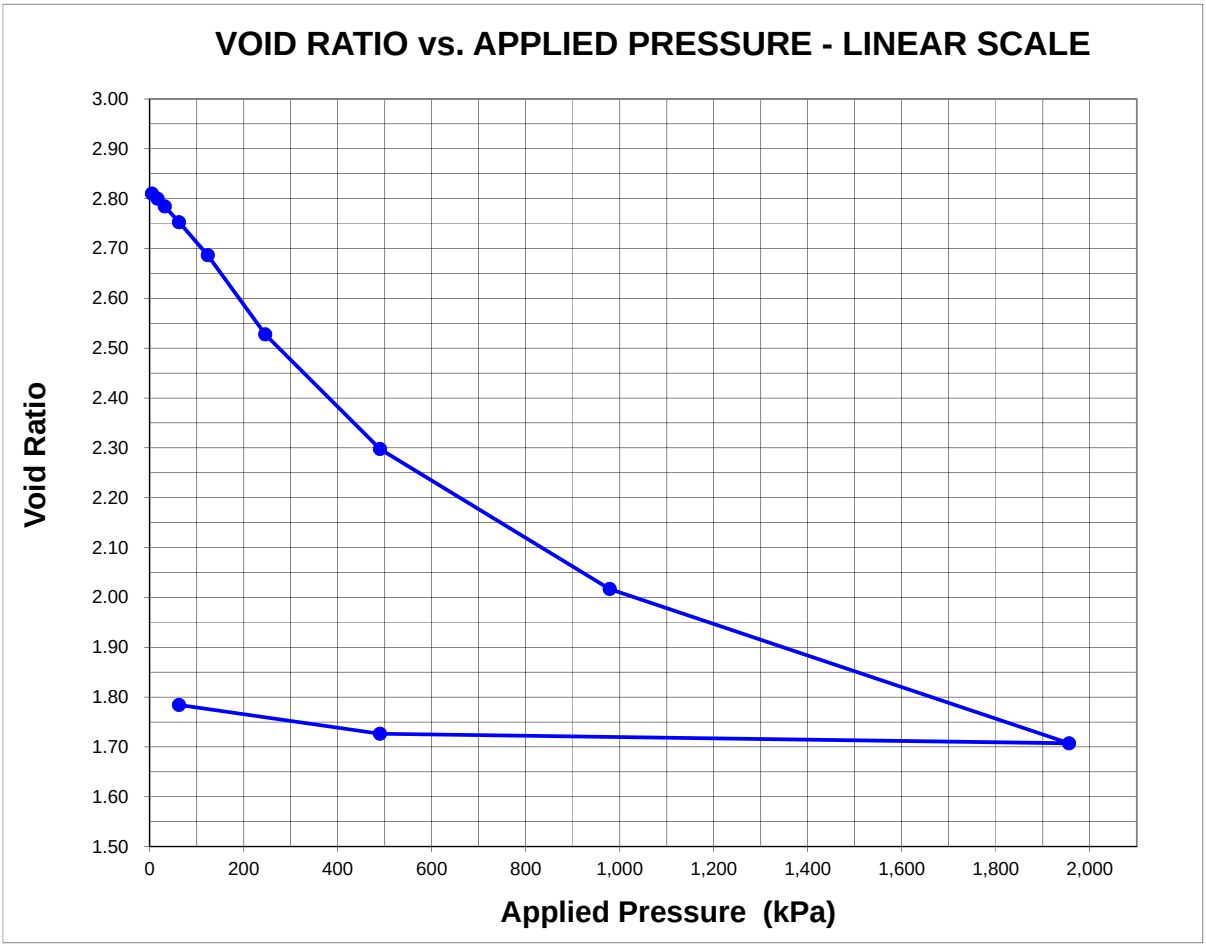
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	10-Apr-24
	Checked By:	JF	11-Apr-24

Borehole No: MBH02 **Sample No:** TUBE **Depth:** 4.50 - 5.00m



PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING

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	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	10-Apr-24
	Checked By:	JF	11-Apr-24

Borehole No: MBH02 **Sample No:** TUBE **Depth:** 4.50 - 5.00m

Applied Pressure	Incremental Deflection	Sample Height	Compression Ratio	Height of Voids	Void Ratio	Coefficient of Volume Compressibility m_v	Coefficient of Consolidation - c_v (log time)	Coefficient of Consolidation - c_v (sqrt time)
kPa	mm	mm		mm	e	m^2/MN	m^2/year	m^2/year
4.9	0.000	19.940	1.000	14.707	2.810			
16.7	0.054	19.886	0.997	14.653	2.800	0.23	80	54
32.0	0.081	19.805	0.993	14.572	2.784	0.27	57	26
62.5	0.165	19.640	0.985	14.407	2.753	0.27	51	30
123.6	0.347	19.293	0.968	14.060	2.687	0.29	46	30
245.7	0.831	18.462	0.926	13.229	2.528	0.35	29	29
490.1	1.203	17.259	0.866	12.025	2.298	0.27	22	26
978.7	1.471	15.788	0.792	10.554	2.017	0.17	21	25
1956.0	1.620	14.168	0.711	8.935	1.707	0.10	14	16
490.1	-0.101	14.269	0.716	9.035	1.727		BACKLOAD 1	
62.5	-0.302	14.570	0.731	9.337	1.784		BACKLOAD 2	

Coefficient of Secondary Compression - C_{sec}	
Applied Pressure	C_{sec}
16.7	0.0003
32.0	0.001
62.5	0.001
123.6	0.003
245.7	0.006
490.1	0.007
978.7	0.008
1956.0	0.007

Coefficient of Permeability - k	
Applied Pressure	k (m/s)
16.7	5.6E-09
32.0	4.7E-09
62.5	4.3E-09
123.6	4.1E-09
245.7	3.2E-09
490.1	1.8E-09
978.7	1.1E-09
1956.0	4.7E-10

	INITIAL	FINAL
Mass of dry sample (g)	27.83	27.83
Height of sample (mm)	19.940	14.168 (after consolidation) 14.570 (after rebound)
Water Content (%)	97.6	65.6
Dry Density (t/m^3)	0.70	0.98
Height of soil particles (mm)	5.233	5.233
Void Ratio	2.810	1.707 (after consolidation) 1.784 (after rebound)
Degree of saturation (%)	92.1	97.4

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Auckland 0740

Attention: **RHYS BRIDGES**

Job Number: 66273#L
BGL Registration Number: 3064
Checked by: JF

15th April 2024

ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

Re: PUKEKOHE PARK
Your Reference: 25208.000.001
Report Number: 66273#L/CONSOL Pukekohe Park MBH02 13.50 – 14.00m

Borehole No: MBH02 Sample No: TUBE Depth: 13.50 – 14.00m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 25th of March 2024. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give both the $\sqrt{T_{90}}$ and T_{50} values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

Water Content:	NZS4402:1986:Test 2.1
One Dimensional Consolidation:	NZS4402:1986:Test 7.1

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of m_v shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m^3 was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation (c_v's), and coefficients of volume compressibility (m_v's) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

Note that the Coefficient of Secondary Compression (C_{sec}) and the Coefficient of Permeability (k) values reported on page 5 have been calculated based on the methods described in "Manual of Soil Laboratory Testing Volume 2: Permeability, Shear Strength & Compressibility Tests" by K.H. Head & R.J. Epps, 3rd Edition, 2011. The Coefficient of Permeability values were calculated using the c_v(log) values determined in the test. The reporting of these figures is not part of NZS4402:1986:Test 7.1, therefore these figures are not part of the IANZ endorsement for this report.

Sample Description (***not part of BGL IANZ Accreditation***)

MBH02 / TUBE / 13.50 – 14.00m:

CLAY, minor fine sand, firm to stiff, blackish dark greenish grey, very moist, low density, sensitive.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
Key Technical Person
Laboratory Manager
Babbage Geotechnical Laboratory

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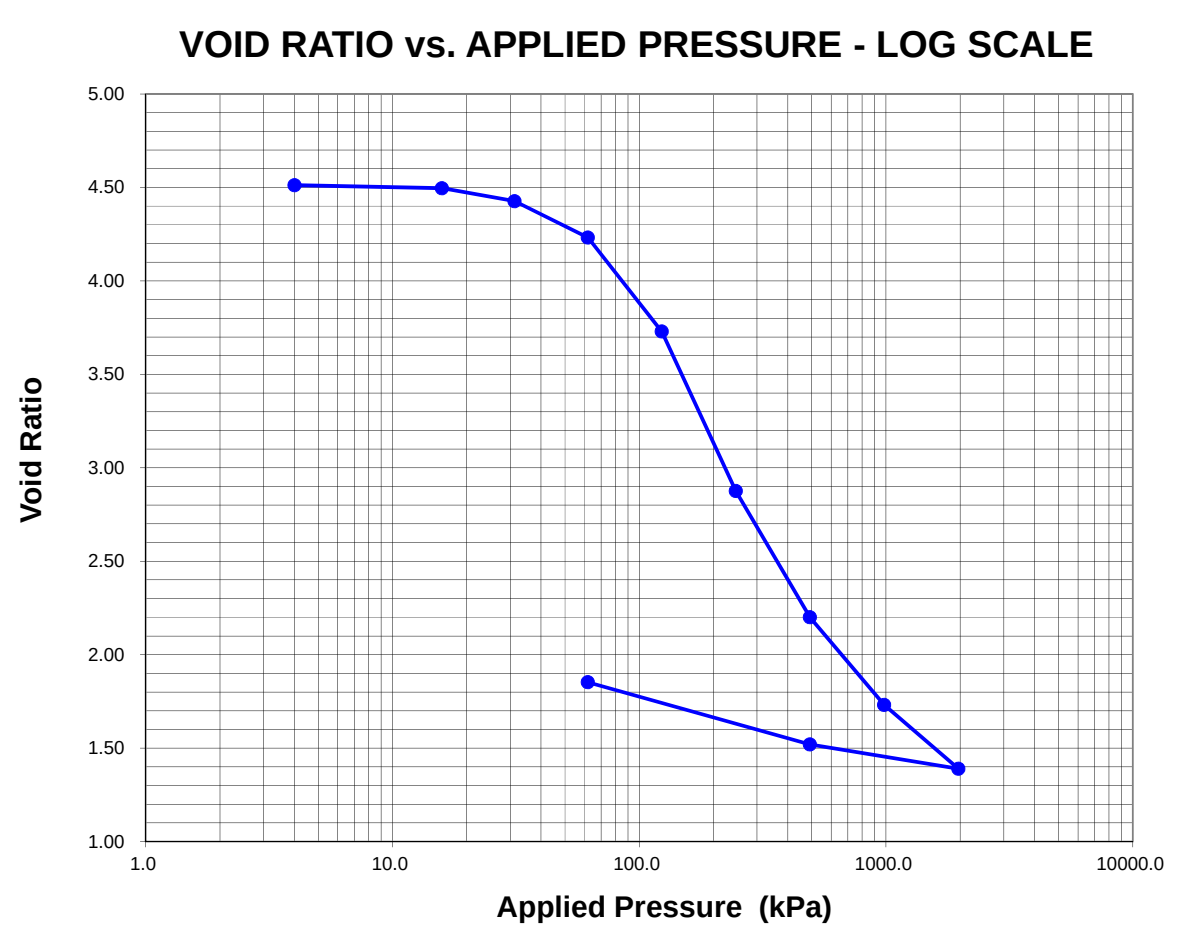
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	April 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	15-Apr-24
	Checked By:	JF	15-Apr-24

Borehole No: MBH02 **Sample No:** TUBE **Depth:** 13.50 - 14.00m



SAMPLE HISTORY & PREPARATION

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

TEST DETAILS

Consol machine number:	4		Surface area of sample top:	1997	mm^2
Consol ring number:	4e		Sample mass:	50.238	g
Sample diameter:	50.42	mm	Initial bulk density:	1.26	t/m^3
Sample height:	20.04	mm	Assumed solid density of soil particles:	2.65	t/m^3

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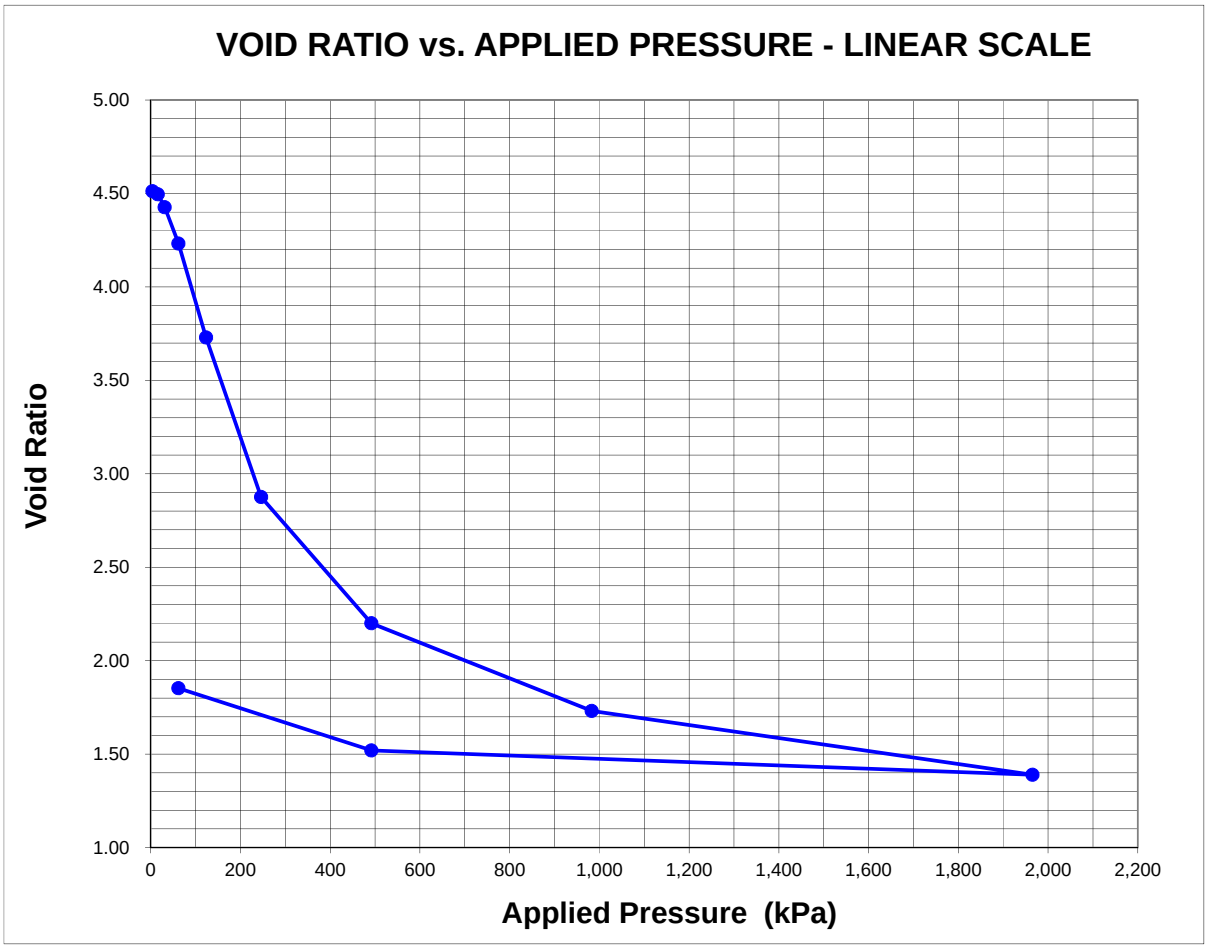
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	April 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	15-Apr-24
	Checked By:	JF	15-Apr-24

Borehole No: MBH02 **Sample No:** TUBE **Depth:** 13.50 - 14.00m



PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING

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PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	April 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	15-Apr-24
	Checked By:	JF	15-Apr-24

Borehole No: MBH02 **Sample No:** TUBE **Depth:** 13.50 - 14.00m

Applied Pressure	Incremental Deflection	Sample Height	Compression Ratio	Height of Voids	Void Ratio	Coefficient of Volume Compressibility m_v	Coefficient of Consolidation - c_v (log time)	Coefficient of Consolidation - c_v (sqrt time)
kPa	mm	mm		mm	e	m^2/MN	m^2/year	m^2/year
4.0	0.000	20.040	1.000	16.404	4.512			
15.9	0.060	19.980	0.997	16.345	4.496	sample swelled after initial consolidation		
31.2	0.252	19.728	0.984	16.093	4.426	0.82	0.65	4.3
61.9	0.707	19.021	0.949	15.385	4.232	1.2	0.44	1.1
123.3	1.827	17.194	0.858	13.559	3.729	1.6	0.18	0.33
246.1	3.104	14.090	0.703	10.455	2.876	1.5	0.10	0.15
491.7	2.456	11.634	0.581	7.999	2.200	0.71	0.071	0.086
982.9	1.704	9.930	0.496	6.295	1.731	0.30	0.054	0.064
1965.2	1.242	8.689	0.434	5.053	1.390	0.13	0.044	0.074
491.7	-0.472	9.161	0.457	5.525	1.520	BACKLOAD 1		
61.9	-1.210	10.370	0.517	6.735	1.852	BACKLOAD 2		

Coefficient of Secondary Compression - C_{sec}	
Applied Pressure	C_{sec}
15.9	-
31.2	**0.002**
61.9	**0.006**
123.3	**0.026**
246.1	**0.035**
491.7	**0.021**
982.9	**0.013**
1965.2	**0.010**

Coefficient of Permeability - k	
Applied Pressure	k (m/s)
15.9	-
31.2	**1.7E-10**
61.9	**1.6E-10**
123.3	**9.0E-11**
246.1	**4.7E-11**
491.7	**1.6E-11**
982.9	**5.0E-12**
1965.2	**1.7E-12**

	INITIAL	FINAL
Mass of dry sample (g)	19.24	19.24
Height of sample (mm)	20.040	8.689 (after consolidation) 10.370 (after rebound)
Water Content (%)	161	66.9
Dry Density (t/m^3)	0.48	1.11
Height of soil particles (mm)	3.636	3.636
Void Ratio	4.512	1.390 (after consolidation) 1.852 (after rebound)
Degree of saturation (%)	94.7	95.6

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Please reply to: W.E. Campton

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PO Box 33-1527
Takapuna
Auckland 0740

Attention: **RHYS BRIDGES**

Job Number: 66273#L
BGL Registration Number: 3064
Checked by: JF

28th March 2024

ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

Re: PUKEKOHE PARK

Your Reference: 25208.000.001
Report Number: 66273#L/CONSOL Pukekohe Park MBH04 7.95 – 8.45m

Borehole No: MBH04 Sample No: TUBE Depth: 7.95 – 8.45m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 15th of March 2024. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give both the $\sqrt{T_{90}}$ and T_{50} values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

Water Content:	NZS4402:1986:Test 2.1
One Dimensional Consolidation:	NZS4402:1986:Test 7.1

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of m_v shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m^3 was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation (c_v's), and coefficients of volume compressibility (m_v's) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

Note that the Coefficient of Secondary Compression (C_{sec}) and the Coefficient of Permeability (k) values reported on page 5 have been calculated based on the methods described in "Manual of Soil Laboratory Testing Volume 2: Permeability, Shear Strength & Compressibility Tests" by K.H. Head & R.J. Epps, 3rd Edition, 2011. The Coefficient of Permeability values were calculated using the c_v(log) values determined in the test. The reporting of these figures is not part of NZS4402:1986:Test 7.1, therefore these figures are not part of the IANZ endorsement for this report.

Sample Description (***not part of BGL IANZ Accreditation***)

MBH04 / TUBE / 7.95 – 8.45m:

CLAY, firm, moderately to highly plastic, greenish grey with black organic speckles, very moist.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
Key Technical Person
Laboratory Manager
Babbage Geotechnical Laboratory

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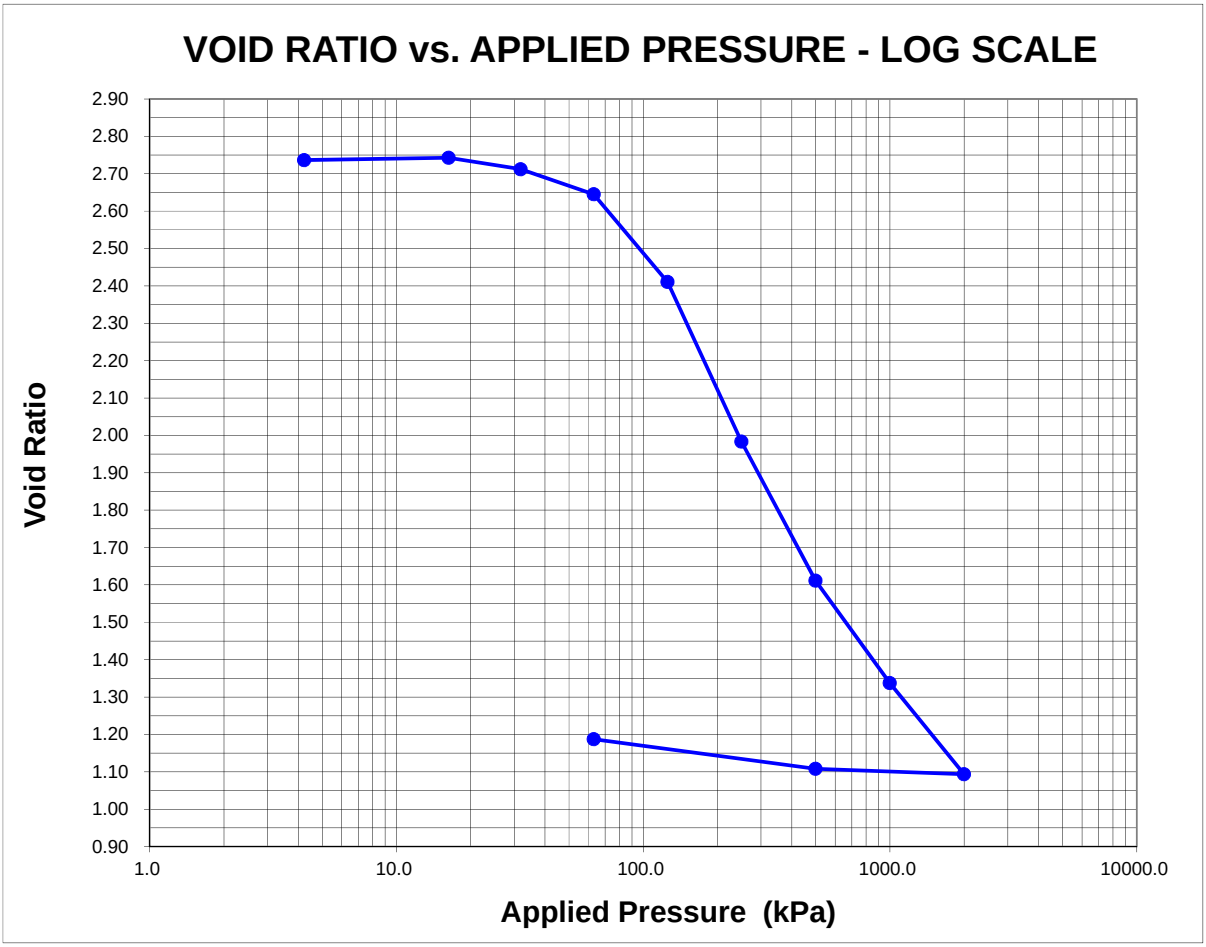
PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	28-Mar-24
	Checked By:	JF	28-Mar-24

Borehole No: MBH04 **Sample No:** TUBE **Depth:** 7.95 - 8.45m



SAMPLE HISTORY & PREPARATION

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

TEST DETAILS

Consol machine number:	1		Surface area of sample top:	1967	mm^2
Consol ring number:	1b		Sample mass:	53.186	g
Sample diameter:	50.05	mm	Initial bulk density:	1.42	t/m^3
Sample height:	19.05	mm	Assumed solid density of soil particles:	2.65	t/m^3

Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
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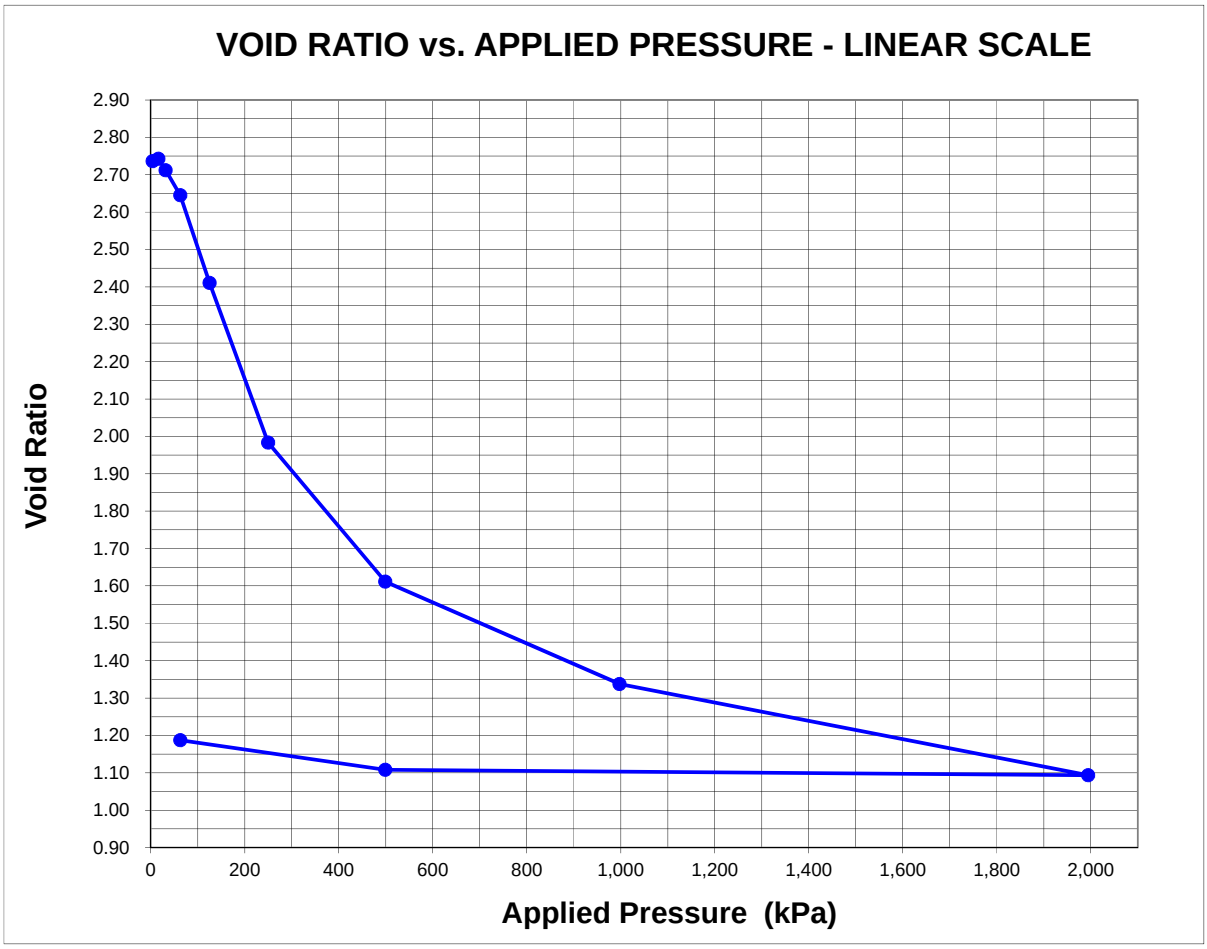
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	28-Mar-24
	Checked By:	JF	28-Mar-24

Borehole No: MBH04 **Sample No:** TUBE **Depth:** 7.95 - 8.45m



PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING

BGL Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
	66273#L	3064	5	5	Issue Date:	July 2022
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	28-Mar-24
	Checked By:	JF	28-Mar-24

Borehole No: MBH04 **Sample No:** TUBE **Depth:** 7.95 - 8.45m

Applied Pressure	Incremental Deflection	Sample Height	Compression Ratio	Height of Voids	Void Ratio	Coefficient of Volume Compressibility m_v	Coefficient of Consolidation - c_v (log time)	Coefficient of Consolidation - c_v (sqrt time)
kPa	mm	mm		mm	e	m^2/MN	m^2/year	m^2/year
4.2	0.000	19.050	1.000	13.952	2.737			
16.3	-0.031	19.081	1.002	13.983	2.743	sample swelled		
31.9	0.156	18.925	0.993	13.827	2.712	0.52	24	26
63.0	0.341	18.584	0.976	13.486	2.645	0.58	21	25
125.3	1.196	17.388	0.913	12.290	2.411	1.0	12	20
249.9	2.179	15.210	0.798	10.112	1.983	1.0	4.6	6.9
499.2	1.896	13.314	0.699	8.216	1.612	0.50	3.3	4.1
997.6	1.396	11.918	0.626	6.820	1.338	0.21	2.6	6.1
1994.5	1.245	10.673	0.560	5.575	1.093	0.10	2.7	3.9
499.2	-0.075	10.748	0.564	5.649	1.108	BACKLOAD 1		
63.0	-0.405	11.152	0.585	6.054	1.187	BACKLOAD 2		

Coefficient of Secondary Compression - C_{sec}	
Applied Pressure	C_{sec}
16.3	-
31.9	0.002
63.0	0.003
125.3	0.013
249.9	0.015
499.2	0.013
997.6	0.007
1994.5	0.005

Coefficient of Permeability - k	
Applied Pressure	k (m/s)
16.3	-
31.9	3.9E-09
63.0	3.7E-09
125.3	3.7E-09
249.9	1.4E-09
499.2	5.2E-10
997.6	1.7E-10
1994.5	8.9E-11

	INITIAL	FINAL
Mass of dry sample (g)	26.58	26.58
Height of sample (mm)	19.050	10.673 (after consolidation) 11.152 (after rebound)
Water Content (%)	100	44.6
Dry Density (t/m^3)	0.71	1.27
Height of soil particles (mm)	5.098	5.098
Void Ratio	2.737	1.093 (after consolidation) 1.187 (after rebound)
Degree of saturation (%)	96.9	99.6

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Takapuna
Auckland 0740

Attention: **RHYS BRIDGES**

Job Number: 66273#L
BGL Registration Number: 3064
Checked by: JF

5th April 2024

ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

Re: PUKEKOHE PARK

Your Reference: 25280
Report Number: 66273#L/CONSOL Pukekohe Park MBH05 4.50 – 5.00m

Borehole No: MBH05 Sample No: TUBE Depth: 4.50 – 5.00m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 15th of March 2024. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give both the $\sqrt{T_{90}}$ and T_{50} values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

Water Content:	NZS4402:1986:Test 2.1
One Dimensional Consolidation:	NZS4402:1986:Test 7.1

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of m_v shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 1.50t/m^3 was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation (c_v's), and coefficients of volume compressibility (m_v's) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

Note that the Coefficient of Secondary Compression (C_{sec}) and the Coefficient of Permeability (k) values reported on page 5 have been calculated based on the methods described in "Manual of Soil Laboratory Testing Volume 2: Permeability, Shear Strength & Compressibility Tests" by K.H. Head & R.J. Epps, 3rd Edition, 2011. The Coefficient of Permeability values were calculated using the c_v(log) values determined in the test. The reporting of these figures is not part of NZS4402:1986:Test 7.1, therefore these figures are not part of the IANZ endorsement for this report.

Sample Description (***not part of BGL IANZ Accreditation***)

MBH05 / TUBE / 4.50 – 5.00m:

PEAT, amorphous & fibrous layers, black, low density, saturated.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
Key Technical Person
Laboratory Manager
Babbage Geotechnical Laboratory

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№ 126

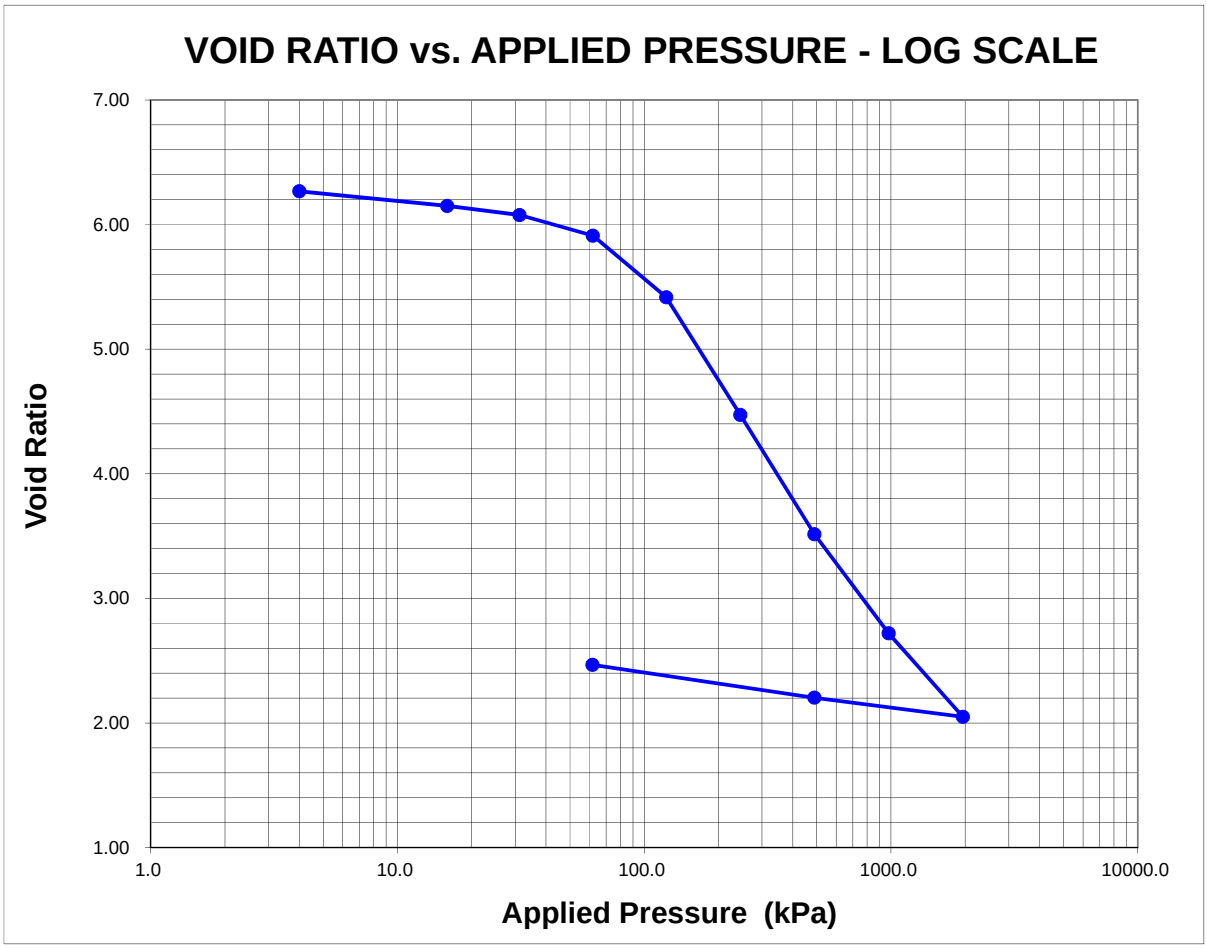
Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
	66273#L	3064	3	5	Issue Date:	July 2022
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March / April 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	5-Apr-24
	Checked By:	JF	5-Apr-24

Borehole No: MBH05 **Sample No:** TUBE **Depth:** 4.50 - 5.00m



SAMPLE HISTORY & PREPARATION

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

TEST DETAILS

Consol machine number:	3		Surface area of sample top:	2005	mm^2
Consol ring number:	3c		Sample mass:	41.835	g
Sample diameter:	50.53	mm	Initial bulk density:	1.04	t/m^3
Sample height:	19.99	mm	Assumed solid density of soil particles:	1.50	t/m^3

Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
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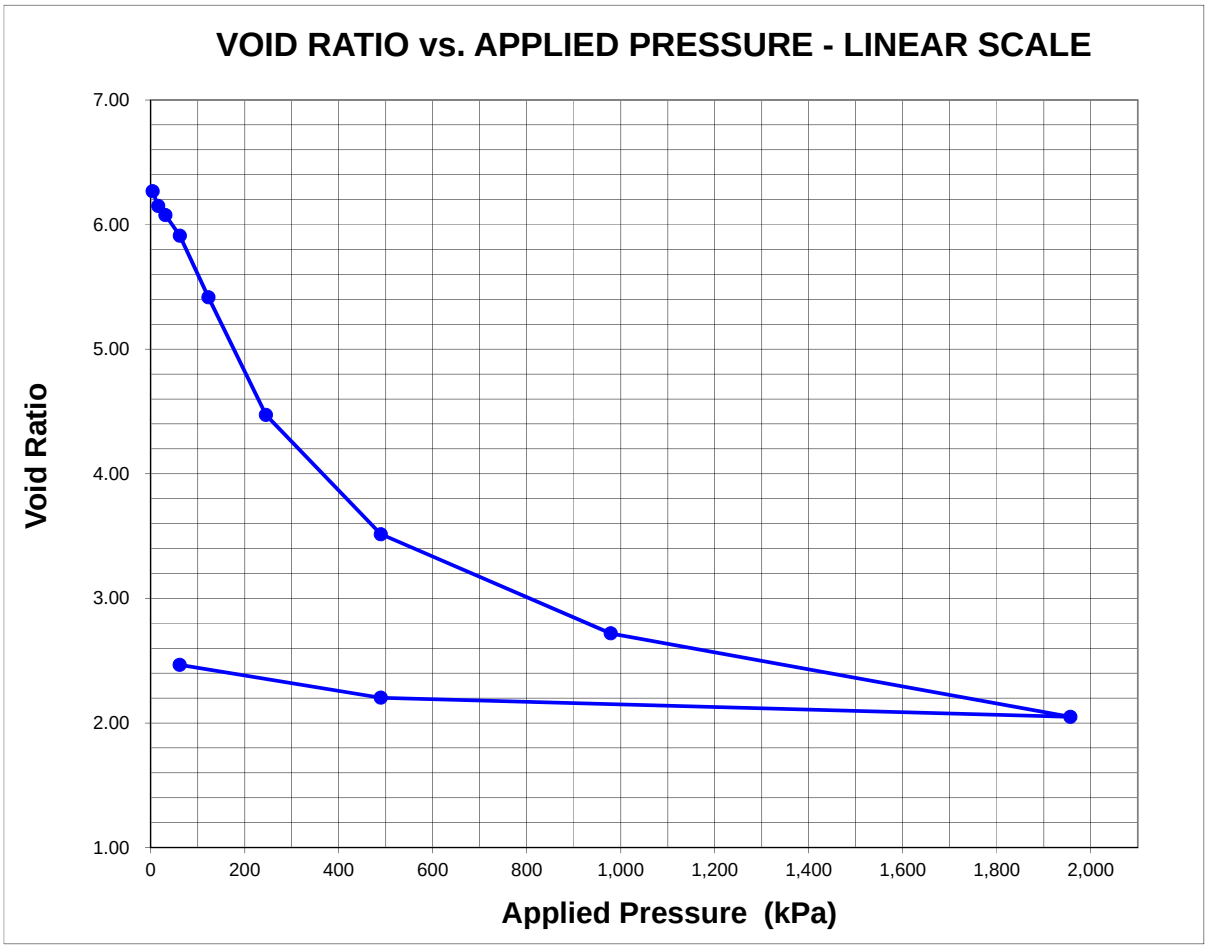
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March / April 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	5-Apr-24
	Checked By:	JF	5-Apr-24

Borehole No: MBH05 **Sample No:** TUBE **Depth:** 4.50 - 5.00m



PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING

BGL Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
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	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March / April 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	5-Apr-24
	Checked By:	JF	5-Apr-24

Borehole No: **MBH05** Sample No: **TUBE** Depth: **4.50 - 5.00m**

Applied Pressure	Incremental Deflection	Sample Height	Compression Ratio	Height of Voids	Void Ratio	Coefficient of Volume Compressibility m_v	Coefficient of Consolidation - c_v (log time)	Coefficient of Consolidation - c_v (sqrt time)
kPa	mm	mm		mm	e	m^2/MN	m^2/year	m^2/year
4.0	0.000	19.990	1.000	17.239	6.267			
15.9	0.322	19.668	0.984	16.917	6.150	1.4	35	37
31.3	0.202	19.466	0.974	16.715	6.077	0.67	22	25
61.9	0.454	19.011	0.951	16.261	5.911	0.76	21	29
122.8	1.362	17.649	0.883	14.898	5.416	1.2	8.9	13
245.1	2.595	15.054	0.753	12.303	4.473	1.2	4.0	6.5
489.6	2.635	12.419	0.621	9.668	3.515	0.72	1.8	3.2
978.6	2.189	10.230	0.512	7.479	2.719	0.36	0.93	1.3
1956.7	1.843	8.388	0.420	5.637	2.049	0.18	0.45	0.69
489.6	-0.423	8.811	0.441	6.060	2.203		BACKLOAD 1	
61.7	-0.727	9.537	0.477	6.787	2.467		BACKLOAD 2	

Coefficient of Secondary Compression - C_{sec}	
Applied Pressure	C_{sec}
15.9	**0.001**
31.3	**0.002**
61.9	**0.004**
122.8	**0.013**
245.1	**0.017**
489.6	**0.016**
978.6	**0.017**
1956.7	**0.010**

Coefficient of Permeability - k	
Applied Pressure	k (m/s)
15.9	**1.5E-08**
31.3	**4.7E-09**
61.9	**5.1E-09**
122.8	**3.3E-09**
245.1	**1.5E-09**
489.6	**4.1E-10**
978.6	**1.0E-10**
1956.7	**2.6E-11**

	INITIAL	FINAL
Mass of dry sample (g)	8.27	8.27
Height of sample (mm)	19.990	8.388 (after consolidation) 9.537 (after rebound)
Water Content (%)	406	179
Dry Density (t/m^3)	0.21	0.49
Height of soil particles (mm)	2.751	2.751
Void Ratio	6.267	2.049 (after consolidation) 2.467 (after rebound)
Degree of saturation (%)	97.1	-

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Please reply to: W.E. Campton

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PO Box 33-1527
Takapuna
Auckland 0740

Attention: **RHYS BRIDGES**

Job Number: 66273#L
BGL Registration Number: 3064
Checked by: JF

5th April 2024

ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

Re: PUKEKOHE PARK
Your Reference: 25208.000.001
Report Number: 66273#L/CONSOL Pukekohe Park MBH05 10.50 – 11.00m

Borehole No: MBH05 Sample No: TUBE Depth: 10.50 – 11.00m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 15th of March 2024. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give both the $\sqrt{T_{90}}$ and T_{50} values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

Water Content:	NZS4402:1986:Test 2.1
One Dimensional Consolidation:	NZS4402:1986:Test 7.1

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of m_v shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m^3 was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation (c_v's), and coefficients of volume compressibility (m_v's) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

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Sample Description (***not part of BGL IANZ Accreditation***)

MBH05 / TUBE / 10.50 – 11.00m:

CLAY, stiff, moderately plastic, brownish grey, moist, low density.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
Key Technical Person
Laboratory Manager
Babbage Geotechnical Laboratory

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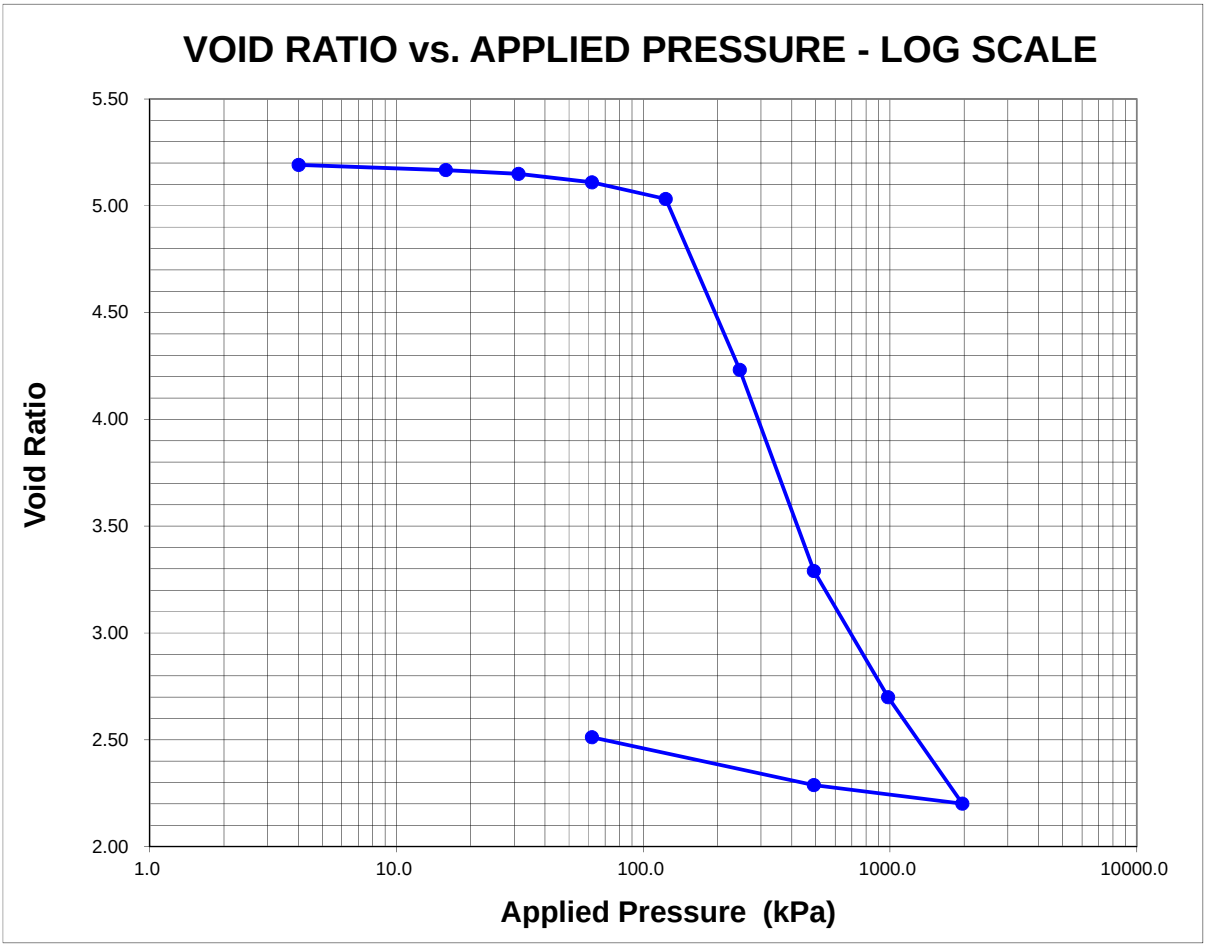
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	5-Apr-24
	Checked By:	JF	5-Apr-24

Borehole No: MBH05 **Sample No:** TUBE **Depth:** 10.50 - 11.00m



SAMPLE HISTORY & PREPARATION

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

TEST DETAILS

Consol machine number:	4		Surface area of sample top:	1997	mm^2
Consol ring number:	4d		Sample mass:	50.009	g
Sample diameter:	50.42	mm	Initial bulk density:	1.25	t/m^3
Sample height:	20.07	mm	Assumed solid density of soil particles:	2.65	t/m^3

Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
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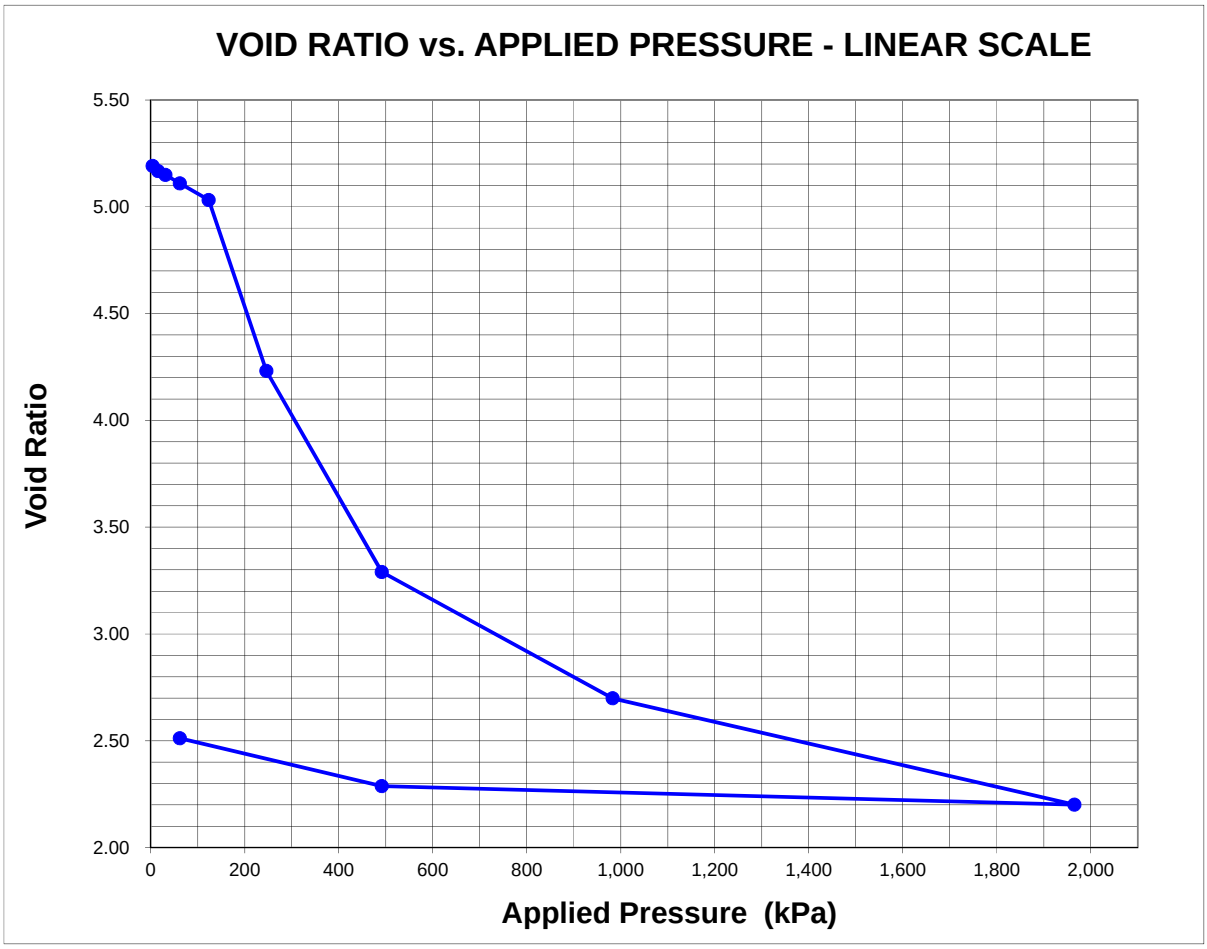
PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	5-Apr-24
	Checked By:	JF	5-Apr-24

Borehole No: MBH05 **Sample No:** TUBE **Depth:** 10.50 - 11.00m



PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING

BGL Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
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PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	5-Apr-24
	Checked By:	JF	5-Apr-24

Borehole No: **MBH05** Sample No: **TUBE** Depth: **10.50 - 11.00m**

Applied Pressure	Incremental Deflection	Sample Height	Compression Ratio	Height of Voids	Void Ratio	Coefficient of Volume Compressibility m_v	Coefficient of Consolidation - c_v (log time)	Coefficient of Consolidation - c_v (sqrt time)
kPa	mm	mm		mm	e	m^2/MN	m^2/year	m^2/year
4.0	0.000	20.070	1.000	16.828	5.192			
15.9	0.079	19.991	0.996	16.750	5.167	0.33	35	31
31.2	0.057	19.934	0.993	16.692	5.150	0.19	23	24
61.9	0.129	19.805	0.987	16.564	5.110	0.21	22	23
123.3	0.252	19.553	0.974	16.312	5.032	0.21	25	24
246.1	2.593	16.960	0.845	13.718	4.232	1.1	0.62	8.0
491.7	3.053	13.907	0.693	10.665	3.290	0.73	1.8	2.5
982.9	1.918	11.989	0.597	8.748	2.699	0.28	1.9	2.9
1965.2	1.613	10.376	0.517	7.135	2.201	0.14	1.7	3.3
491.7	-0.280	10.656	0.531	7.415	2.287		BACKLOAD 1	
61.9	-0.727	11.384	0.567	8.142	2.512		BACKLOAD 2	

Coefficient of Secondary Compression - C_{sec}	
Applied Pressure	C_{sec}
15.9	0.001
31.2	0.001
61.9	0.001
123.3	0.002
246.1	0.032
491.7	0.017
982.9	0.013
1965.2	0.009

Coefficient of Permeability - k	
Applied Pressure	k (m/s)
15.9	3.6E-09
31.2	1.3E-09
61.9	1.4E-09
123.3	1.6E-09
246.1	2.1E-10
491.7	4.2E-10
982.9	1.7E-10
1965.2	7.2E-11

	INITIAL	FINAL
Mass of dry sample (g)	17.15	17.15
Height of sample (mm)	20.070	10.376 (after consolidation) 11.384 (after rebound)
Water Content (%)	192	95.1
Dry Density (t/m^3)	0.43	0.83
Height of soil particles (mm)	3.242	3.242
Void Ratio	5.192	2.201 (after consolidation) 2.512 (after rebound)
Degree of saturation (%)	97.8	-

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Please reply to: W.E. Campton

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Auckland 0740

Attention: **RHYS BRIDGES**

Job Number: 66273#L
BGL Registration Number: 3064
Checked by: WEC

10th April 2024

ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

Re: PUKEKOHE PARK

Your Reference: 25208.000.001
Report Number: 66273#L/CONSOL Pukekohe Park MBH07 9.00 – 9.50m

Borehole No: MBH07 Sample No: TUBE Depth: 9.00 – 9.50m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 25th of March 2024. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give both the $\sqrt{T_{90}}$ and T_{50} values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

Water Content:	NZS4402:1986:Test 2.1
One Dimensional Consolidation:	NZS4402:1986:Test 7.1

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of m_v shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m^3 was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation (c_v's), and coefficients of volume compressibility (m_v's) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

Note that the Coefficient of Secondary Compression (C_{sec}) and the Coefficient of Permeability (k) values reported on page 5 have been calculated based on the methods described in "Manual of Soil Laboratory Testing Volume 2: Permeability, Shear Strength & Compressibility Tests" by K.H. Head & R.J. Epps, 3rd Edition, 2011. The Coefficient of Permeability values were calculated using the c_v(log) values determined in the test. The reporting of these figures is not part of NZS4402:1986:Test 7.1, therefore these figures are not part of the IANZ endorsement for this report.

Sample Description (***not part of BGL IANZ Accreditation***)

MBH07 / TUBE / 9.00 – 9.50m:

CLAY, firm, moderately plastic, brownish grey, very moist, low density, sensitive.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
Key Technical Person
Laboratory Manager
Babbage Geotechnical Laboratory

ACCREDITED
IANZ
TESTING LABORATORY
№ 126

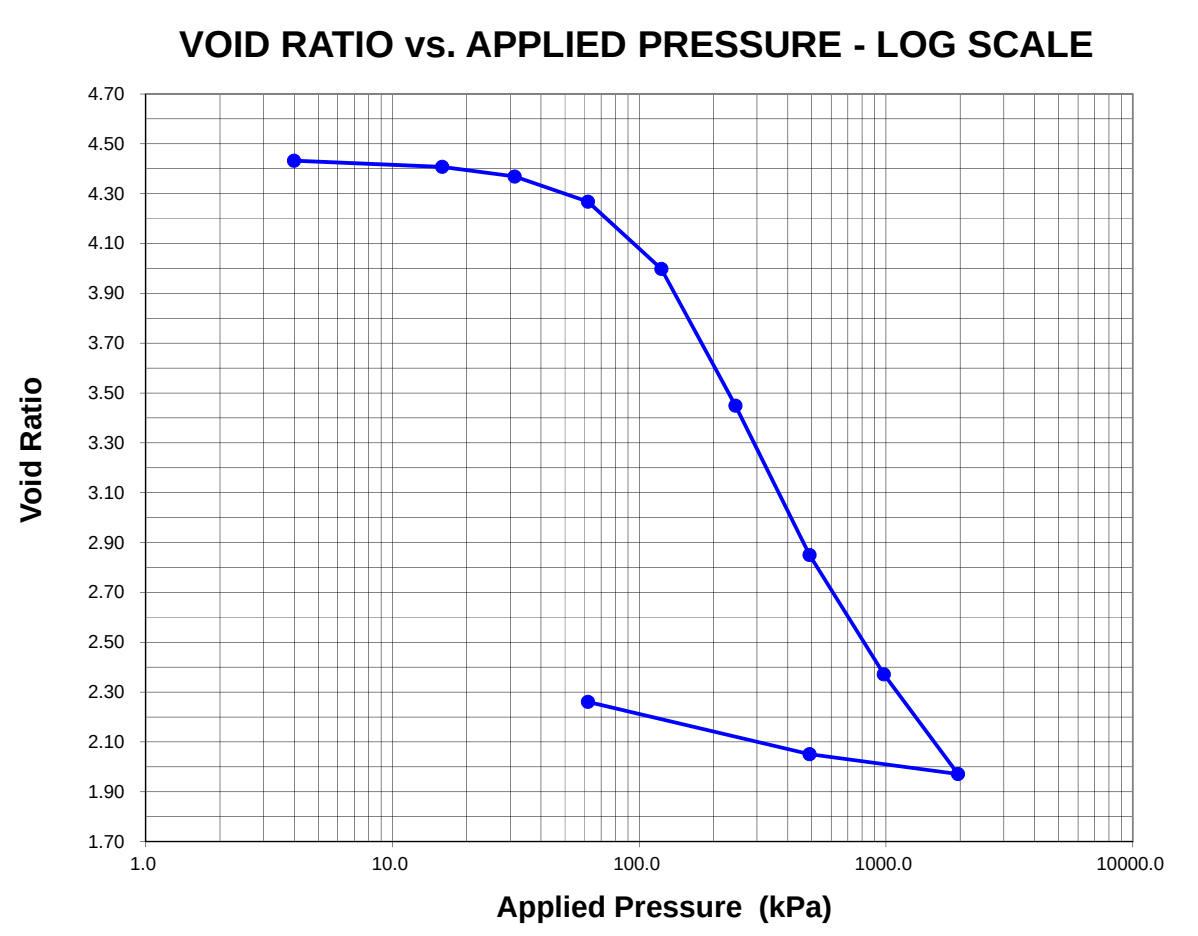
Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
	66273#L	3064	3	5	Issue Date:	July 2022
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	10-Apr-24
	Checked By:	JF	10-Apr-24

Borehole No: MBH07 **Sample No:** TUBE **Depth:** 9.00 - 9.50m



SAMPLE HISTORY & PREPARATION

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

TEST DETAILS

Consol machine number:	3		Surface area of sample top:	2003	mm^2
Consol ring number:	3a		Sample mass:	51.125	g
Sample diameter:	50.50	mm	Initial bulk density:	1.28	t/m^3
Sample height:	19.96	mm	Assumed solid density of soil particles:	2.65	t/m^3

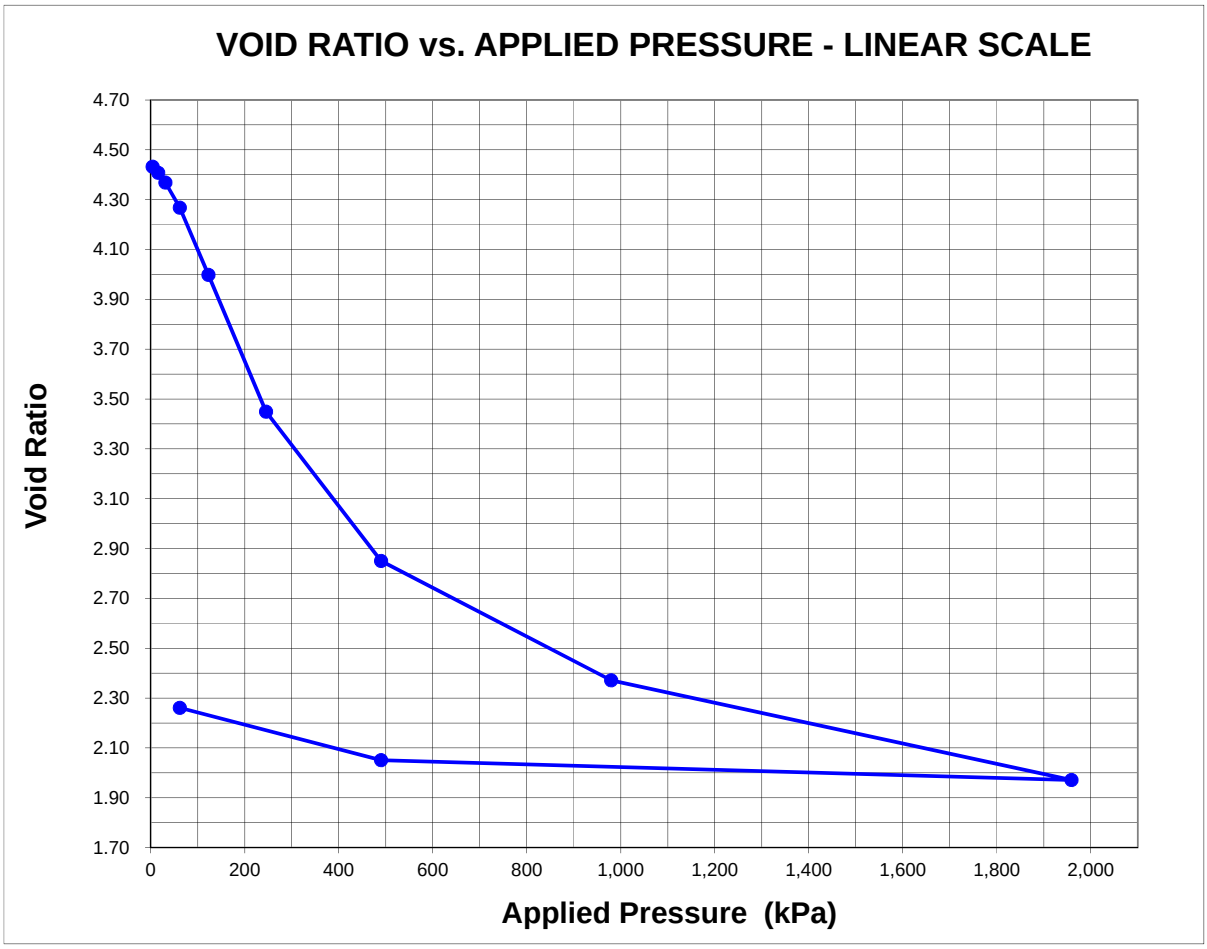
	Job No:	Reg. No:	Page	of	Version No:	13
BGL Babbage Geotechnical Laboratory	66273#L	3064	4	5	Issue Date:	July 2022
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	10-Apr-24
	Checked By:	JF	10-Apr-24

Borehole No: MBH07 **Sample No:** TUBE **Depth:** 9.00 - 9.50m



PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING

BGL Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
	66273#L	3064	5	5	Issue Date:	July 2022
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	10-Apr-24
	Checked By:	JF	10-Apr-24

Borehole No: MBH07 **Sample No:** TUBE **Depth:** 9.00 - 9.50m

Applied Pressure	Incremental Deflection	Sample Height	Compression Ratio	Height of Voids	Void Ratio	Coefficient of Volume Compressibility m_v	Coefficient of Consolidation - c_v (log time)	Coefficient of Consolidation - c_v (sqrt time)
kPa	mm	mm		mm	e	m^2/MN	m^2/year	m^2/year
4.0	0.000	19.960	1.000	16.286	4.432			
15.9	0.091	19.869	0.995	16.195	4.408	sample swelled after initial consolidation		
31.3	0.143	19.726	0.988	16.051	4.369	0.47	11	19
62.0	0.370	19.356	0.970	15.682	4.268	0.61	9.6	13
122.9	0.992	18.364	0.920	14.690	3.998	0.84	5.1	8.2
245.3	2.018	16.347	0.819	12.672	3.449	0.90	2.1	3.2
490.1	2.201	14.145	0.709	10.471	2.850	0.55	1.7	2.8
979.7	1.758	12.387	0.621	8.713	2.371	0.25	1.7	3.6
1959.0	1.472	10.916	0.547	7.241	1.971	0.12	1.4	3.5
490.1	-0.294	11.210	0.562	7.536	2.051	BACKLOAD 1		
62.0	-0.771	11.981	0.600	8.307	2.261	BACKLOAD 2		

Coefficient of Secondary Compression - C_{sec}	
Applied Pressure	C_{sec}
15.9	-
31.3	0.002
62.0	0.004
122.9	0.013
245.3	0.019
490.1	0.012
979.7	0.010
1959.0	0.009

Coefficient of Permeability - k	
Applied Pressure	k (m/s)
15.9	-
31.3	1.7E-09
62.0	1.8E-09
122.9	1.3E-09
245.3	5.8E-10
490.1	3.0E-10
979.7	1.4E-10
1959.0	5.4E-11

	INITIAL	FINAL
Mass of dry sample (g)	19.50	19.50
Height of sample (mm)	19.960	10.916 (after consolidation) 11.981 (after rebound)
Water Content (%)	162.1	84.1
Dry Density (t/m^3)	0.49	0.89
Height of soil particles (mm)	3.674	3.674
Void Ratio	4.432	1.971 (after consolidation) 2.261 (after rebound)
Degree of saturation (%)	96.9	98.6

Babbage Geotechnical Laboratory
Level 4
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Telephone
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P O Box 2027
New Zealand
64-9-367 4954
wec@babbage.co.nz

Please reply to: W.E. Campton

ENGEO LTD.
PO Box 33-1527
Takapuna
Auckland 0740

Attention: **RHYS BRIDGES**

Job Number: 66273#L
BGL Registration Number: 3064
Checked by: JF

5th April 2024

ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

Re: PUKEKOHE PARK
Your Reference: 25208.000.001
Report Number: 66273#L/CONSOL Pukekohe Park MBH08 10.50 – 11.00m

Borehole No: MBH08 Sample No: TUBE Depth: 10.50 – 11.00m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 15th of March 2024. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give both the $\sqrt{T_{90}}$ and T_{50} values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

Water Content:	NZS4402:1986:Test 2.1
One Dimensional Consolidation:	NZS4402:1986:Test 7.1

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of m_v shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m^3 was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation (c_v's), and coefficients of volume compressibility (m_v's) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

Note that the Coefficient of Secondary Compression (C_{sec}) and the Coefficient of Permeability (k) values reported on page 5 have been calculated based on the methods described in "Manual of Soil Laboratory Testing Volume 2: Permeability, Shear Strength & Compressibility Tests" by K.H. Head & R.J. Epps, 3rd Edition, 2011. The Coefficient of Permeability values were calculated using the c_v(log) values determined in the test. The reporting of these figures is not part of NZS4402:1986:Test 7.1, therefore these figures are not part of the IANZ endorsement for this report.

Sample Description (***not part of BGL IANZ Accreditation***)

MBH08 / TUBE / 10.50 – 11.00m:

CLAY, SILT, SAND, FINE GRAVEL MIX, very stiff, slightly plastic, orangish brown with reddish brown & dark grey speckles, [TUFF / VOLCANIC ASH].

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
Key Technical Person
Laboratory Manager
Babbage Geotechnical Laboratory

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Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
	66273#L	3064	3	5	Issue Date:	July 2022
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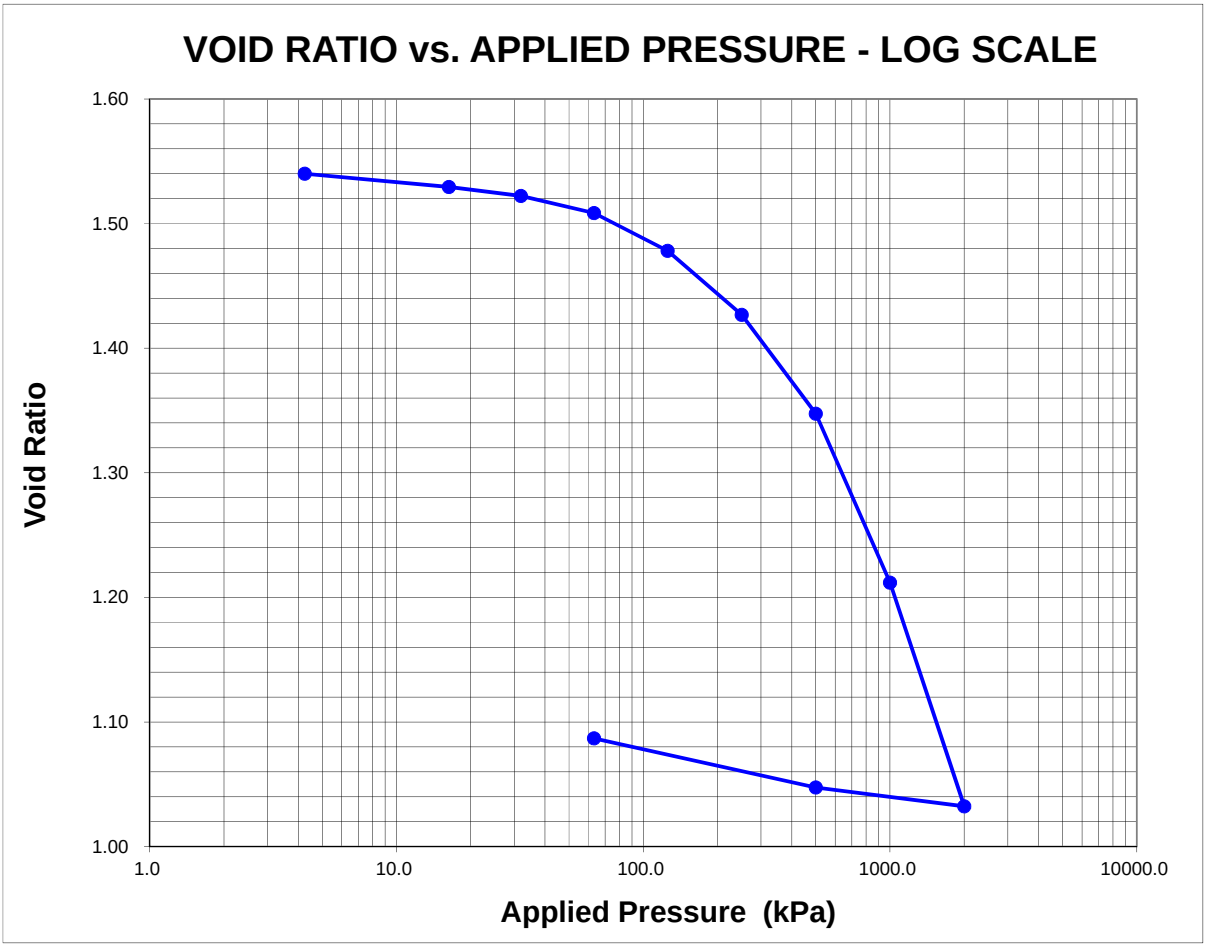
PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	4-Apr-24
	Checked By:	JF	5-Apr-24

Borehole No: MBH08 **Sample No:** TUBE **Depth:** 10.50 - 11.00m



SAMPLE HISTORY & PREPARATION

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

TEST DETAILS

Consol machine number:	SB		Surface area of sample top:	1962	mm^2
Consol ring number:	1A		Sample mass:	67.834	g
Sample diameter:	49.98	mm	Initial bulk density:	1.64	t/m^3
Sample height:	21.12	mm	Assumed solid density of soil particles:	2.65	t/m^3

Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
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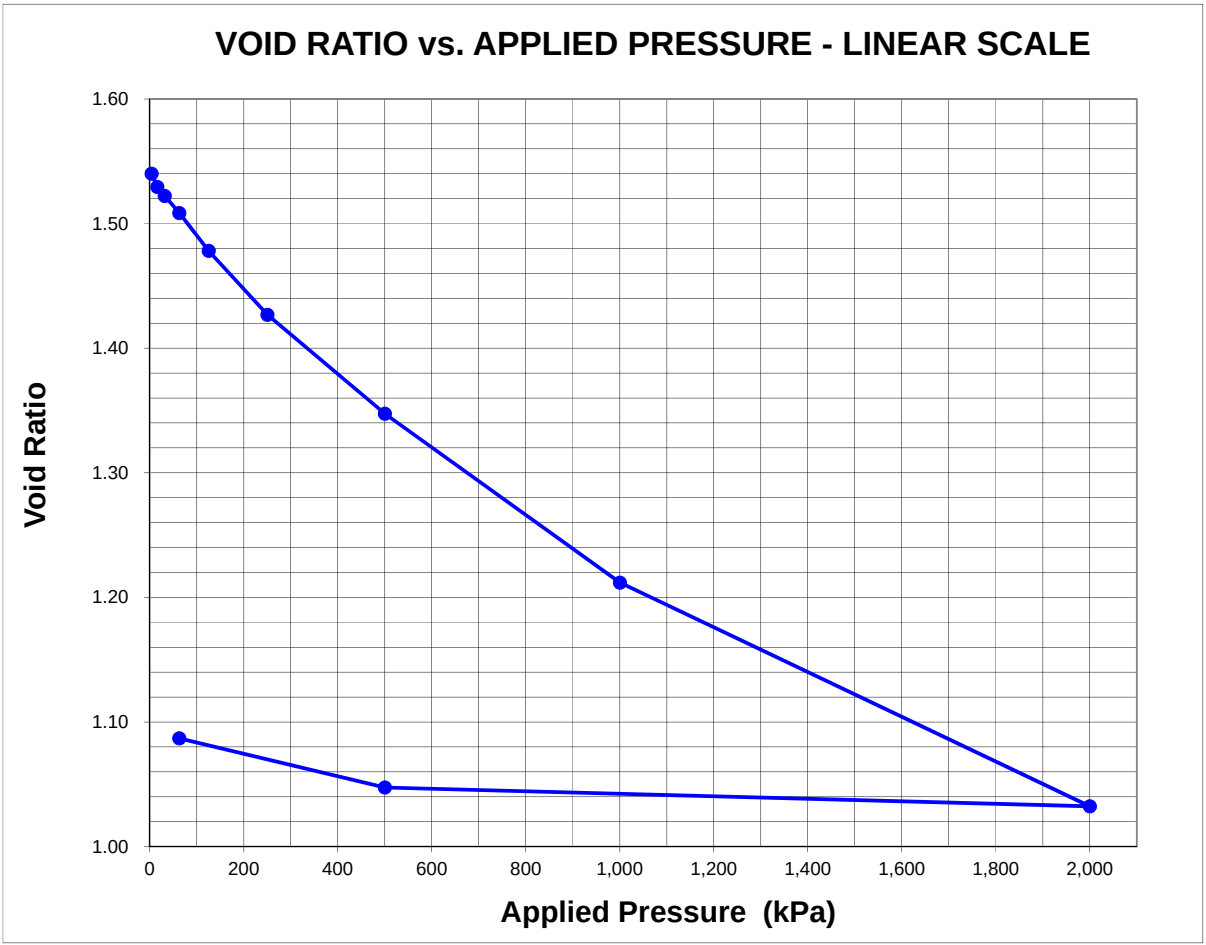
PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	4-Apr-24
	Checked By:	JF	5-Apr-24

Borehole No: MBH08 **Sample No:** TUBE **Depth:** 10.50 - 11.00m



PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING

BGL Babbage Geotechnical Laboratory	Job No:	Reg. No:	Page	of	Version No:	13
	66273#L	3064	5	5	Issue Date:	July 2022
	PROJECT:				Auth. By:	WEC

PUKEKOHE PARK

ONE DIMENSIONAL CONSOLIDATION

Test Method: NZS4402:1986:Test 2.1 - Water Content	Tested By:	WEC	March 2024
Test Method: NZS4402:1986:Test 7.1 - Consolidation	Compiled By:	WEC	4-Apr-24
	Checked By:	JF	5-Apr-24

Borehole No: MBH08 **Sample No:** TUBE **Depth:** 10.50 - 11.00m

Applied Pressure	Incremental Deflection	Sample Height	Compression Ratio	Height of Voids	Void Ratio	Coefficient of Volume Compressibility m_v	Coefficient of Consolidation - c_v (log time)	Coefficient of Consolidation - c_v (sqrt time)
kPa	mm	mm		mm	e	m^2/MN	m^2/year	m^2/year
4.3	0.000	21.120	1.000	12.805	1.540			
16.3	0.088	21.032	0.996	12.717	1.529	0.34	45	45
32.0	0.060	20.972	0.993	12.657	1.522	0.18	44	29
63.2	0.114	20.858	0.988	12.543	1.508	0.17	38	31
125.7	0.253	20.605	0.976	12.290	1.478	0.19	36	20
250.6	0.426	20.179	0.955	11.864	1.427	0.17	28	33
500.6	0.660	19.519	0.924	11.204	1.347	0.13	30	31
1000.4	1.128	18.391	0.871	10.076	1.212	0.12	29	29
2000.1	1.492	16.899	0.800	8.584	1.032	0.081	23	28
500.6	-0.125	17.024	0.806	8.709	1.047		BACKLOAD 1	
63.2	-0.328	17.352	0.822	9.037	1.087		BACKLOAD 2	

Coefficient of Secondary Compression - C_{sec}	
Applied Pressure	C_{sec}
16.3	0.0004
32.0	0.001
63.2	0.001
125.7	0.002
250.6	0.027
500.6	0.002
1000.4	0.004
2000.1	0.004

Coefficient of Permeability - k	
Applied Pressure	k (m/s)
16.3	4.8E-09
32.0	2.5E-09
63.2	2.1E-09
125.7	2.2E-09
250.6	1.4E-09
500.6	1.2E-09
1000.4	1.0E-09
2000.1	5.8E-10

	INITIAL	FINAL
Mass of dry sample (g)	43.23	43.23
Height of sample (mm)	21.120	16.899 (after consolidation) 17.352 (after rebound)
Water Content (%)	56.9	44.4
Dry Density (t/m^3)	1.04	1.30
Height of soil particles (mm)	8.315	8.315
Void Ratio	1.540	1.032 (after consolidation) 1.087 (after rebound)
Degree of saturation (%)	97.9	-

APPENDIX 6:

Piezometer Designs

MBH02

PIEZOMETER RECORD

PIEZO No

Coordinates: DATAMAST mN mE

Job Name: Location: Pukekohe Park

Job No: 25208 Drilling Commencement Date:

Prepared by: RB Installation Completion Date:

	Spec	As built
TOP OF PVC/ UPSTAND (delete one if applicable)	Flush	m / m
Field Notes: GW prior to install: 2.8 Date: 18/03 Time: 10:00am	0.0 m	0.0 m
	1.5 m	m
GW post install: Date: Time:		
	m / m	m / m
	1.5 m	m
	1.8 m	m
	2.3 m	m
Filter sock: Y/N		
Screened Layer:		
	10.0 m	m
	10.5 m	m
	10.8 m	m
	12.0 m	m
	END of hole?? m ?	m

FLUSH LOCKABLE TOBY/ UPSTAND ~~(Delete one)~~

GROUND SURFACE

END CAP

CONCRETE + 1.0 m bentonite surface seal

BACKFILL

BENTONITE (Min 1.0m)

BLINDING SAND (min 300 mm)

Min 0.5 m

GRAVEL

SCREEN

END CAP

Min 0.5 m

BLINDING SAND (min 300 mm)

BENTONITE

BACKFILL

END OF BOREHOLE

HOLE dia ____ mm

Additional Notes:

groundwater appx @ 2.3m on 18/03/21.

(50mm piezo)

Construction Notes: Construction tolerance is set at ____mm

Piezometer: (50mm ID/ 32mm ID/ 20mm ID) (Select one)

Template

NOT TO SCALE

MBH03

PIEZOMETER RECORD

PIEZO No

Coordinates: 2428 mN DATANEST mE

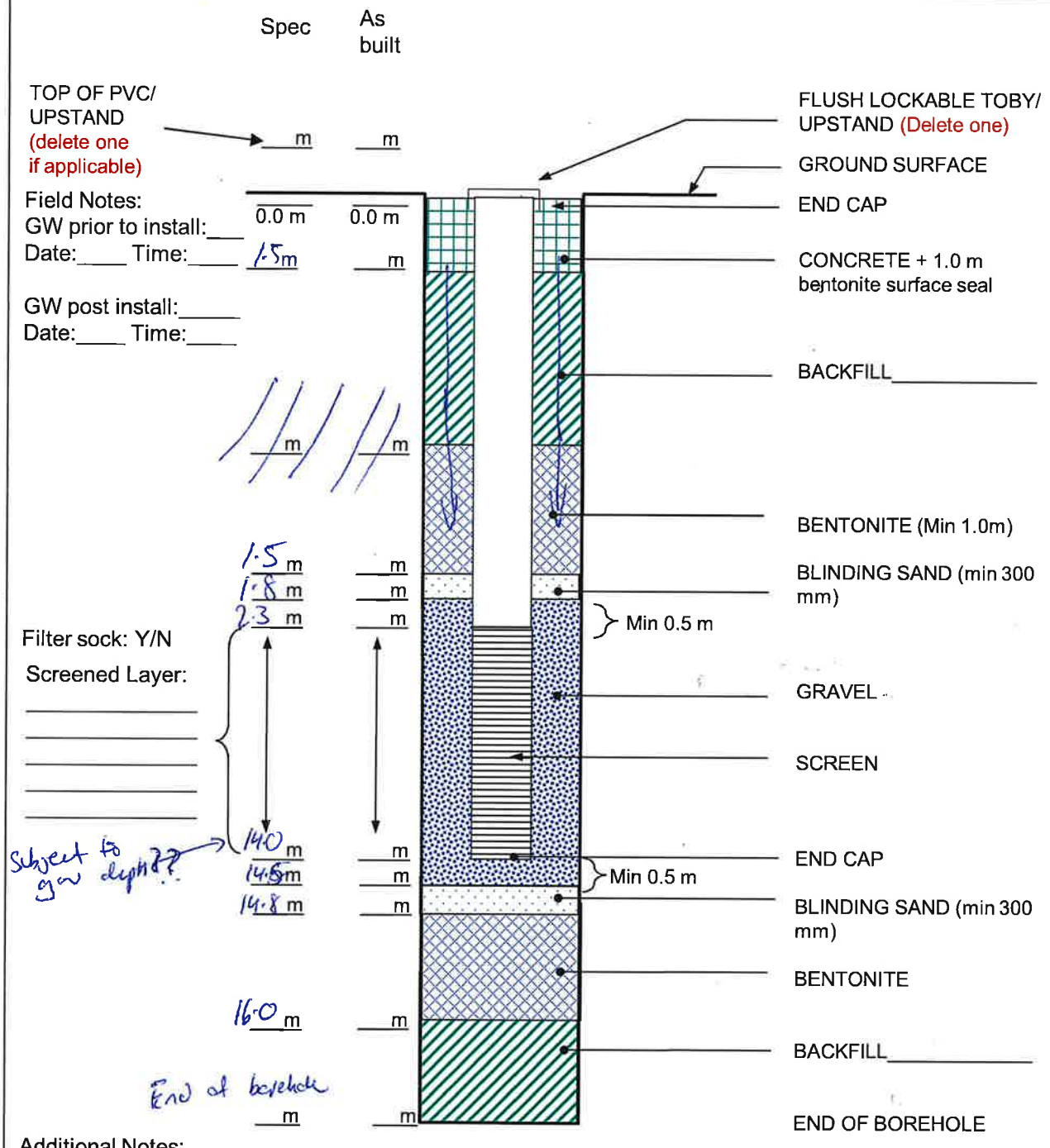
Job Name: 24508.000.000 Location: Pukekohe Park

Job No:

Prepared by: RB

Drilling Commencement Date: 13-14/03/24

Installation Completion Date: 14/03/24??



Additional Notes:

gw to be dipped @ start of day to be communicated w/ PM.

Construction Notes: Construction tolerance is set at ____mm

Piezometer: (50mm ID/ 32mm ID/ 20mm ID) (Select one)

Template

NOT TO SCALE

MBH08_

PIEZOMETER RECORD

PIEZO No

Coordinates: 24208 mN DATANEST mE

Job Name: 24508.000.000 Location: Pukekohe Park

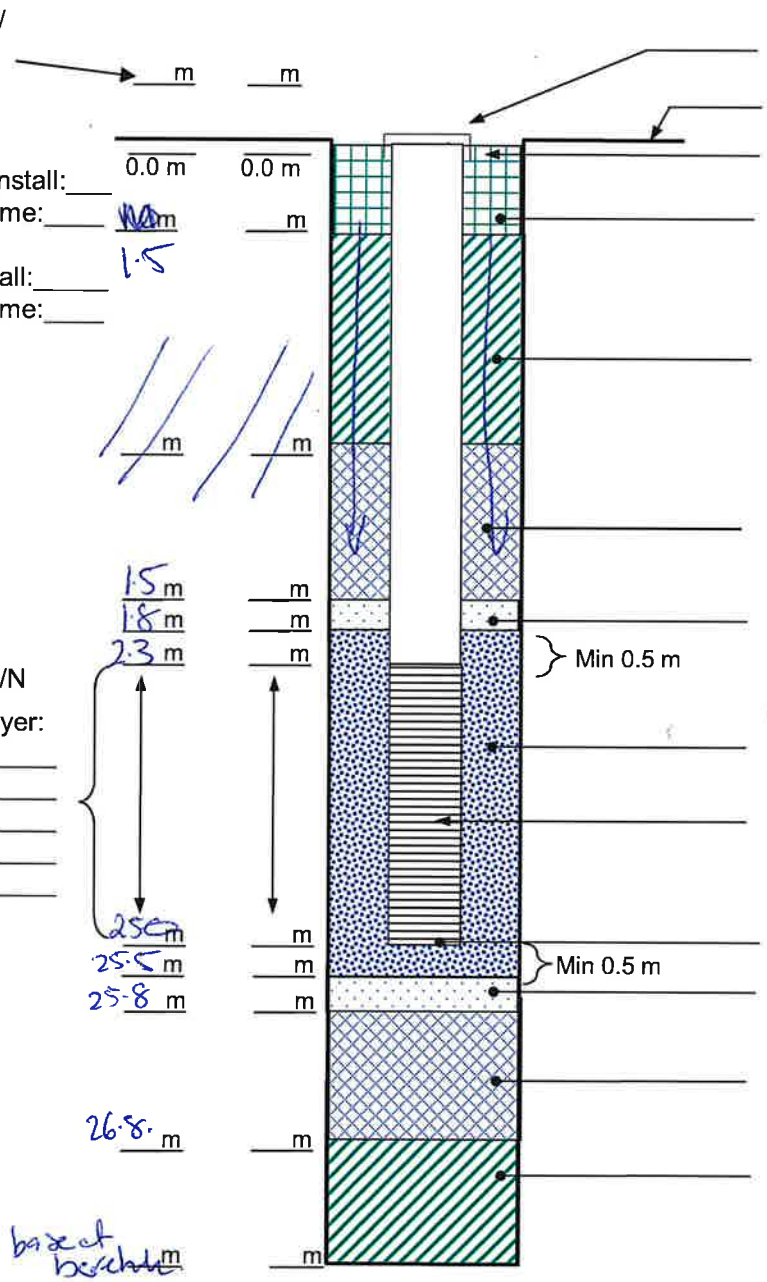
Job No:

Prepared by: RB.

Drilling Commencement Date: 12-13/03/24.

Installation Completion Date: 14/03/24

	Spec	As built
TOP OF PVC/ UPSTAND (delete one if applicable)	m	m
Field Notes: GW prior to install:___ Date:____ Time:____	0.0 m	0.0 m
	~~N/A~~ m	m
GW post install:_____ Date:____ Time:____	1.5	
	m	m
	1.5 m	m
	1.8 m	m
Filter sock: Y/N	2.3 m	m
Screened Layer:		
	25.2 m	m
	25.5 m	m
	25.8 m	m
	26.8. m	m
	base of borehole m	m



Additional Notes:

gw measured @ 10.35m bgl immediately after drilling.

(50mm piezo.)

HOLE dia ____ mm

Construction Notes: Construction tolerance is set at ____mm

Piezometer (50mm ID/ 32mm ID/ 20mm ID) (Select one)

Template

NOT TO SCALE

MBH09

PIEZOMETER RECORD

PIEZO No

Coordinates: mN mE

Job Name: Location: Pukekohe Park

Job No: 25208.000.001 ling Commencement Date:

Prepared by: RB Installation Completion Date:

	Spec	As built
TOP OF PVC/ UPSTAND (delete one if applicable)	1 m	m
	0.0 m	0.0 m
	1.5 m	m
	m	m
	1.5 m	m
	1.8 m	m
	2.3 m	m
	@ 17.0 m	m
	17.5 m	m
	17.8 m	m
	20.0 m	m
base of hole	m	m

Field Notes:
GW prior to install:
Date: Time:

GW post install:
Date: Time:

Filter sock: Y/N

Screened Layer:

FLUSH LOCKABLE TOBY/ UPSTAND (Delete one)

GROUND SURFACE

END CAP

CONCRETE + 1.0 m bentonite surface seal

BACKFILL

BENTONITE (Min 1.0m)

BLINDING SAND (min 300 mm)

Min 0.5 m

GRAVEL

SCREEN

END CAP

Min 0.5 m

BLINDING SAND (min 300 mm)

BENTONITE

BACKFILL

END OF BOREHOLE

HOLE dia mm

Additional Notes:
groundwater dipped @ 5.89m below grnd level on 15/05/24

Construction Notes: Construction tolerance is set at ____mm
Piezometer: (50mm ID 32mm ID/ 20mm ID) (Select one)

Template

NOT TO SCALE

MBH10

PIEZOMETER RECORD

PIEZO No

Coordinates: mN mE

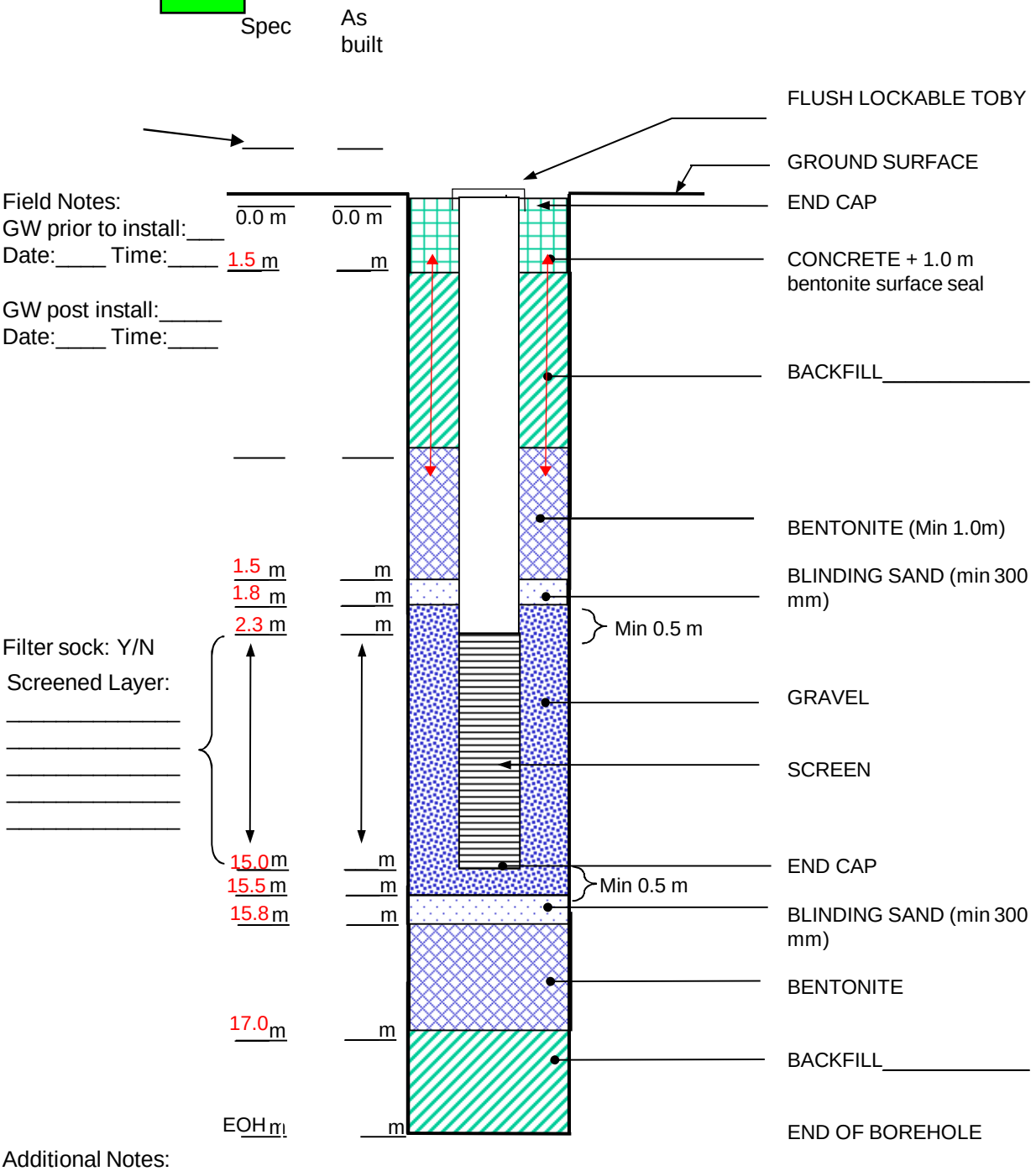
Job Name: Location: Pukekohe Park

Job No: 25208

Prepared by: RB

Drilling Commencement Date:

Installation Completion Date:



Field Notes:
GW prior to install:___
Date:____ Time:____

GW post install:_____
Date:____ Time:____

Filter sock: Y/N

Screened Layer:

Additional Notes:

Groundwater measured on 19/03/2024 (am) at 7.19 m below ground level.

HOLE dia ___ mm

Construction Notes: Construction tolerance is set at ____mm

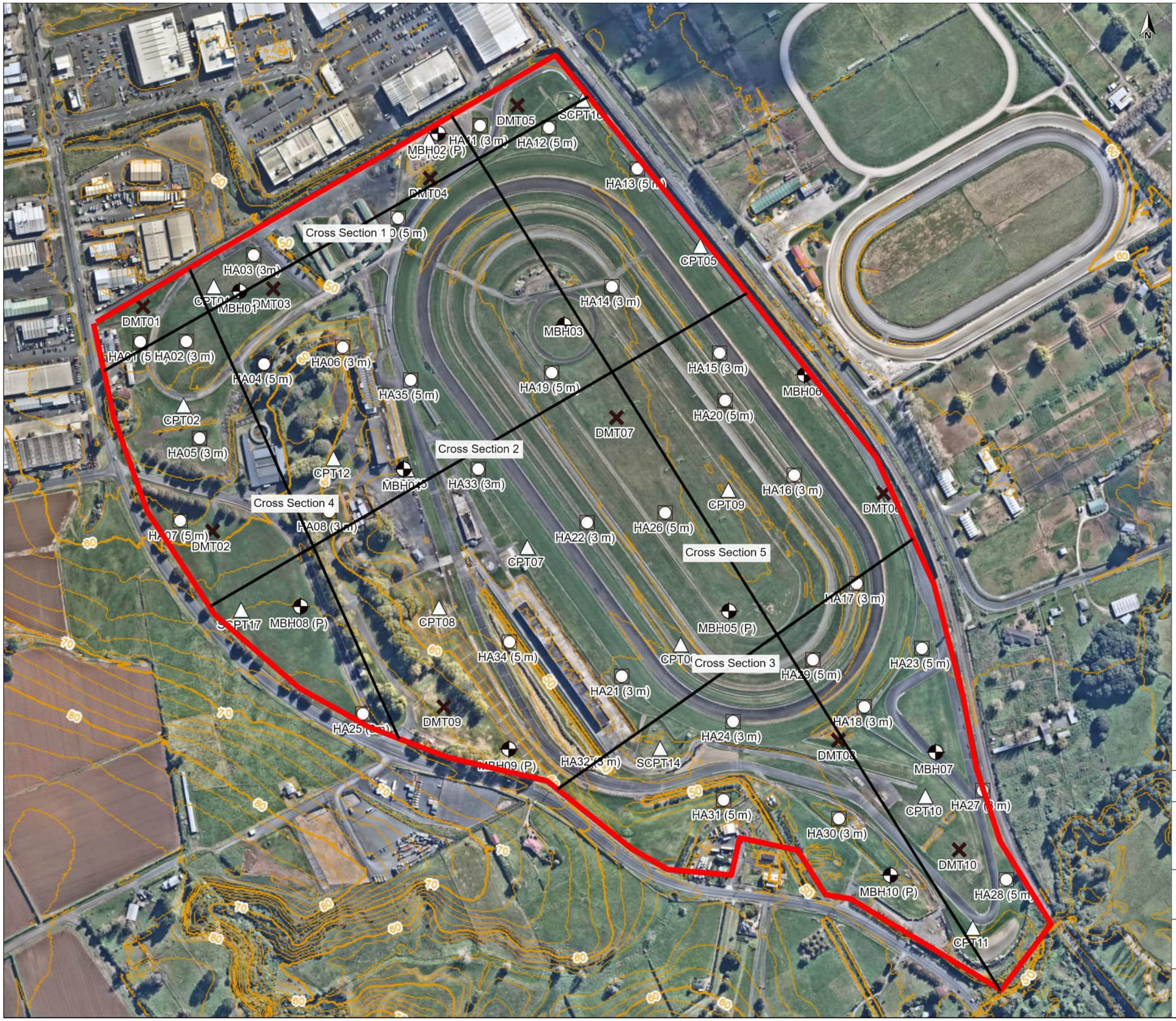
Piezometer: (50mm ID / 32mm ID/ 20mm ID) (Select one)

Template

NOT TO SCALE

APPENDIX 7:

Leapfrog Interpretive Cross-Sections



Legend

- Cross Section 3
- Cross Section 2
- Cross Section 1
- Cross Section 4
- Cross Section 5
- Site Boundary
- Proposed machine drilled borehole
- Proposed cone penetration test
- Proposed hand augured borehole
- Proposed dilatometer test

0 50 m 100 m

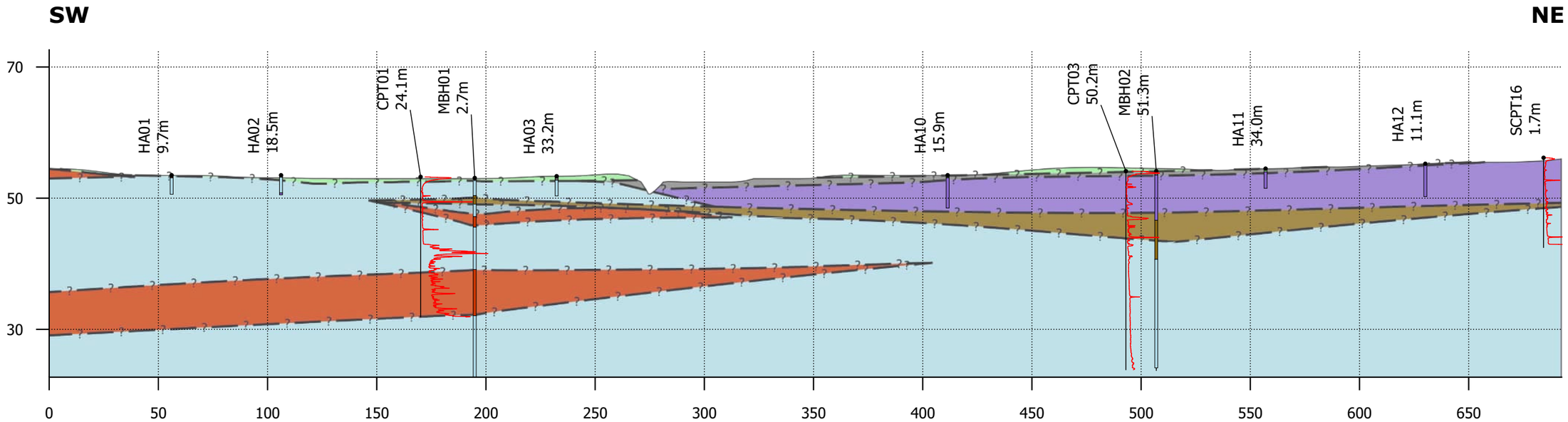
© Nearmap,

ENGEO

Produced by **Datanest.earth**

Title: Site Investigation Location Plan		
Client: Auckland Thoroughbred Racing Incorporated		Size: A3
Project: Pukekohe Park	Drawn: KE	Figure No.: 1
Date: 11-04-2024	Checked: MM	
Proj No: P25208.000.001	Scale: 1:4500	Version: draft

Cross-Section 1



Legend

Material

- TOPSOIL
- FILL
- HOBSONVILLE MEMBER
- RUNCIMAN MEMBER
- ARDMORE MEMBER
- SOUTH AUCKLAND VOLCANIC FIELD
- PAHUREHURE MEMBER

Cone_Resistance_MPa

Cone_Resistance_MPa legend

Notes:
1) Existing topography based on LiDAR contours sourced from Woods Consulting (2024).
2) Only investigations within +/- 55m shown on plan, horizontal offset (see investigation location plan).
3) The material boundaries are inferred geological boundaries only
4) Material units outputted in this model are 3-D volumes derived from materials encountered from intrusive investigations.

Scale: 1:2,000

Vertical exaggeration: 3x

0m 200m

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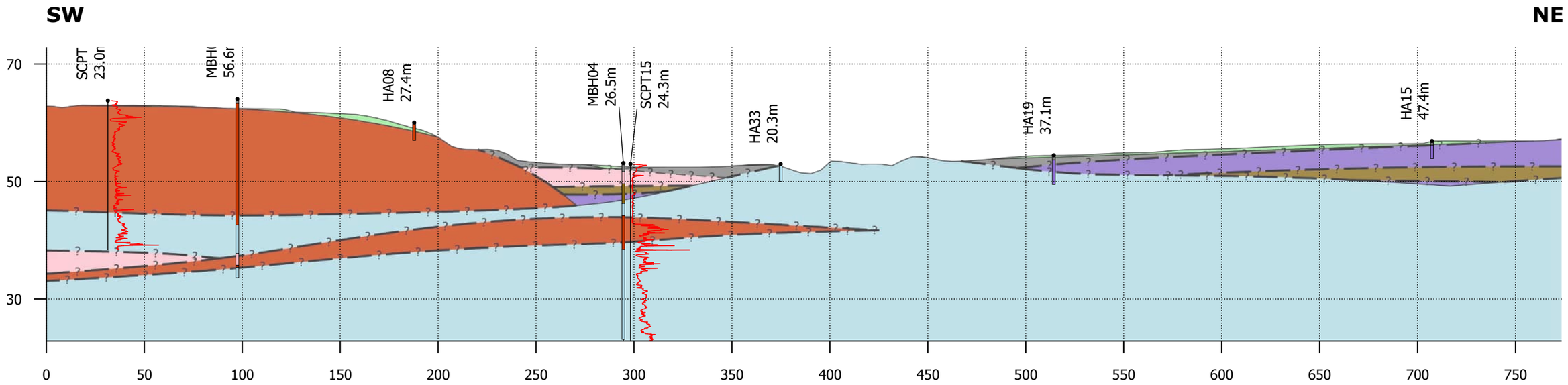
Legal owner ENGEO		Document type Geological Cross Section		Document status DRAFT FOR COMMENT	
		Title Pukekohe Racecourse, Cross Section 1		Identification number	
			Rev. 02	Date of issue 31/05/2024	Sheet 01

Cross-Section 2



Legend

Material

- TOPSOIL
- FILL
- HOBSONVILLE MEMBER
- RUNCIMAN MEMBER
- ARDMORE MEMBER
- SOUTH AUCKLAND VOLCANIC FIELD
- PAHUREHURE MEMBER

Cone_Resistance_MPa

Cone_Resistance_MPa legend

Notes:
1) Existing topography based on LiDAR contours sourced from Woods Consulting (2024).
2) Only investigations within +/- 55m shown on plan, horizontal offset (see investigation location plan).
3) The material boundaries are inferred geological boundaries only
4) Material units outputted in this model are 3-D volumes derived from materials encountered from intrusive investigations.

Scale: 1:2,100

Vertical exaggeration: 3x

0m 250m

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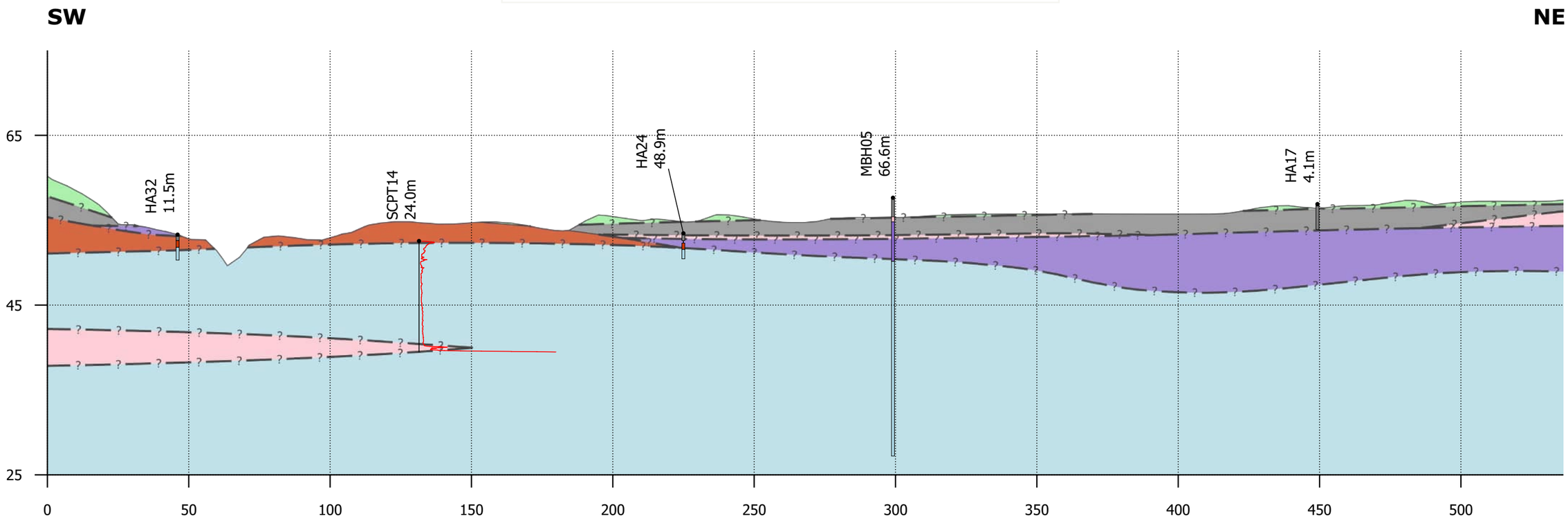
ENGEO		Geological Cross Section	DRAFT FOR COMMENT	
		Title	Identification number	
		Pukekohe Racecourse, Cross Section 2		
			Rev. 02 / Date of issue 30/05/2024	Sheet 01

Cross-Section 3



Legend

Material

- TOPSOIL
- FILL
- HOBSONVILLE MEMBER
- RUNCIMAN MEMBER
- ARDMORE MEMBER
- SOUTH AUCKLAND VOLCANIC FIELD
- PAHUREHURE MEMBER

Cone_Resistance_MPa

Cone_Resistance_MPa legend

Notes:
1) Existing topography based on LiDAR contours sourced from Woods Consulting (2024).
2) Only investigations within +/- 70m shown on plan, horizontal offset (see investigation location plan).
3) The material boundaries are inferred geological boundaries only
4) Material units outputted in this model are 3-D volumes derived from materials encountered from intrusive investigations.

Scale: 1:1,500

Vertical exaggeration: 3x

0m 200m

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		Title Pukekohe Racecourse, Cross Section 3		Identification number	
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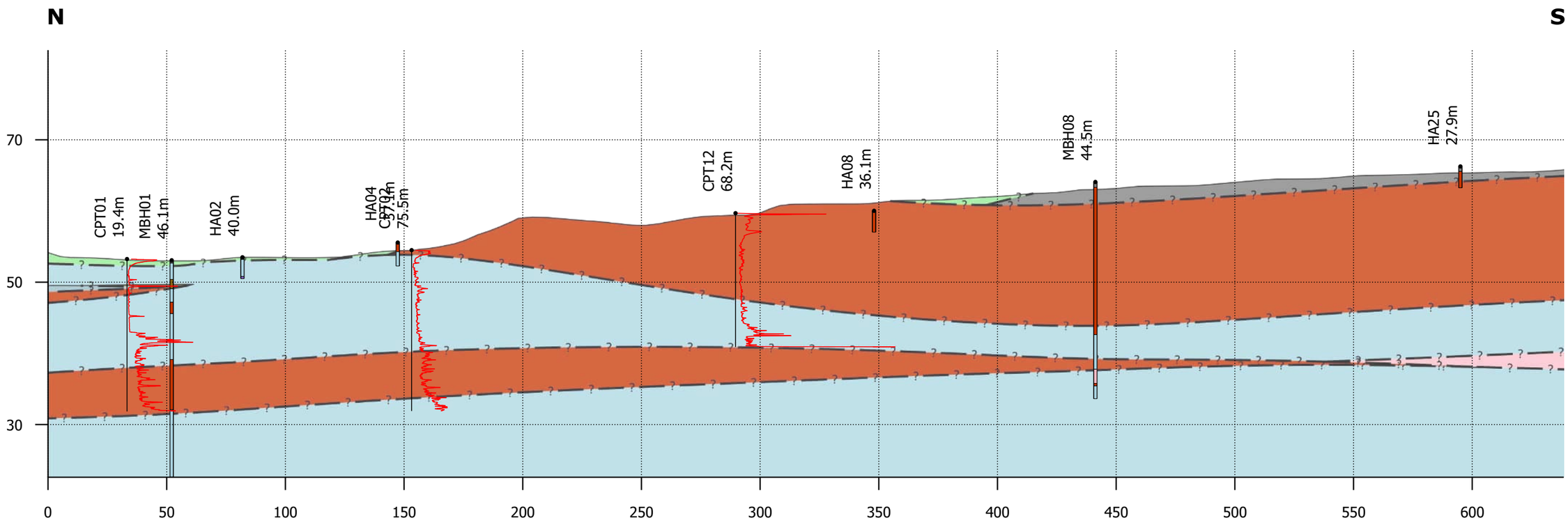
Cross-Section 4



Legend

Material

- TOPSOIL
- FILL
- HOBSONVILLE MEMBER
- RUNCIMAN MEMBER
- ARDMORE MEMBER
- SOUTH AUCKLAND VOLCANIC FIELD
- PAHUREHURE MEMBER

Cone_Resistance_MPa

Cone_Resistance_MPa legend

Scale: 1:1,800

Vertical exaggeration: 3x

0m — 200m

Notes:

1) Existing topography based on LiDAR contours sourced from Woods Consulting (2024).
2) Only investigations within +/- 70m shown on plan, horizontal offset (see investigation location plan).
3) The material boundaries are inferred geological boundaries only
4) Material units outputted in this model are 3-D volumes derived from materials encountered from intrusive investigations.

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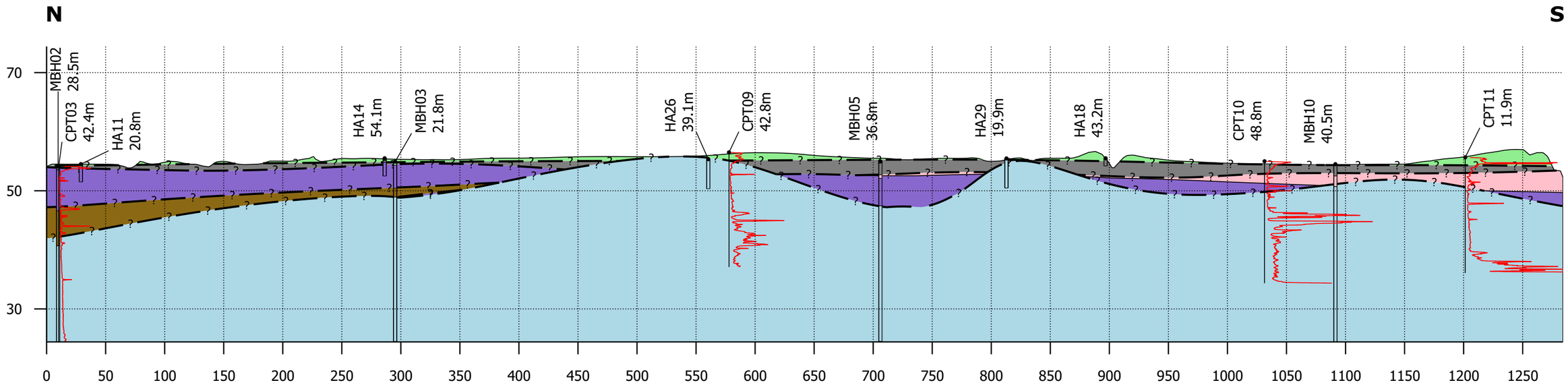
Legal owner: ENGEO		Document type: Geological Cross Section	Document status: DRAFT FOR COMMENT	
		Title: Pukekohe Racecourse, Cross Section 4	Identification number	
			Rev. 02	Date of issue 31/05/2024 / Sheet 01

Cross-Section 5



Legend

Material

- TOPSOIL
- FILL
- HOBSONVILLE MEMBER
- RUNCIMAN MEMBER
- ARDMORE MEMBER
- SOUTH AUCKLAND VOLCANIC FIELD
- PAHUREHURE MEMBER

Cone_Resistance_MPa

Cone_Resistance_MPa legend

Notes:
1) Existing topography based on LiDAR contours sourced from Woods Consulting (2024).
2) Only investigations within +/- 70m shown on plan, horizontal offset (see investigation location plan).
3) The material boundaries are inferred geological boundaries only
4) Material units outputted in this model are 3-D volumes derived from materials encountered from intrusive investigations.

Scale: 1:3,500

Vertical exaggeration: 5x

0m 600m

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Legal owner ENGEO		Document type Geological Cross Section	Document status DRAFT FOR COMMENT
		Title Pukekohe Racecourse, Cross Section 5	Identification number
			Rev. 02 / Date of issue 31/05/2024 / Sheet 01