

05 August 2019

LAKESIDE DEVELOPMENT

STAGES 1, 2 AND 3

GEOTECHNICAL COMPLETION REPORT No.1

Lakeside Developments (2017) Limited

Ref. HAM2018-0106AM Rev 5

HAM2018-0106AM Rev 5		
Date	Revision	Comments
23 May 2019	0	Draft text issued for external comment
05 June 2019	1	Final text issued
17 June 2019	2	Text amended following client comment on Rev 1 and peer reviewer comments on Rev 0.
04 July 2019	3	Text amended following peer reviewer comments on Rev 2.
31 July 2019	4	Recommendations for Lots 291/358 amended following peer reviewer comments on Rev 3.
05 August 2019	5	Included lot numbers amended to match drawings following WDC review.



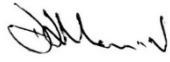
	Name	Signature	Position
Prepared by	Lance Knauf		Engineering Geologist
Reviewed by	Ken Read		Principal Geotechnical Engineer
Authorised by	Dave Morton		Principal Geotechnical Engineer



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Appendices

Appendix A: Suitability Statement and Lot Summary Report

Appendix B: Relevant Pre-Development Field Investigation - Plan, Cross Section and Data

Appendix C: Laboratory Solid Density and Compaction Test Results

Appendix D: Subdivision Earthworks Specification

Appendix E: Fill Quality Control Data

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1. INTRODUCTION

This Geotechnical Completion Report (GCR) has been prepared for Lakeside Developments (2017) Limited as part of the documentation to be submitted to Waikato District Council (WDC) to support the application of land titles for the following residential lots at 98 Scott Road, Te Kauwhata:

Stage 1: Lots 37 to 54, 266 to 270, 281 to 286, 289 to 326, and 336 to 359,

Stage 2: Lot 58, Lots 60 to 64, Lot 84, Lots 87 to 97, 116 to 118, 273 to 277 and Lot 279,

Stage 3: Lots 1 to 3, 15 and 16, 22 to 25 and 28 to 35,

Subdivision construction was undertaken in accordance with Waikato District Council Resource Consent Conditions documents LUC0557/18 and LUC0315/18, the Regional Infrastructure Technical Specification (RITS) and the requirements of NZS 3604, NZS 4404 and NZS 4431.

This report contains our Suitability Statement and Lot Summary Report (**Appendix A**), as-built plans provided by Candor3 and specific geotechnical recommendations for building development.

Stormwater controls, roading and civil works carried out as part of the subdivision have been supervised by other parties therefore are outside the scope of this report.

2. DESCRIPTION OF SUBDIVISION

The original landform across Stages 1 to 6 of the Lakeside Development comprised rolling hill topography that graded gently to the northeast from RL27m (Mount Eden Datum) at the western boundary to RL5m along the north-eastern boundary where a low-lying floodplain exists adjacent to Lake Waikare. Several of the northern-most lots in Stage 1 extend out over the former floodplain.

The contours of the original landform are presented on **Drawings 01 to 03**.

An early works earthworks package was undertaken during the 2017/18 season across the Sales Precinct within Stages 2 and 3. The remaining bulk earthworks across Stages 1 to 3 were commenced in the 2018/19 season but were not completed.

As can be seen from the Cut-Fill Contour Plans (**Drawings 04 to 06**), ground levels within the subject area have been extensively modified by subdivision earthworks incorporating cut and fill depths of up to 3.0m and 7.0m respectively.

The as-built landform (**Drawings 07 to 09**) comprises a series of near level benched building platforms that step down towards the east, with each step separated by a gently graded bench. A 7m high fill embankment has been constructed to the north of Stage 1 to support a future road (Road 201).

3. RELATED REPORTS

The following relevant geotechnical reports have been referenced and used as the basis for the earthworks construction at Lakeside:

- Earthtech Stage 1 Geotechnical Design Report (ref: 4036-3), dated December 2017;
- Earthtech Stage 2 Geotechnical Design Report (ref 4036-4), dated January 2017;
- Earthtech Rata Street Extension Geotechnical Design Report (ref 4036-5), dated February 2017;
- CMW Geotechnical Completion Report (ref HAM2017-0102 Rev 0) dated 05 May 2018;
- CMW Earthworks Specification (ref HAM2018-0106AB Rev 1) dated 17 October 2018.

4. GROUND MODEL

4.1. Soil Profile

The landform over which the lots are situated was investigated in stages over the period October 2016 to November 2017. These comprised a combination of machine and hand auger boreholes, trial pits, Cone Penetration Tests (CPTs) and Machine Boreholes. Copies of the relevant site investigation plans, cross sections and test data is attached to this report (**Appendix B**).

A summary of the main geological units beneath the site is presented in Table 1 below:

Table 1: Summary of Geological Units		
Geological Unit	Description	Typical Thickness
Topsoil	Stiff Organic SILT.	0.15m to 0.3m
A. Alluvial Flats (Lots 308 to 310 and 347 to 356)		
Upper Holocene	Very soft to firm PEAT, SILT and CLAY, loose Silty Sand	1.0m to 6.0m
Lower Holocene	Interbedded soft to firm SILT, CLAY and Sandy SILT; Loose to medium dense Silty SAND.	4.0m to 7.5m
Whangamarino Formation	Very stiff Clayey SILT and Sandy SILT; Medium dense Silty SAND	4.0m to 8.0m
B. Rolling Hills (all remaining lots)		
Brown Ash (Hamilton/Kauroa Ash)	Stiff to very stiff CLAY and Silty CLAY	0.0m to 3.7m
Gully floor Alluvium	Soft CLAY, SILT, organics and loose Silty SAND	0.0m to 3.3m
Whangamarino Silts and Clays	Stiff to very stiff CLAY, SILT, Silty CLAY, Clayey SILT, Sandy SILT; pumiceous.	1.0 to 4.0m
Whangamarino Sands	Medium dense to very dense pumiceous SAND and Silty SAND	0.5m to 2.0m
Whangamarino Lignite	Hard LIGNITE	0.5m to 3.0m

Ground conditions encountered during earthworks generally agreed with those described above. Of particular note is that within the soils of the Whangamarino formation, there is rapid lateral and vertical variation in composition and grain size between silty sands, sandy silts, clayey silts and silty clays.

4.2. Groundwater

Based on the investigation data and observations, the regional groundwater table on the Alluvial Flats is observed to vary between approximately 0.5 to 1.0m below the existing ground level. This is expected to rise close to ground level during winter rainfall conditions (RL5.0m).

The investigation data suggests perched groundwater conditions are present in the shallow Whangamarino sands in the rolling hills. A piezometer installed in BH2-02 at a depth of 10 to 15

metres measured Sub-artesian groundwater conditions at -0.1m below original ground level (approx. 10.5m RL).

5. DESCRIPTION OF EARTHWORKS

5.1. Plant

The main items of plant used by the contractor, Ross Reid Contractors Limited during bulk earthworks included:

- Motor scrapers
- Moxy dump trucks
- Excavators
- Bulldozers
- Sheepsfoot rollers

5.2. Construction Programme

Earthworks operations for the subject lots generally involved downcutting of the more elevated hills and the placement of fills within lower-lying gullies and the former floodplain within the northern part of Stage 1.

The main earthworks activities that were completed are summarised as follows:

- Topsoil stripping and stockpiling across all bulk cut and fill earthworks surfaces;
- Over-excavation of the soft and compressible Upper Holocene Alluvium from beneath the lots across the northern floodplain to depths of up to 5m to expose a stiff to very stiff subgrade. Undercut depths have been accounted for on the cut/fill plan;
- Undercutting or benching of soils in the gully at the western side of Stage 1.
- Subsoil drains were installed at the locations shown on **Drawings 07 to 09** to intercept identified groundwater seepages from beneath the proposed gully and valley floor fills and to discharge them into open drains within the low-lying floodplain;
- Due to abundant groundwater seepage in the base of the northern undercut, a working surface was prepared by placing an initial granular starter fill layer to a typical depth of 0.5m between 2 layers of Bidim A14 geotextile;
- Bulk cut to fill earthworks were then undertaken to the levels presented on **Drawings 07 to 09**, which were completed by 27 May 2019.

6. GEOTECHNICAL QUALITY CONTROL

6.1. Construction Observations

Site observations were undertaken on a part time basis by CMW field staff during bulk earthworks to assess compliance with NZS 4431, the project specification and any other specific design recommendations.

Site visits were carried out to observe and confirm compliance relating to:

- Adequate topsoil stripping and underfill subsoil drainage;
- Removal of existing uncontrolled fill and/or unsuitable soft natural soils;

- Placement and compaction of engineered fill;
- Drilling hand auger boreholes across the as-built landform to verify soil shear strength and consistency.

The results of our observations and associated correspondence with the developer and earthworks contractor show that the works appear to have generally been carried out in accordance with the relevant codes, specifications and standards and our on-site recommendations.

6.2. Compaction Control

Prior to the earthworks being undertaken potential borrow materials were subjected to laboratory testing to determine the solid density and compaction properties for each of the soil types present.

During works blending of materials was undertaken to maximise the use of available soils.

Samples of the 'blended' fill were obtained subjected to laboratory testing to determine the solid density and compaction properties.

Copies of the laboratory compaction testing results are presented in **Appendix C**.

Regular earthfill compaction compliance testing comprising hand shear vane testing, and the determination of the placed fill dry density and air voids by the use of a Nuclear Density Meter, was carried out with respect to NZS 4431:1989, RITS and the CMW Subdivision Earthworks Specification. A copy of the earthworks specification is presented in **Appendix D**.

The compaction control criteria adopted for all engineered fills on this site were as follows:

Air voids percentage average value* less than	8 %
Air voids percentage maximum single value	10 %
Undrained shear strength average value* not less than	120 kPa
Undrained shear strength minimum single value	100 kPa

*The average value is determined over any ten consecutive tests

Minimum Shear Strength (Measured by hand held shear vane calibrated using NZGS 2001 method) and Maximum Air Voids Method was as defined in NZS 4402.

A total of 335 compliance tests (48 retests) have been carried out on a certified fill volume of 252,534m³ placed to 27 May 2019. This equates to one fill test per 880m³ of fill. The specification required 1 test every 1000m³ to 1500m³.

The locations of the respective earthfill quality control tests are presented on the attached **Drawings 10 to 14**.

6.3. Earthfill Suitability

Results of the earthfill quality control testing are provided in **Appendix E**.

Control tests carried out on the fill showed that on some occasions the required compaction standards were not being achieved, generally due to wetter than optimum soil moisture content or inadequate compaction effort.

Results of test failures were relayed to the contractor with instructions to rework or replace the affected areas of fill until compliance with the appropriate standards were achieved.

No geotechnical testing was carried out on the starter layer. Through visual observation of the fill placement and proof rolling we are confident the starter layer has been adequately compacted.

Based on the appended earthfill quality control test results the fill areas across the subject lots are considered to have been constructed in accordance with NZS4431:1989, the RITS and site specific compaction control criteria.

6.4. Post Construction Investigations

Post-construction hand auger boreholes with in-situ shear vane and dynamic cone penetrometer tests were undertaken within the completed lots to confirm geotechnical ultimate bearing capacities for building foundations. Test locations are presented on **Drawings 07 to 09**.

Copies of our borehole logs with detailed descriptions and depths of strata encountered during the post construction investigations are provided in **Appendix F**.

With respect to the post construction hand augers, particularly those in natural soils the lateral and vertical variation in composition of the Whangamarino soils has meant it is not possible to rely on a single test method (shear vane or DCP) to determine soil strength. In interbedded and transitional soils we have therefore assessed foundation conditions on review of both hand shear vane and dynamic penetrometer test results. In silt-rich sands and sand-rich silts we have considered both sets of data.

Based on charts published by Stockwell¹ we have taken a minimum DCP test result of 3 blows/100mm as indicative of 300kPa ultimate bearing pressure in more sandy soils.

6.5. Contractors Work

CMW's site presence during earthworks construction for this project included periodic observations of specific elements of work as described herein.

As we were not on site at all times during construction, we have relied on the Contractor's diligence and construction observations to ensure that the works have been carried out in accordance with:

- a) The approved Contract drawings and design details;
- b) The approved Contract specifications;
- c) Authorised Variations during the execution of the works;
- d) The conditions of Resource, Earthworks and Building Consents where applicable;
- e) The relevant Geotechnical Investigation reports, recommendations and site instructions,

and that all as-built information and other details provided to the Client and/or CMW Geosciences are accurate and correct in all respects.

7. GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

7.1. Liquefaction

The liquefaction risk for the residential development has previously been assessed in the Stage 1 Stage 2 Investigation and Design reports (ref. 4036-3 & 4036-4). The liquefaction risk is low.

7.2. Slope Stability

Following bulk earthworks, the landform encompassed by this report comprises a series of terraced building platforms. Terraces between platforms are generally in the order of 0.5m in height formed at

¹ M J Stockwell, 'Determination of allowable bearing pressure under small structures' New Zealand Engineering, 15 June 1977.

gradients of 1 vertical (v) to 3 horizontal (h) with global gradients across the site in the order of 1(v):20(h).

The northern edge of Stage 1 comprises a 7m high fill embankment constructed at a gradient of 1(v):3(h) from very stiff to hard silt and clay fill.

Lots near the fill embankment of Stage 1 are setback 20m from the crest of the slope.

Based on the presence of stiff to very stiff foundation subsoils and very stiff competent fill materials forming the embankment we consider there is a low risk of deep-seated land instability affecting the building platforms.

7.3. Fill Induced Settlement

Fill induced settlements in the over-consolidated stiff to very stiff and dense Whangamarino soils beneath the fill are expected to be negligible.

Where softer and compressible upper Holocene soils have been encountered these have been undercut and removed with the new structural fill being placed directly over the stiff to very stiff Whangamarino silts and clays.

As the specified degree of compaction has been achieved internal settlement of the fill is also expected to be negligible.

7.4. Post Construction Ground Profile

7.4.1. Post Construction Hand Auger Frequency

Based on the expected natural ground conditions of stiff to very stiff cohesive soils and medium dense granular soils, together with the stiff nature of the controlled engineered fill, our post construction hand auger frequency was as follows;

- Where Lots sizes are less than 400m² one post construction hand auger was carried out for every second. This was usually on a shared lot boundary.
- Where Lot sizes are greater than 400m² one post construction hand auger was carried out near the centre of the Lot.

7.4.2. Lignite

In the geotechnical interpretative reports prepared for the subdivision various recommendations were made regarding undercutting lignite deposits where exposed at platform level to a minimum depth of between 1.0m and 1.5m below final platform levels. During the earthworks consenting process a figure of 1.5m was recommended.

These recommendations to remove all lignite exposed at final level to a depth of 1.5m below platforms were based on the lignite being weak and compressible, thereby posing a risk of low bearing capacities and unacceptable settlement for standard NZS3604 based foundations, together with possible shrinkage on drying and possible acid soil conditions.

As the works have progressed the Lignite encountered has been hard, dry and of low compressibility.

In the Lots considered in this report lignite has not been exposed at platform level, and is a minimum of 500mm below platform level.

From a geotechnical perspective, we have adopted a minimum of 500mm of soil cover to any hard lignite material present beneath design subgrade level subject to that material meeting bearing capacity requirements.

Should soft and compressible lignite be encountered in the future the depth of undercut required will be assessed on a case by case basis.

With respect to possible acid soil conditions no foundations will be in contact with the lignite and all services will be in gravel filled trenches. We therefore consider any risk posed by possible acid soil conditions to be low.

7.4.3. Sensitive Soils

Sensitive soils of the Whangamarino Formation exposed at finish level across Stage 1 cut areas have been found to be susceptible to significant shear strength loss upon repetitive vehicle and plant movements.

Plant movements across Lots 313 - 318 during the earthworks has caused the partial remoulding of the soils exposed at finish level.

If not carefully managed the soils across these lots may become damaged beyond repair and require remedial works. To avoid disturbance, we recommend a 150mm of sand or hardfill be placed over the natural surface which is expected to provide suitable protection to the underlying subsoils.

7.5. Foundation Bearing Capacity

7.5.1. General

Post construction hand auger borehole results completed following earthworks combined with the fill test results indicate that for all lots covered by this report except those mentioned below in Section 7.5.2 a Geotechnical Ultimate Bearing Capacity of 300kPa should be available for the construction of shallow foundations (strip footings or pad foundations) and structures designed in accordance with NZS3604.

Should isolated lenses of soft or loose soils be encountered during construction, they must be over-excavated and replaced with suitably compacted granular fill or footings widened or deepened accordingly necessitating the involvement of a Chartered Professional Engineer.

7.5.2. Lots 291 and 358

Hard lignite has been proved 500mm beneath final level of these lots. The surface soils comprise moderately sensitive very stiff silty clay.

To allow for possible variation in the lignite level and strength proprietary raft foundations are recommended for these lots.

7.5.3. Lots 313 – 318

These lots are located over cut soils locally comprising sensitive moist silty sand. During the earthworks significant weaving was observed in these soils under the wheel loads imposed by the motor scrapers.

Further investigation combined with post construction hand augers carried out across these lots indicates that a Geotechnical Ultimate Bearing Capacity of 200 kPa should be available.

Proprietary raft foundations are therefore recommended for these lots.

The lots have been cut, or unloaded, to a depth of 1.5m to 3.0m whereby they have been fully load compensated for 1 and 2 level buildings constructed to NZS 3604 standard and subsequently static settlements have been calculated as being negligible.

7.5.4. Lot 63 & 64

Near the boundary of Lot 63 and 64 very soft organic soils were encountered in the post construction borehole from a depth of 1.2m to 1.5m. Further hand augers were carried out within the proposed building platforms as shown on **Drawing 09** and did not encounter the organic soils.

A Geotechnical Ultimate Bearing Capacity of 300kPa should be available for the construction of shallow foundations (strip footings or pad foundations) and structures designed in accordance with NZS 3604 for the current proposed building location.

Should the building extend beyond the designated building platform (see **Drawing 09**) further assessment must be carried out.

7.6. Cut and Fill Restrictions

Level to very gently sloping building platforms have been formed during bulk earthworks therefore only minor site preparation works, comprising stripping of topsoil from within the building footprint, is expected prior to building construction.

If any earthworks are proposed they shall be subject to the normal topsoil stripping, fill conditioning and appropriate compaction of any fill in accordance with the requirements of NZS 4431, RITS and subject to engineer inspection and certification at the time.

7.7. Respread Topsoil

Topsoil has been placed across the lots following the post construction hand auger. Survey data provided by Candor3 indicates that the topsoil depths across these lots range from 0.1m to 0.35m.

7.8. Suitability Statement

A copy of our Statement of Professional Opinion as to the Suitability of Land for Building Consent, in the form of the Regional Infrastructure Technical Specification Schedule 2A, is provided in **Appendix A**.

A summary of Geotechnical Data for individual lots, in the form of a lot summary spreadsheet is also provided in **Appendix A**.

8. LIMITATION

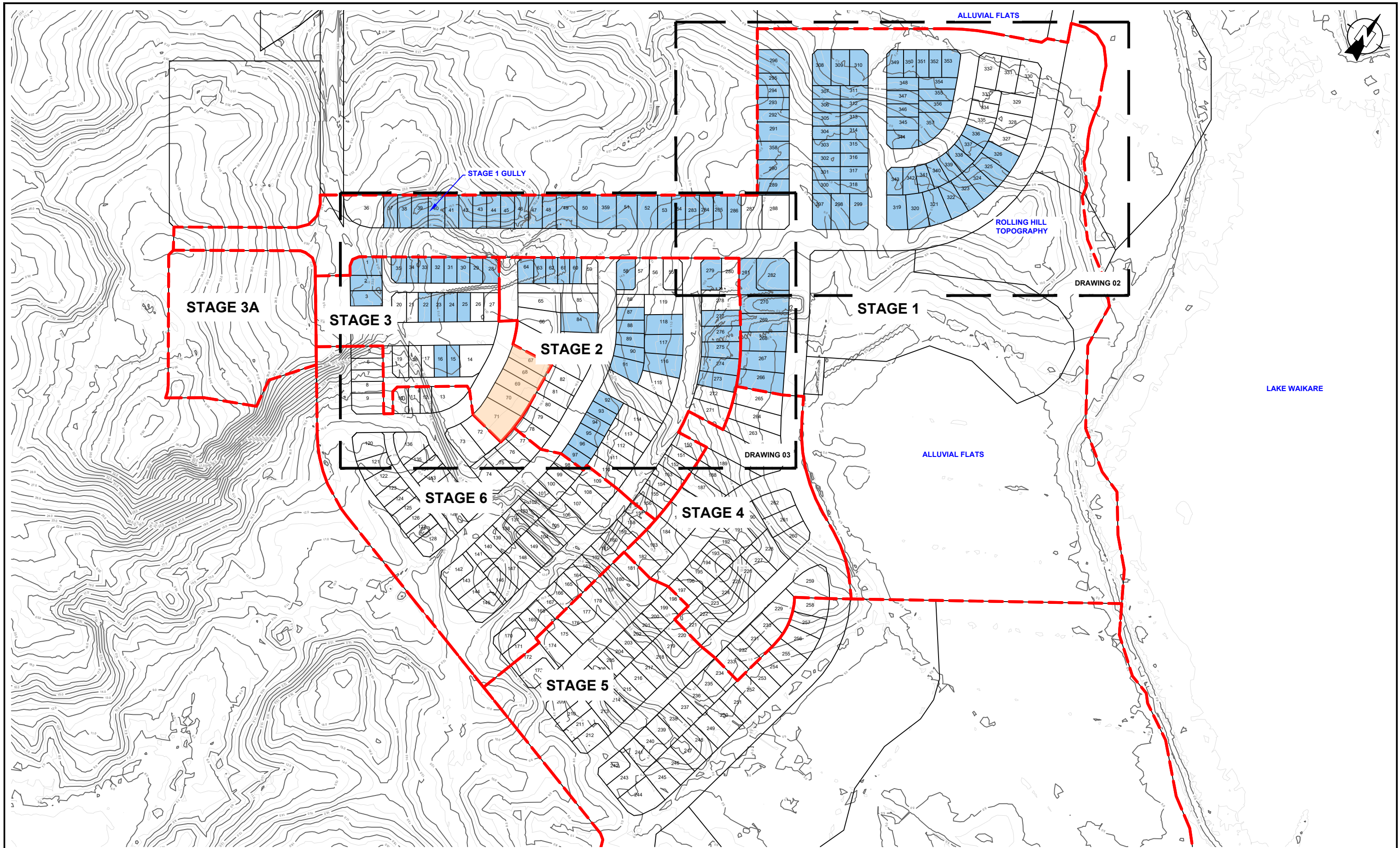
This report has been prepared for use by our Lakeside Developments (2017) Limited, their consultants and Waikato District Council. Liability for its use is limited to the scope of work for which it was prepared as it may not contain sufficient information for other parties or for other purposes.

Although regular site visits have been undertaken for observation, for providing guidance and instruction for testing purposes, the geotechnical services scope did not include full time site presence. To this end, our appended suitability statement also relies on the Contractors' work practices and assumes that when we have not been present to observe the work, it has been completed to high standard and in accordance with the drawings, instructions and consent conditions provided to them.

There may be special conditions pertaining to this site which have not been disclosed by the investigation and which have not been taken into account in the report. If variations in the subsoils occur from those described or assumed to exist then the matter should be referred back to CMW immediately.

Distribution: 1 copy to Lakeside Developments (2017) Limited (electronic)
 1 copy to Candor3 Consultants (electronic)
 1 copy to Waikato District Council
 Original held by CMW Geosciences

Drawings



LEGEND:

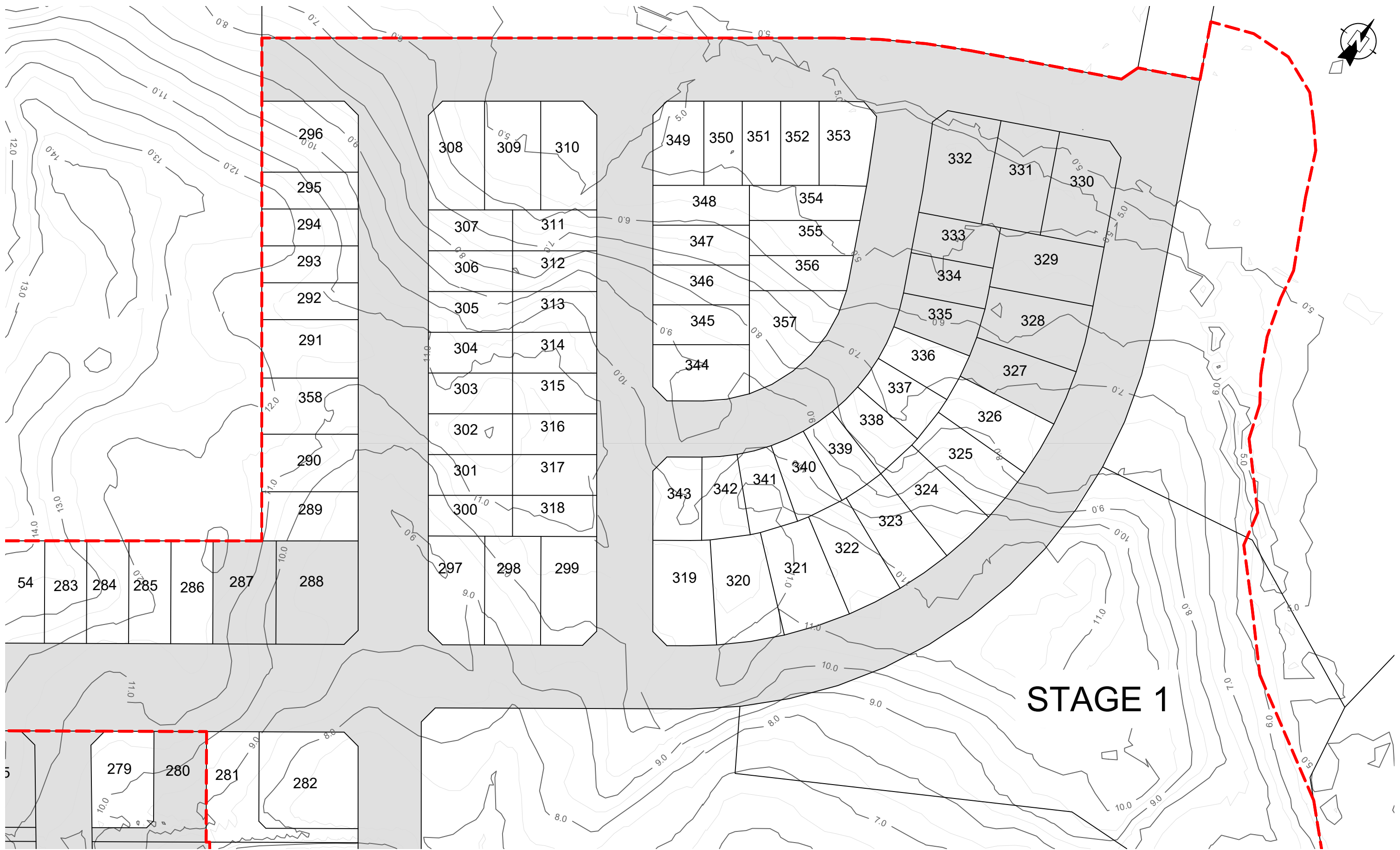
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- SHOW HOMES AREA PREVIOUSLY REPORTED ON
- LOTS COVERED BY GCR REPORT RE. HAM2018-106AM REV 5
- PREDEVELOPMENT CONTOURS

NOTES:

1. SUBDIVISION SCHEME PLAN & PREDEVELOPMENT CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
3. PREDEVELOPMENT CONTOURS RELEVANT AS OF 30.07.2018 ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.



CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN: WPJ	PROJECT No: HAM2018-0106
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED: LYK	DRAWING: 01
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STAGE 1

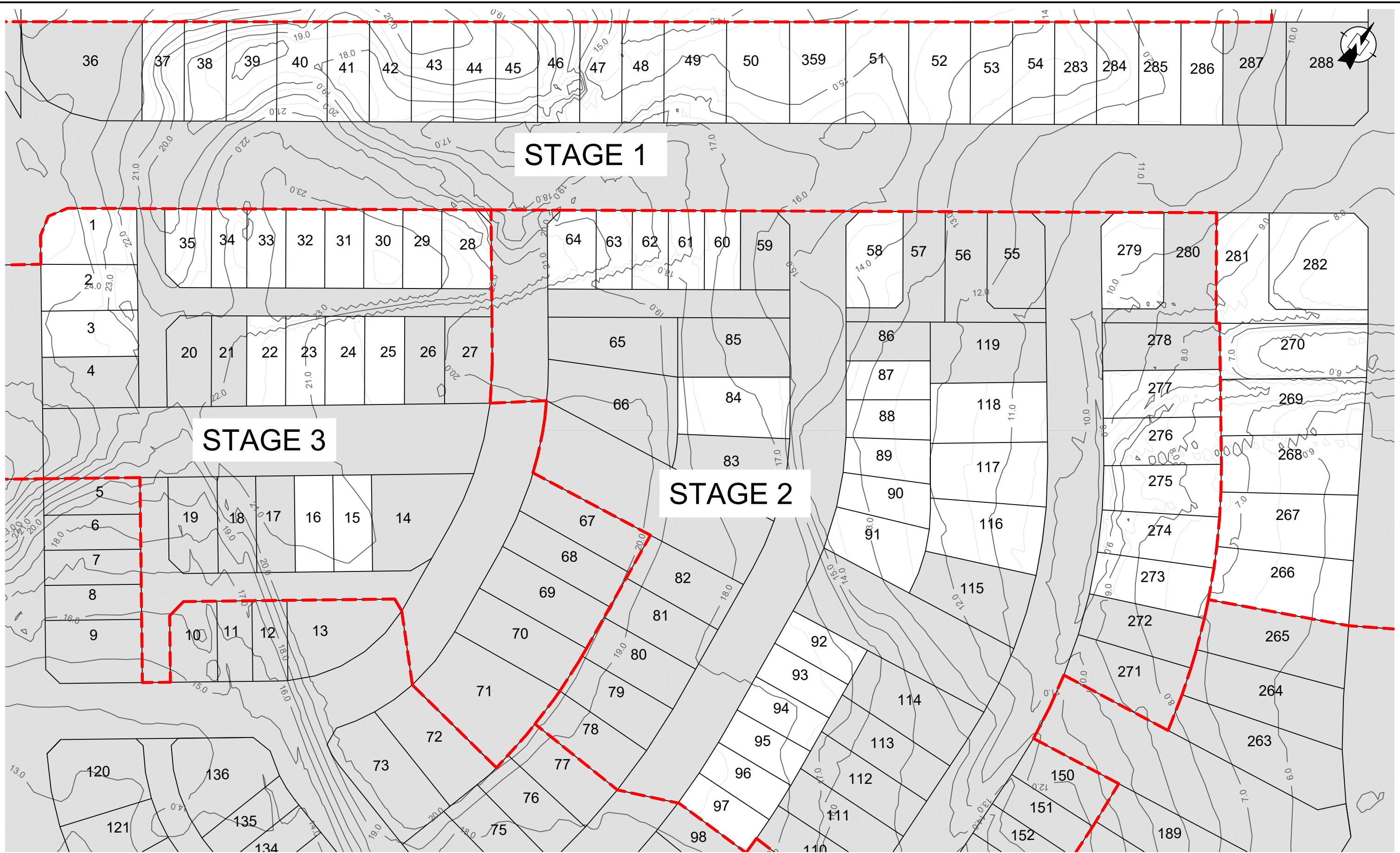
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	LOTS COVERED BY GCR REPORT RE. HAM2018-106AM REV 5
	PREDEVELOPMENT CONTOURS

- NOTES:**
- SUBDIVISION SCHEME PLAN & PREDEVELOPMENT CONTOURS PROVIDED BY CANDOR3.
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 - PREDEVELOPMENT CONTOURS RELEVANT AS OF 30.07.2018 ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.



CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN: WPJ	PROJECT No: HAM2018-0106
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED: LYK	DRAWING: 02
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STAGE 1

STAGE 3

STAGE 2

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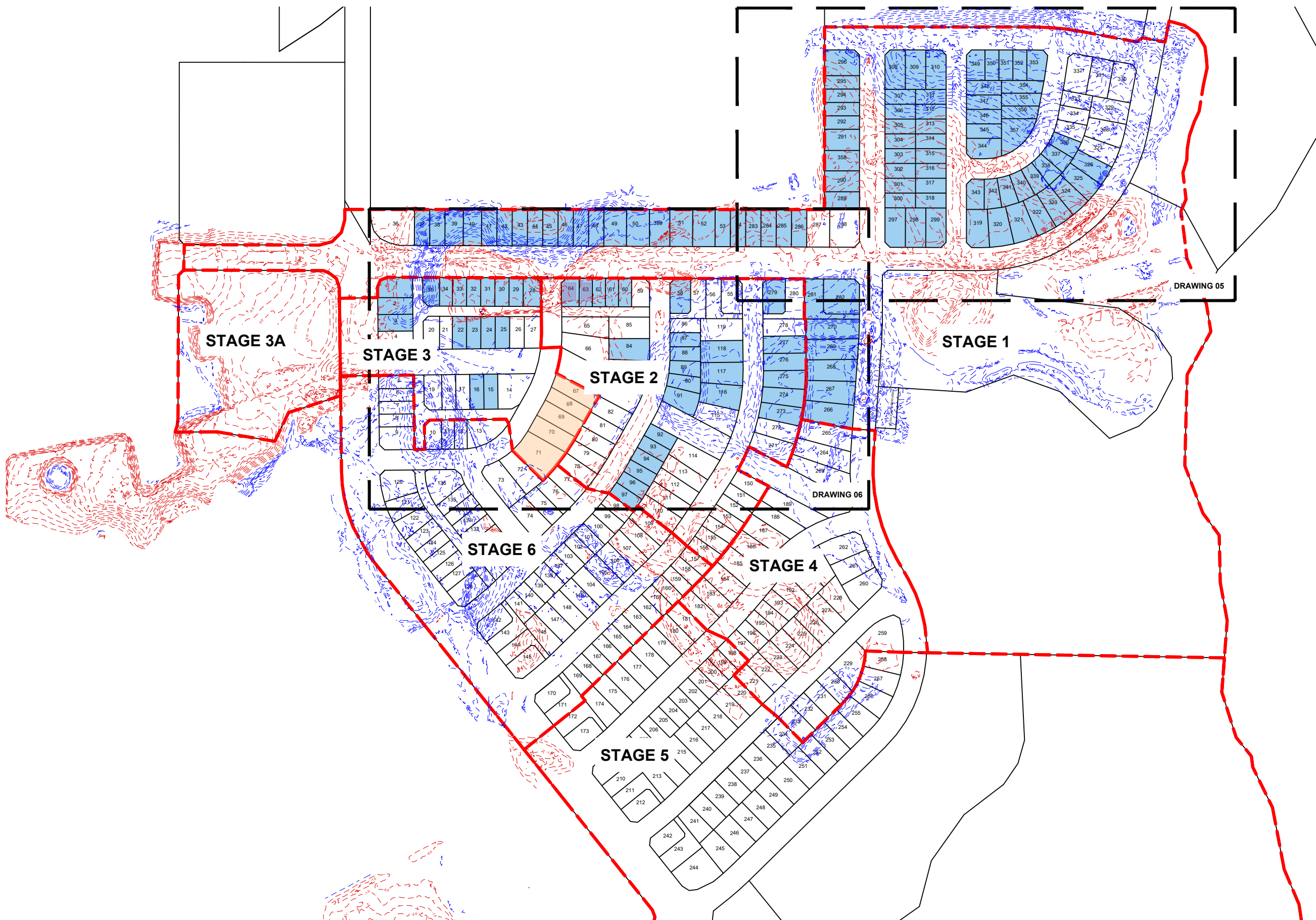
- STAGE BOUNDARY
- AREAS OUTSIDE REPORT SCOPE
- LOTS COVERED BY GCR REPORT
RE. HAM2018-106AM REV 5
- PREDEVELOPMENT CONTOURS

NOTES:

1. SUBDIVISION SCHEME PLAN & PREDEVELOPMENT CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
3. PREDEVELOPMENT CONTOURS RELEVANT AS OF 30.07.2018 ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.



CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN: WPJ	PROJECT No: HAM2018-0106
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED: LYK	DRAWING: 03
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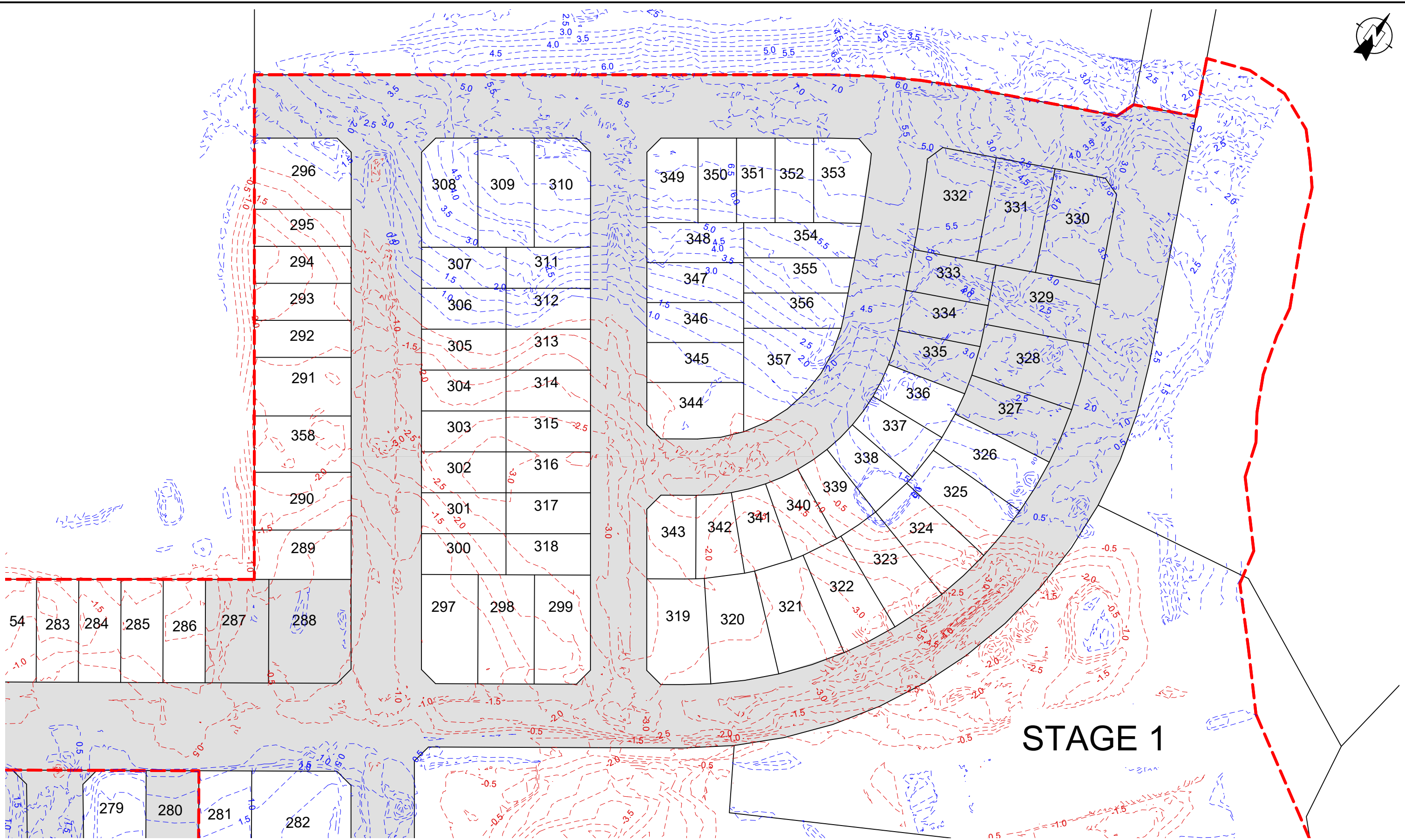
- STAGE BOUNDARY
- SHOW HOMES AREA PREVIOUSLY REPORTED ON
- LOTS COVERED BY GCR REPORT RE. HAM2018-106AM REV 5
- CUT CONTOURS
- FILL CONTOURS

NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 27.05.19 AND PROVIDED BY CANDOR3. OUTSIDE THESE LOTS CONTOURS DERIVED FROM DRONE SURVEY 17.05.19 AND ARE APPROXIMATE ONLY.



CLIENT:	LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN:	WPJ	PROJECT No:	HAM2018-0106
PROJECT:	LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED:	LYK	DRAWING:	04
TITLE:	CUT / FILL CONTOUR PLAN A	REVISION:	0	SCALE:	1:3000
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STAGE 1

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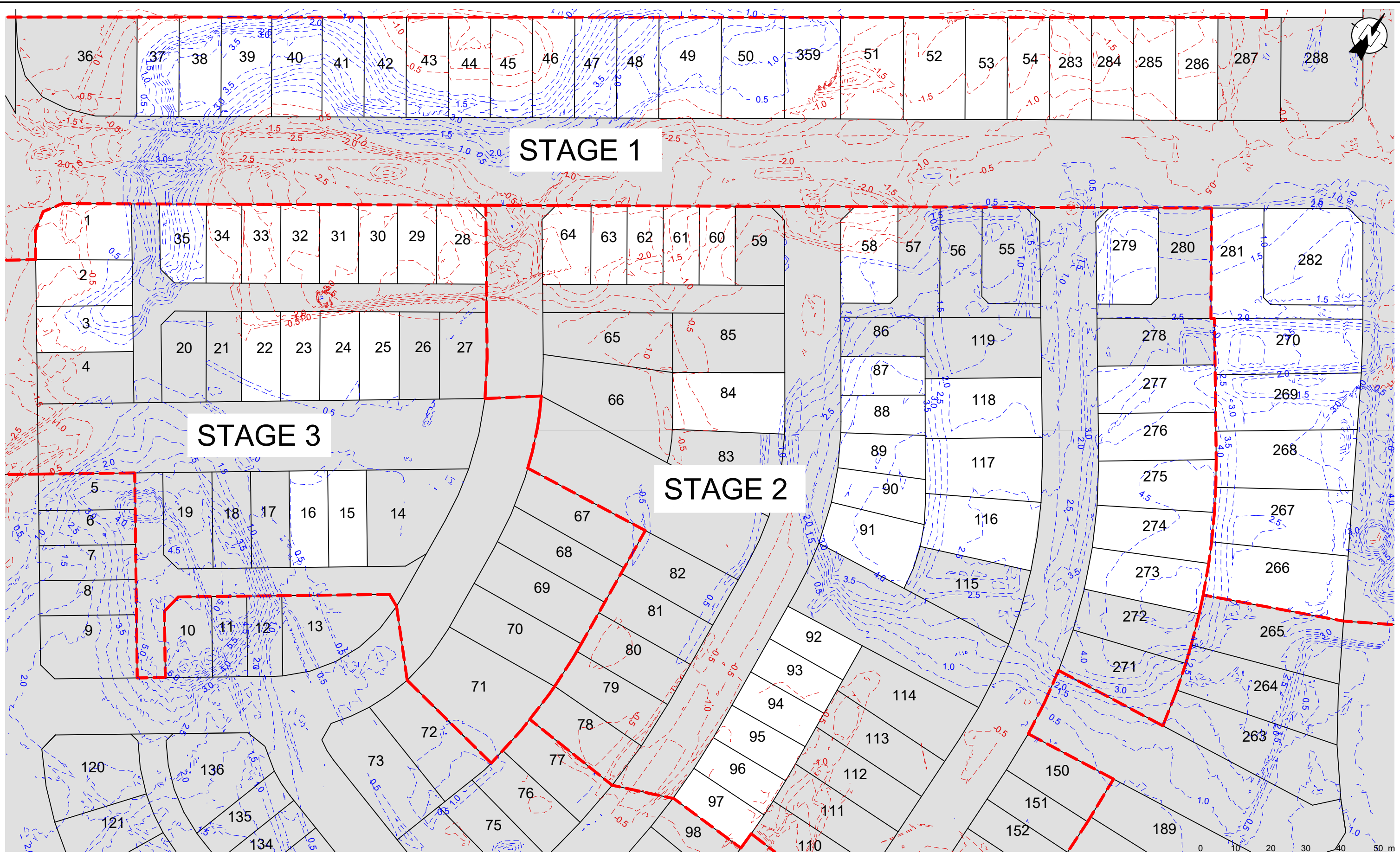
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 - CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.
 - CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 27.05.19 AND PROVIDED BY CANDOR3. OUTSIDE THESE LOTS CONTOURS DERIVED FROM DRONE SURVEY 17.05.19 AND ARE APPROXIMATE ONLY.



CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN: WPJ	PROJECT No: HAM2018-0106
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED: LYK	DRAWING: 05
TITLE: CUT / FILL CONTOUR PLAN B	REVISION: 0	SCALE: 1:1000
	DATE: 28.05.19	SHEET: A3 L





STAGE 1

STAGE 3

STAGE 2

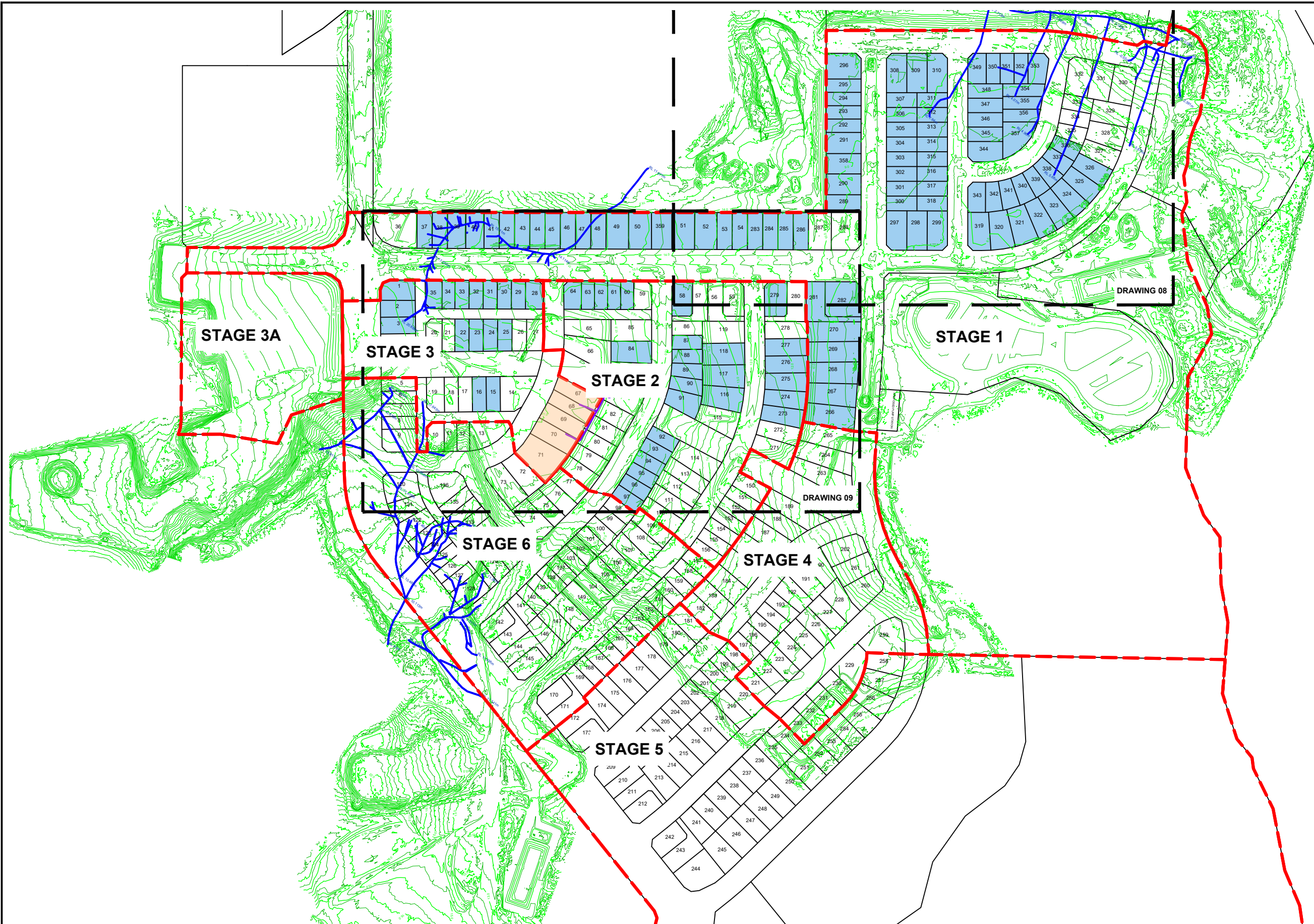
LEGEND:

	STAGE BOUNDARY
	AREAS OUTSIDE REPORT SCOPE
	LOTS COVERED BY GCR REPORT RE. HAM2018-106AM REV 5
	CUT CONTOURS
	FILL CONTOURS

- NOTES:**
- SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
 - STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
 - CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.
 - CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 27.05.19 AND PROVIDED BY CANDOR3. OUTSIDE THESE LOTS CONTOURS DERIVED FROM DRONE SURVEY 17.05.19 AND ARE APPROXIMATE ONLY.



CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN: WPJ	PROJECT No: HAM2018-0106
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED: LYK	DRAWING: 06
TITLE: CUT / FILL CONTOUR PLAN C	REVISION: 0	SCALE: 1:1000
	DATE: 28.05.19	SHEET: A3 L



LEGEND:

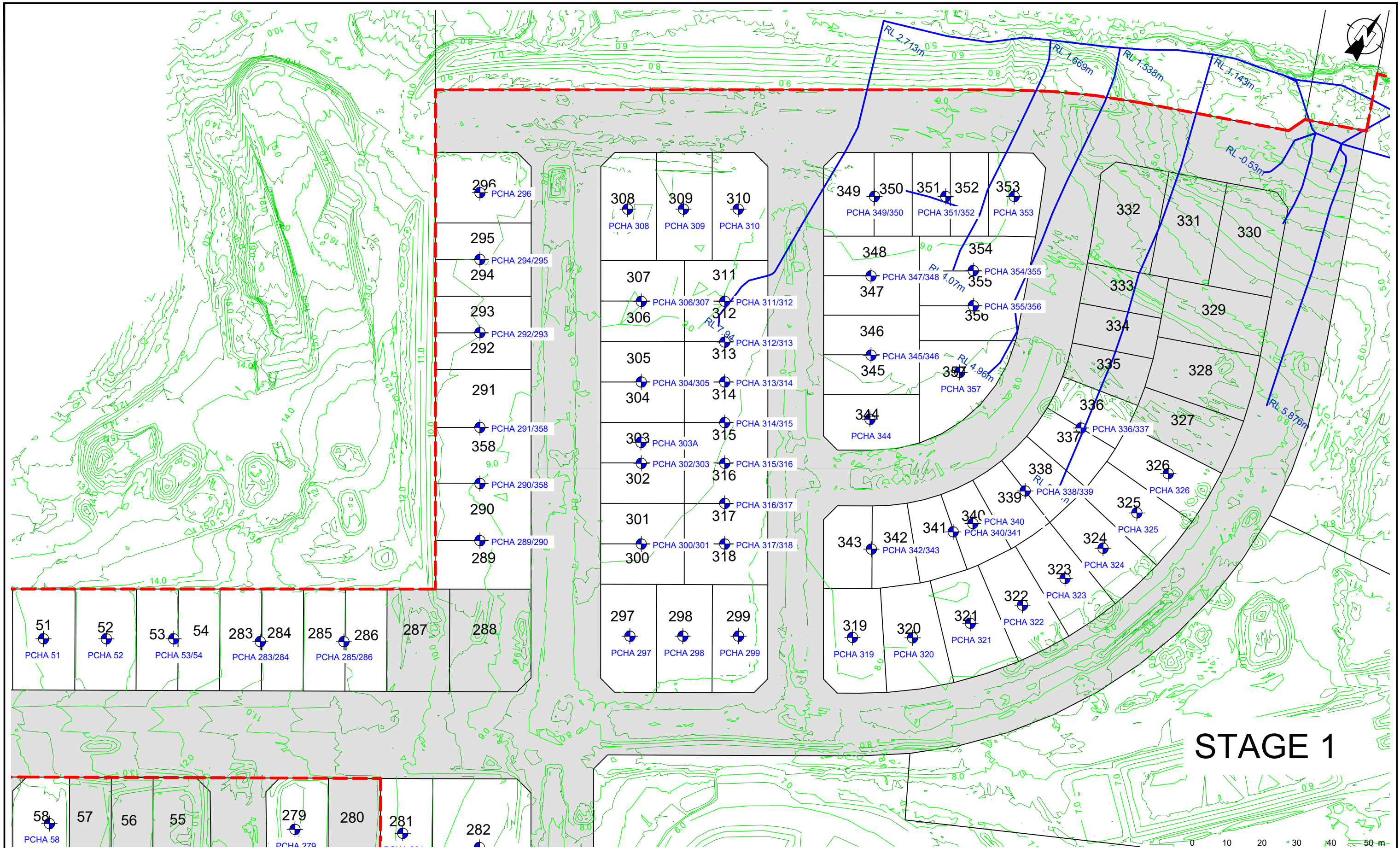
- - - STAGE BOUNDARY
- SHOW HOMES AREA PREVIOUSLY REPORTED ON
- LOTS COVERED BY GCR REPORT RE. HAM2018-106AM REV 5
- AS BUILT SURVEY CONTOURS
- AS BUILT SUBSOIL DRAIN

NOTES:

1. SUBDIVISION SCHEME PLAN & AS BUILT CONTOURS PROVIDED BY CANDOR3 29/05/2019.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
3. AS BUILT CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM
4. AS BUILT CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 27.05.19 AND PROVIDED BY CANDOR3. OUTSIDE THESE LOTS CONTOURS DERIVED FROM DRONE SURVEY 17.05.19 AND ARE APPROXIMATE ONLY.



CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN: WPJ	PROJECT No: HAM2018-0106
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED: LYK	DRAWING: 07
TITLE: POST CONSTRUCTION HAND AUGER PLAN A	REVISION: 0	SCALE: 1:3000
	DATE: 28.05.19	SHEET: A3 L



STAGE 1

LEGEND:

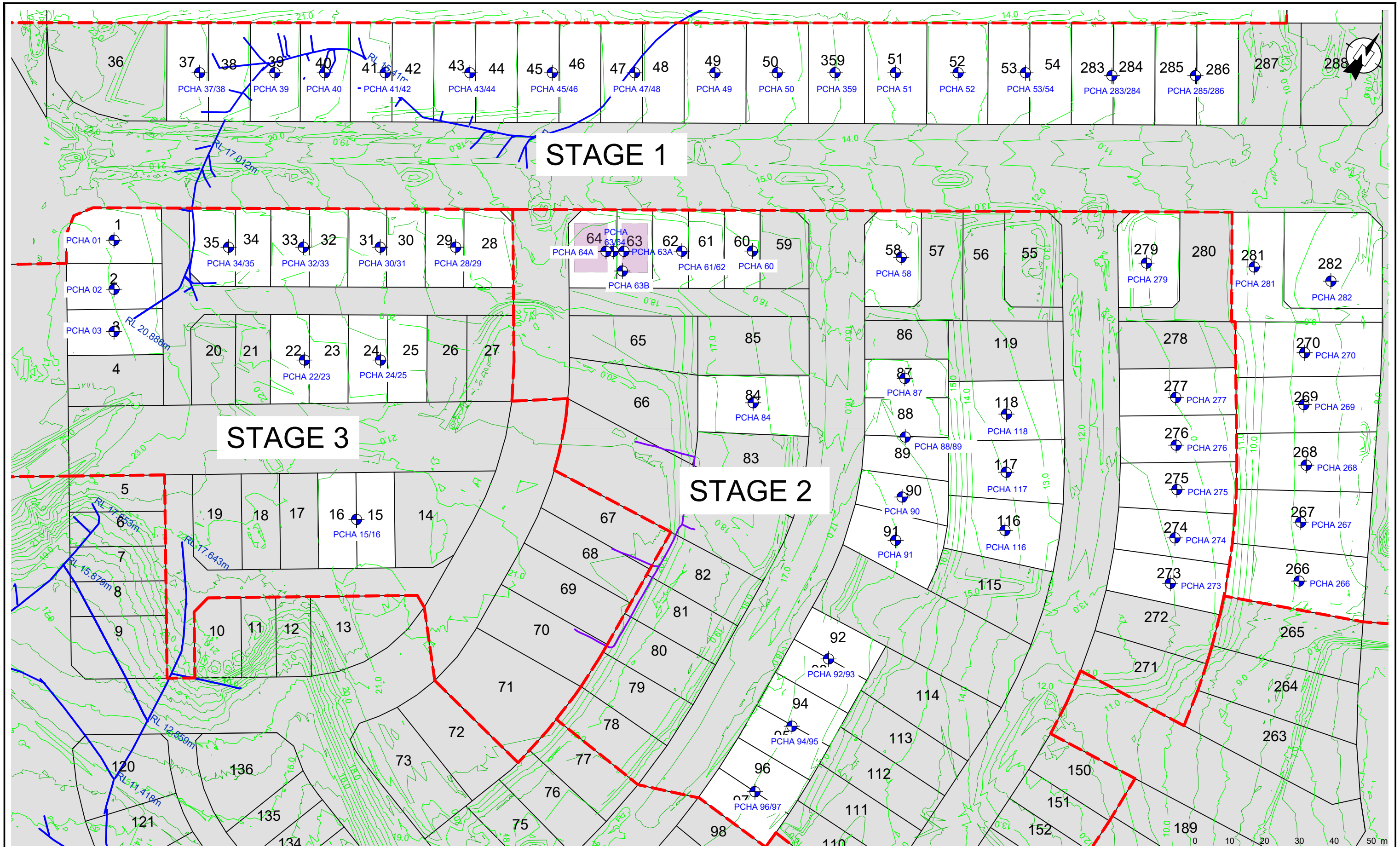
	STAGE BOUNDARY
	LOTS COVERED BY GCR REPORT RE. HAM2018-106AM REV 5
	AREAS OUTSIDE REPORT SCOPE
	AS BUILT SURVEY CONTOURS
	PCHA01 POST CONSTRUCTION HAND AUGER LOCATION
	AS BUILT SUBSOIL DRAIN

- NOTES:**
- SUBDIVISION SCHEME PLAN & AS BUILT CONTOURS PROVIDED BY CANDOR3 29/05/2019.
 - STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
 - AS BUILT CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM
 - AS BUILT CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 27.05.19 AND PROVIDED BY CANDOR3. OUTSIDE THESE LOTS CONTOURS DERIVED FROM DRONE SURVEY 17.05.19 AND ARE APPROXIMATE ONLY.



CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN: WPJ	PROJECT No: HAM2018-0106
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED: LYK	DRAWING: 08
TITLE: POST CONSTRUCTION HAND AUGER PLAN B	REVISION: 0	SCALE: 1:1000
	DATE: 28.05.19	SHEET: A3 L





LEGEND:

- - - STAGE BOUNDARY
- LOTS COVERED BY GCR REPORT
RE. HAM2018-106AM REV 5
- AREAS OUTSIDE REPORT SCOPE
- LOT 63 & 64 PROPOSED BUILDING
PLATFORMS.
- AS BUILT SURVEY CONTOURS
- PCHA01 POST CONSTRUCTION HAND AUGER
LOCATION
- AS BUILT SUBSOIL DRAIN

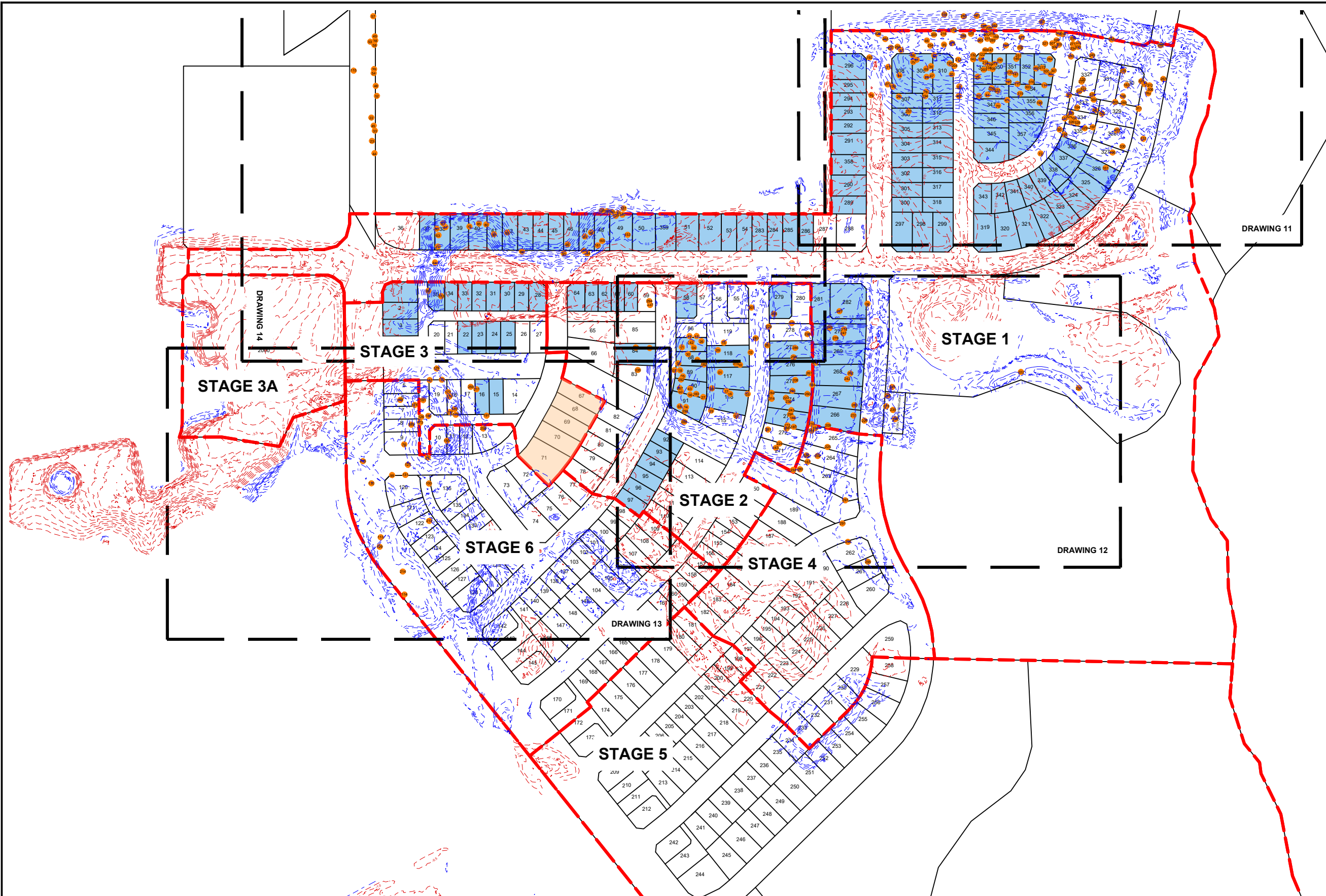
NOTES:

1. SUBDIVISION SCHEME PLAN & AS BUILT CONTOURS PROVIDED BY CANDOR3 29/05/2019.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
3. AS BUILT CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM
4. AS BUILT CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 27.05.19 AND PROVIDED BY CANDOR3. OUTSIDE THESE LOTS CONTOURS DERIVED FROM DRONE SURVEY 17.05.19 AND ARE APPROXIMATE ONLY.



CLIENT:	LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN:	WPJ
PROJECT:	LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED:	LYK
TITLE:	POST CONSTRUCTION HAND AUGER PLAN C	REVISION:	0
		DATE:	28.05.19
		PROJECT No:	HAM2018-0106
		DRAWING:	09
		SCALE:	1:1000
		SHEET:	A3 L

1:1000



LEGEND:

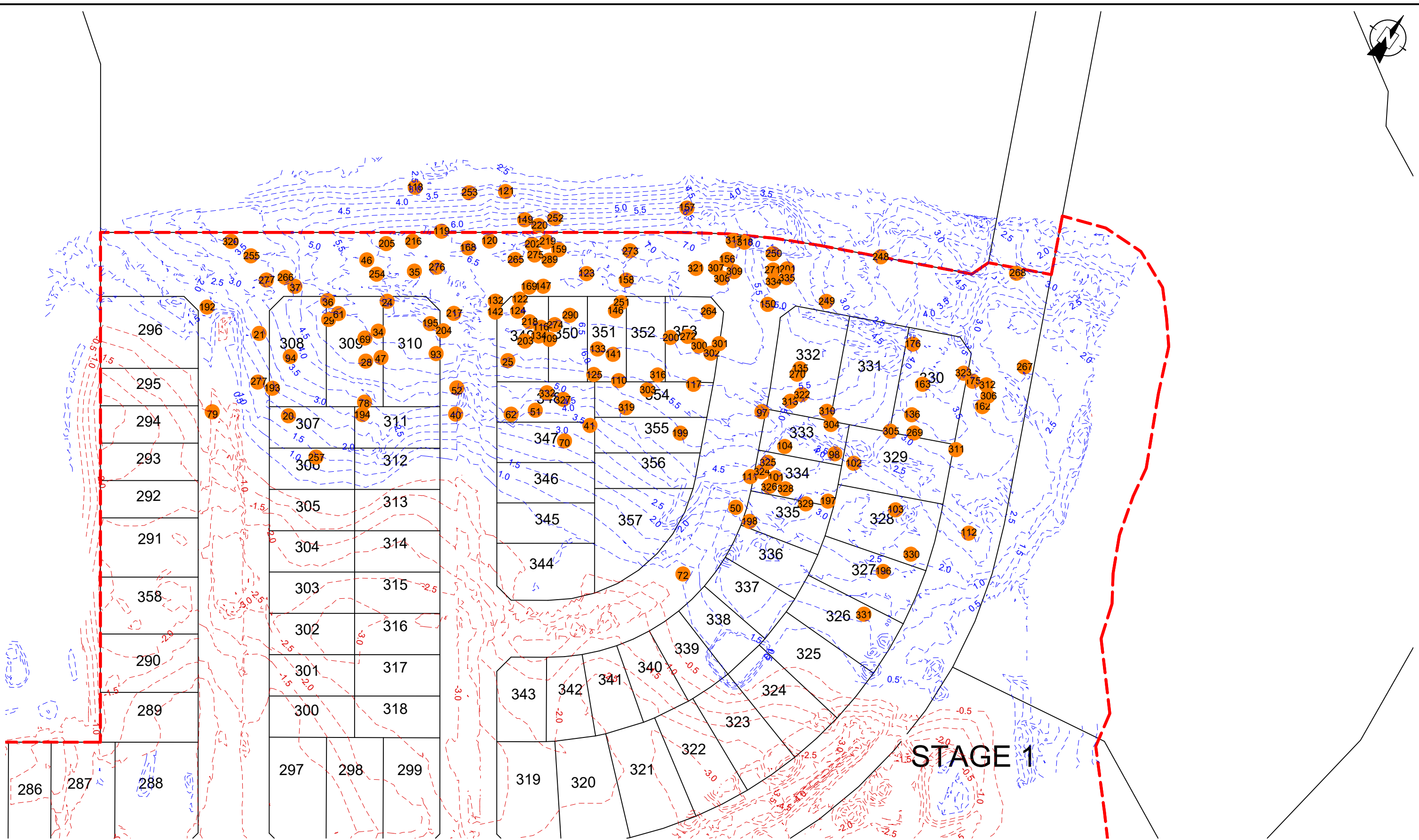
- - - STAGE BOUNDARY
- SHOW HOMES AREA PREVIOUSLY REPORTED ON
- LOTS COVERED BY GCR REPORT RE. HAM2018-106AM REV 5
- - - CUT CONTOURS
- - - FILL CONTOURS
- NUCLEAR DENSITY METER (NDM) TEST LOCATION

NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.
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5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.



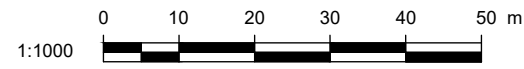
CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN: WPJ	PROJECT No: HAM2018-0106
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED: LYK	DRAWING: 10
TITLE: FILL TEST LOCATION SITE PLAN A	REVISION: 0	SCALE: 1:3000
	DATE: 28.05.19	SHEET: A3 L



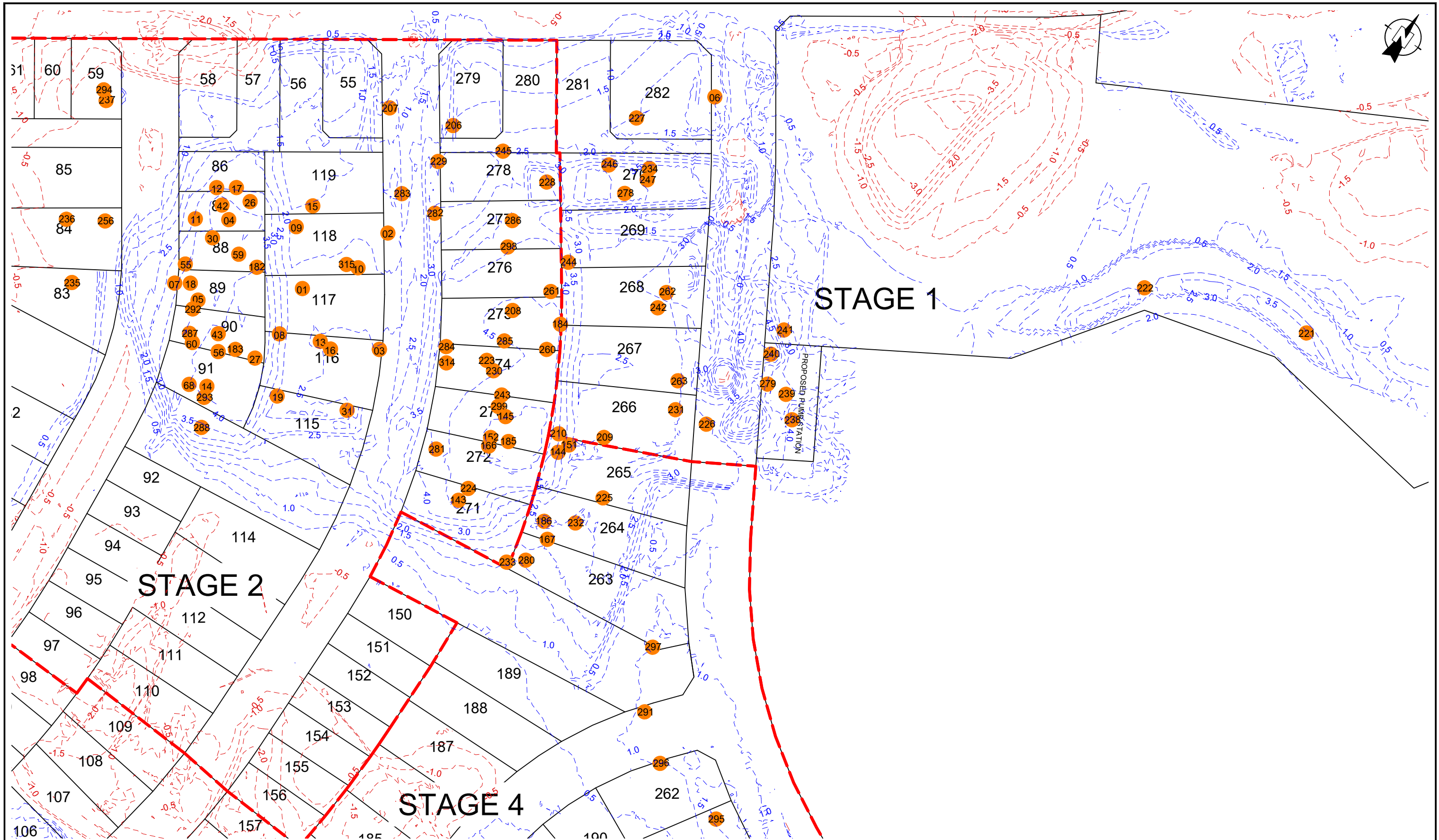
LEGEND:

	STAGE BOUNDARY
	CUT CONTOURS
	FILL CONTOURS
	NUCLEAR DENSITY METER (NDM) TEST LOCATION

- NOTES:**
1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
 2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
 3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.
 4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 27.05.19 AND PROVIDED BY CANDOR3. OUTSIDE THESE LOTS CONTOURS DERIVED FROM DRONE SURVEY 17.05.19 AND ARE APPROXIMATE ONLY.
 5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.



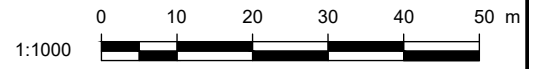
CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN: WPJ	PROJECT No: HAM2018-0106
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED: LYK	DRAWING: 11
TITLE: FILL TEST LOCATION SITE PLAN B	REVISION: 0	SCALE: 1:1000
	DATE: 28.05.19	SHEET: A3 L



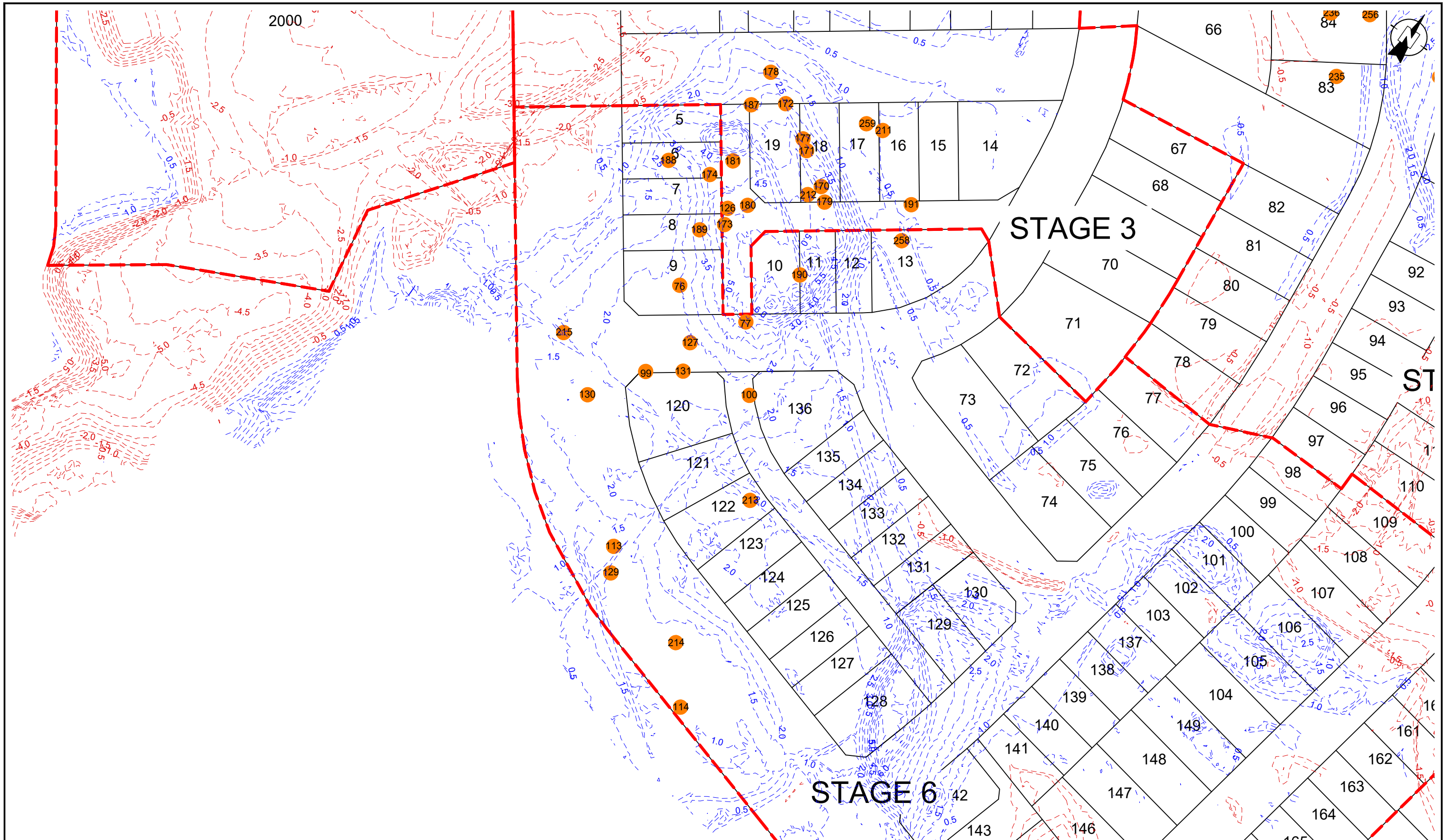
LEGEND:

	STAGE BOUNDARY
	CUT CONTOURS
	FILL CONTOURS
	NUCLEAR DENSITY METER (NDM) TEST LOCATION

- NOTES:**
1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
 2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
 3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.
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 5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.



CLIENT:	LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN:	WPJ	PROJECT No:	HAM2018-0106
PROJECT:	LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED:	LYK	DRAWING:	12
TITLE:	FILL TEST LOCATION SITE PLAN C	REVISION:	0	SCALE:	1:1000
		DATE:	28.05.19	SHEET:	A3 L



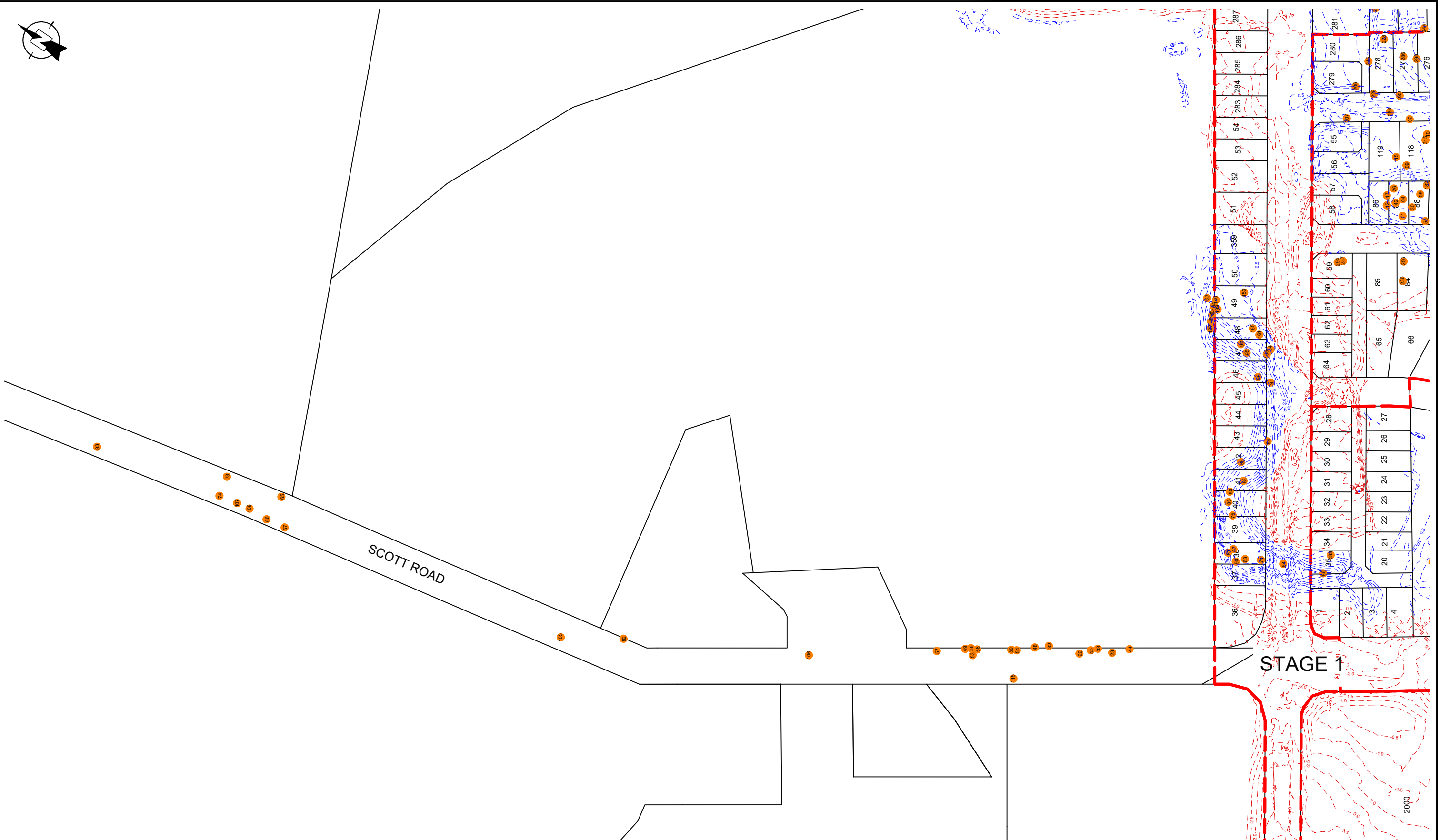
- LEGEND:**
- STAGE BOUNDARY
 - CUT CONTOURS
 - FILL CONTOURS
 - 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION

NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.
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5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.



CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN: WPJ	PROJECT No: HAM2018-0106
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED: LYK	DRAWING: 13
TITLE: FILL TEST LOCATION SITE PLAN D	REVISION: 0	SCALE: 1:1000
	DATE: 28.05.19	SHEET: A3 L

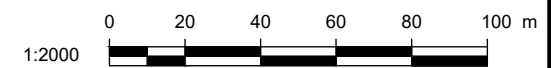



LEGEND:

- STAGE BOUNDARY
- CUT CONTOURS
- FILL CONTOURS
- NUCLEAR DENSITY METER (NDM) TEST LOCATION

NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.
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5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.



	CLIENT:	LAKESIDE DEVELOPMENTS (2017) LTD	
	PROJECT:	LAKESIDE DEVELOPMENT, TE KAUWHATA	
	TITLE:	FILL TEST LOCATION SITE PLAN E	
	DRAWN:	WPJ	PROJECT No: HAM2018-0106
	CHECKED:	LYK	DRAWING: 14
	REVISION:	0	SCALE: 1:2000
	DATE:	28.05.19	SHEET: A3 L

Appendix A: Suitability Statement & Lot Summary Report

APPENDIX 2A: SCHEDULE 2A (NZS 4404:2010) STATEMENT OF PROFESSIONAL OPINION ON SUITABILITY OF LAND FOR BUILDING CONSENT

Development: Lakeside Development Stages 1, 2 and 3

Developer: Lakeside Developments (2017) Limited

Location: 98 Scott Street, Te Kauwhata

I, Kenneth John Read
(Full name)

**of CMW Geosciences (NZ) Ltd
Partnership, 5 Hill Street Hamilton**
(Name and address of firm)

Hereby confirm that:

1. I am a geo-professional as defined in **Clause 1.3.3 of Section 1 (General Information) of the Regional Infrastructure Technical Specification (RITS)** and was retained by the developer as the geo-professional on the above development.
2. The extent of preliminary investigations are described in the following Report(s):

Earthtech Stage 1 Geotechnical Design Report (ref: 4036-3), December 2017; Earthtech Stage 2 Geotechnical Design Report (ref 4036-4), January 2017;
Earthtech Rata Street Extension Geotechnical Design Report (ref 4036-5), February 2017

and the conclusions and recommendations of that/those document(s) have been re-evaluated in the preparation of this report.
3. The extent of my inspections during construction, and the results of all tests and/or re-evaluations carried out are as described in my geotechnical completion report:

Number: HAM2018-0106AM Rev 5

Date: 05 August 2019

4. In my professional opinion, not to be construed as a guarantee, I consider that (delete as appropriate):
 - (a) The earth fills shown on the attached Drawings No 04 to 06 within the subject lots of the above report have been placed in compliance with the requirements of the Waikato District Council and the project specification.
 - (b) The completed works take into account land slope and foundation stability considerations, subject to the appended foundation recommendations and earthworks restrictions (which should be read in conjunction with the appended final site contour plan).
 - (c) Subject to 3(a) and 3(b) of this Schedule, the filled ground is suitable for the erection of buildings designed according to NZS 3604 provided that:
 - i. The recommendations and procedures given in Geotechnical Completion Report No. 1, Ref HAM2018-0106AM Rev 5, dated 05 August 2019 are followed.

- (d) This professional opinion is furnished to the TA and the developer for their purposes alone on the express condition that it will not be relied upon by any other person and does not remove the necessity for the normal inspection of foundation conditions at the time of erection of any building.
- (e) This certificate shall be read in conjunction with the geotechnical reports referred to in Clause 2 above and shall not be copied or reproduced except in conjunction with the full geotechnical completion report.

Signed:



Date: 05 August 2019

Full name: Kenneth John Read

Title: Principal Geotechnical Engineer

Professional qualifications: BSc GEology, MSC Engineering Geology, CPEng CMENZ

Copyright waived¹

¹ Note : The above schedule is a copy of that included in NZS 4404:2010. The form is identical to Schedule 2A except in Clause 1 where the definition of a 'geo-professional' is referred to the definitions included in Section 1 of this RITS instead of the definitions included in NZS4404:2010.

Table 1: Lot Summary Table

Lot No:	Area (m ²)	Stage	Subsurface Data						Foundations		Topsoil Thickness (m) as provided by Candor3.	Building Restriction Line	Comments
			DCP (average blows per 100mm)	VSS (average kPa over upper 2m)	Fill		Cut		Conventional Shallow Foundation to NZS 3604:2011	Specific Design			
					Y/N	Depth (m)	Y/N	Depth (m)					
1	422	3	-	131	Y	0.5	Y	1.5	Y	N	0.20	N	
2	362	3	11	131	Y	2.0	Y	1.0	Y	N	0.10	N	
3	362	3	12	>152	Y	2.0	Y	0.5	Y	N	0.10	N	
15	302	3	21	>200	Y	0.4	Y	-	Y	N	0.30	N	See Note 3.
16	303	3	21	>200	Y	0.4	Y	-	Y	N	0.30	N	See Note 3.
22	285	3	25	>200	Y	0.2	Y	-	Y	N	0.20	N	See Note 3.
23	285	3	25	>200	Y	0.2	Y	-	Y	N	0.25	N	See Note 3.
24	285	3	23	>200	Y	0.4	Y	-	Y	N	0.25	N	See Note 3.
25	285	3	23	>200	Y	0.4	Y	-	Y	N	0.25	N	See Note 3.
28	310	3	17	>197	N	-	Y	3.5	Y	N	0.20	N	
29	250	3	17	>197	N	-	Y	3.5	Y	N	0.20	N	
30	250	3	20	>200	N	-	Y	3.0	Y	N	0.30	N	
31	250	3	20	>200	N	-	Y	3.0	Y	N	0.35	N	
32	250	3	17	>200	N	-	Y	2.5	Y	N	0.25	N	
33	250	3	17	>200	N	-	Y	2.0	Y	N	0.30	N	
34	227	3	-	>181	N	-	Y	1.0	Y	N	0.25	N	
35	289	3	-	>181	Y	4.0	N	-	Y	N	0.20	N	
37	339	1	-	>174	Y	4.0	Y	1.0	Y	N	0.20	N	
38	340	1	-	>174	Y	4.0	N	-	Y	N	0.30	N	
39	408	1	-	>147	Y	3.5	N	-	Y	N	0.25	N	
40	409	1	-	>163	Y	3.5	N	-	Y	N	0.25	N	
41	342	1	-	>174	Y	3.5	N	-	Y	N	0.20	N	
42	342	1	-	>174	Y	3.5	Y	1.0	Y	N	0.25	N	
43	343	1	-	99	Y	3.5	Y	1.0	Y	N	0.20	N	
44	343	1	-	99	Y	2.0	Y	1.5	Y	N	0.30	N	
45	344	1	14	>193	Y	1.5	Y	1.5	Y	N	0.20	N	
46	344	1	14	>193	Y	3.5	Y	1.0	Y	N	0.20	N	
47	345	1	-	>189	Y	3.5	N	-	Y	N	0.15	N	
48	345	1	-	>189	Y	3.5	N	-	Y	N	0.15	N	
49	513	1	-	>195	Y	1.5	N	-	Y	N	0.20	N	

Notes:

1. Foundation soils are suitable to support rib-raft foundations and structures designed in accordance with NZS 3604.
2. Topsoil thickness not determined at time of reporting. Depth to be checked by Lot purchaser.
3. Some works carried out during 2017/18 season.

Table 1: Lot Summary Table

Lot No:	Area (m ²)	Stage	Subsurface Data						Foundations		Topsoil Thickness (m) as provided by Candor3.	Building Restriction Line	Comments
			DCP (average blows per 100mm)	VSS (average kPa over upper 2m)	Fill		Cut		Conventional Shallow Foundation to NZS 3604:2011	Specific Design			
					Y/N	Depth (m)	Y/N	Depth (m)					
50	520	1	-	>164	Y	1.0	N	-	Y	N	0.15	N	
51	520	1	-	>162	N	-	Y	2.5	Y	N	0.15	N	
52	512	1	-	>158	N	-	Y	1.5	Y	N	0.15	N	
53	350	1	-	143	N	-	Y	1.5	Y	N	0.15	N	
54	350	1	-	143	N	-	Y	1.5	Y	N	0.15	N	
58	437	2	-	>177	Y	1.0	Y	2.0	Y	N	0.10	N	
60	232	2	7	>194	N	-	Y	1.5	Y	N	0.20	N	
61	232	2	12	55	N	-	Y	2.0	Y	N	0.20	N	
62	232	2	12	55	N	-	Y	2.0	Y	N	0.20	N	
63	232	2	6	>157	N	-	Y	2.0	Y	N	0.25	N	Further investigation required if building platform moves.
64	304	2	5	>200	N	-	Y	2.5	Y	N	0.25	N	Further investigation required if building platform moves.
84	541	2	-	155	N	-	Y	1.0	Y	N	0.15	N	See Note 3.
87	266	2	-	>194	Y	3.5	N	-	Y	N	0.20	N	
88	266	2	-	>194	Y	4.0	N	-	Y	N	0.30	N	
89	277	2	-	>194	Y	4.0	N	-	Y	N	0.25	N	
90	298	2	-	>191	Y	4.0	N	-	Y	N	0.20	N	
91	435	2	-	>189	Y	4.0	N	-	Y	N	0.15	N	
92	262	2	-	192	N	-	N	-	Y	N	0.20	N	See Note 3.
93	262	2	-	192	N	-	Y	0.5	Y	N	0.35	N	See Note 3.
94	262	2	12	>200	N	-	Y	0.5	Y	N	0.35	N	See Note 3.
95	262	2	12	>200	N	-	Y	0.5	Y	N	0.35	N	See Note 3.
96	263	2	12	>200	N	-	Y	0.5	Y	N	0.35	N	See Note 3.
97	263	2	12	>200	N	-	Y	0.5	Y	N	0.25	N	See Note 3.
116	568	2	-	>192	Y	2.5	N	-	Y	N	0.20	N	
117	568	2	-	>195	Y	2.5	N	-	Y	N	0.20	N	
118	569	2	-	>185	Y	2.0	N	-	Y	N	0.20	N	
266	674	1	-	>182	Y	2.5	N	-	Y	N	0.30	N	
267	669	1	-	>200	Y	2.5	N	-	Y	N	0.25	N	
268	662	1	-	>184	Y	3.0	N	-	Y	N	0.15	N	
269	660	1	-	>181	Y	3.0	N	-	Y	N	0.20	N	

Notes:

1. Foundation soils are suitable to support rib-raft foundations and structures designed in accordance with NZS 3604.
2. Topsoil thickness not determined at time of reporting. Depth to be checked by Lot purchaser.
3. Some works carried out during 2017/18 season.

Table 1: Lot Summary Table

Lot No:	Area (m ²)	Stage	Subsurface Data						Foundations		Topsoil Thickness (m) as provided by Candor3.	Building Restriction Line	Comments
			DCP (average blows per 100mm)	VSS (average kPa over upper 2m)	Fill		Cut		Conventional Shallow Foundation to NZS 3604:2011	Specific Design			
					Y/N	Depth (m)	Y/N	Depth (m)					
270	659	1	-	>182	Y	4.0	N	-	Y	N	0.20	N	
273	448	2	-	>164	Y	5.0	N	-	Y	N	0.15	N	
274	449	2	-	>176	Y	4.5	N	-	Y	N	0.20	N	
275	464	2	-	>192	Y	4.5	N	-	Y	N	0.25	N	
276	453	2	-	>187	Y	4.0	N	-	Y	N	0.30	N	
277	453	2	-	>200	Y	4.0	N	-	Y	N	0.25	N	
279	479	2	-	>200	Y	2.0	N	-	Y	N	0.25	N	
281	588	1	-	>199	Y	1.5	N	-	Y	N	-	N	See Note 2.
282	767	1	-	>200	Y	1.5	N	-	Y	N	-	N	See Note 2.
283	351	1	-	122	N	-	Y	2.0	Y	N	0.15	N	
284	351	1	-	122	N	-	Y	2.0	Y	N	0.20	N	
285	352	1	-	161	N	-	Y	1.5	Y	N	0.2	N	
286	352	1	-	161	N	-	Y	1.5	Y	N	0.3	N	
289	385	1	-	>183	N	-	Y	1.5	Y	N	0.1	N	
290	451	1	-	>183	N	-	Y	2.0	Y	N	0.15	N	
291	458	1	-	>172	N	-	Y	2.5	N	Y	0.2	N	See Note 1.
292	289	1	-	>176	N	-	Y	2.0	Y	N	0.15	N	
293	289	1	-	>176	N	-	Y	2.0	Y	N	0.2	N	
294	289	1	-	>157	N	-	Y	2.5	Y	N	0.25	N	
295	289	1	-	>157	N	-	Y	2.5	Y	N	0.15	N	
296	548	1	-	>198	Y	1.0	Y	1.5	Y	N	0.3	N	
297	490	1	-	>185	N	-	Y	1.0	Y	N	0.2	N	
298	496	1	-	>179	N	-	Y	2.0	Y	N	0.25	N	
299	486	1	5	>175	N	-	Y	2.5	Y	N	0.25	N	
300	279	1	11	-	N	-	Y	2.5	Y	N	0.2	N	
301	279	1	11	-	N	-	Y	3.0	Y	N	0.2	N	
302	279	1	-	>174	N	-	Y	3.0	Y	N	0.2	N	
303	279	1	-	>128	N	-	Y	3.0	Y	N	0.15	N	
304	279	1	-	>174	N	-	Y	2.0	Y	N	0.25	N	
305	279	1	-	>174	N	-	Y	1.0	Y	N	0.25	N	

Notes:

1. Foundation soils are suitable to support rib-raft foundations and structures designed in accordance with NZS 3604.
2. Topsoil thickness not determined at time of reporting. Depth to be checked by Lot purchaser.
3. Some works carried out during 2017/18 season.

Table 1: Lot Summary Table

Lot No:	Area (m ²)	Stage	Subsurface Data						Foundations		Topsoil Thickness (m) as provided by Candor3.	Building Restriction Line	Comments
			DCP (average blows per 100mm)	VSS (average kPa over upper 2m)	Fill		Cut		Conventional Shallow Foundation to NZS 3604:2011	Specific Design			
					Y/N	Depth (m)	Y/N	Depth (m)					
306	279	1	-	>200	Y	1.5	N	-	Y	N	0.2	N	
307	279	1	-	>200	Y	3.0	N	-	Y	N	0.2	N	
308	488	1	-	>182	Y	5.0	N	-	Y	N	0.2	N	
309	496	1	-	>196	Y	5.5	N	-	Y	N	0.3	N	
310	488	1	-	>189	Y	5.5	N	-	Y	N	-	N	See Note 2.
311	280	1	-	>200	Y	3.5	N	-	Y	N	0.25	N	
312	279	1	9	134	Y	2.0	N	-	Y	N	0.3	N	
313	279	1	8	>200	N	-	Y	1.5	N	Y	-	N	See Notes 1 & 2.
314	279	1	11	-	N	-	Y	2.0	N	Y	-	N	See Notes 1 & 2.
315	279	1	6	-	N	-	Y	3.0	N	Y	-	N	See Notes 1 & 2.
316	279	1	4	149	N	-	Y	3.0	N	Y	-	N	See Notes 1 & 2.
317	279	1	5	-	N	-	Y	3.0	N	Y	-	N	See Notes 1 & 2.
318	281	1	5	-	N	-	Y	2.5	N	Y	-	N	See Notes 1 & 2.
319	510	1	-	>167	N	-	Y	2.5	Y	N	0.25	N	
320	510	1	-	>111	N	-	Y	2.5	Y	N	0.2	N	
321	510	1	4	>195	N	-	Y	3.0	Y	N	0.2	N	
322	424	1	7	-	N	-	Y	3.0	Y	N	0.15	N	
323	424	1	7	>200	N	-	Y	2.5	Y	N	0.15	N	
324	425	1	14	>200	Y	1.0	Y	2.0	Y	N	0.2	N	
325	424	1	-	>173	Y	0.5	Y	1.0	Y	N	0.1	N	
326	424	1	-	>187	Y	1.5	N	-	Y	N	-	N	See Note 2.
336	276	1	-	>200	Y	2.0	N	-	Y	N	-	N	See Note 2.
337	272	1	-	>200	Y	2.0	N	-	Y	N	0.2	N	
338	275	1	-	>161	N	1.0	Y	-	Y	N	0.25	N	
339	265	1	-	>161	Y	0.5	Y	1.0	Y	N	0.15	N	
340	272	1	5	>178	N	-	Y	2.5	Y	N	0.15	N	
341	276	1	6	>200	N	-	Y	2.5	Y	N	0.15	N	
342	280	1	7	>124	N	-	Y	2.5	Y	N	0.15	N	
343	324	1	7	>124	N	-	Y	2.0	Y	N	0.25	N	
344	423	1	9	>173	Y	0.5	Y	1.0	Y	N	0.15	N	

Notes:

1. Foundation soils are suitable to support rib-raft foundations and structures designed in accordance with NZS 3604.
2. Topsoil thickness not determined at time of reporting. Depth to be checked by Lot purchaser.
3. Some works carried out during 2017/18 season.

Table 1: Lot Summary Table

Lot No:	Area (m ²)	Stage	Subsurface Data						Foundations		Topsoil Thickness (m) as provided by Candor3.	Building Restriction Line	Comments
			DCP (average blows per 100mm)	VSS (average kPa over upper 2m)	Fill		Cut		Conventional Shallow Foundation to NZS 3604:2011	Specific Design			
					Y/N	Depth (m)	Y/N	Depth (m)					
345	312	1	8	>187	Y	1.0	Y	0.5	Y	N	-	N	See Note 2.
346	312	1	-	>200	Y	2.0	N	-	Y	N	-	N	See Note 2.
347	312	1	15	>200	Y	3.0	N	-	Y	N	-	N	See Note 2.
348	312	1	15	>200	Y	5.0	N	-	Y	N	-	N	See Note 2.
349	340	1	-	>200	Y	6.5	N	-	Y	N	-	N	See Note 2.
350	263	1	-	>200	Y	6.5	N	-	Y	N	-	N	See Note 2.
351	263	1	-	181	Y	6.5	N	-	Y	N	-	N	See Note 2.
352	263	1	-	181	Y	7.0	N	-	Y	N	-	N	See Note 2.
353	360	1	-	>177	Y	7.0	N	-	Y	N	-	N	See Note 2.
354	324	1	-	>195	Y	6.0	N	-	Y	N	-	N	See Note 2.
355	306	1	-	>195	Y	5.0	N	-	Y	N	-	N	See Note 2.
356	287	1	-	>200	Y	4.5	N	-	Y	N	-	N	See Note 2.
357	545	1	8	>139	Y	3.0	Y	0.5	Y	N	-	N	See Note 2.
358	440	1	-	>184	N	-	Y	2.5	N	Y	0.20	N	See Note 1.
359	463	1	-	>189	Y	1.0	Y	1.0	Y	N	0.15	N	

Notes:

1. Foundation soils are suitable to support rib-raft foundations and structures designed in accordance with NZS 3604.
2. Topsoil thickness not determined at time of reporting. Depth to be checked by Lot purchaser.
3. Some works carried out during 2017/18 season.

**Appendix B: Relevant Pre-Development
Field Investigation - Plans,
Cross Sections and Data**



Note: Existing contours, cut/fill contours and design contours provided by Candor 4 31 October 2017

LEGEND

Investigations

- MA5 - Machine Borehole (Maunsell (2008))
- HA3 - Hand Auger (Maunsell (2008))
- P4 - Hand Auger and Percolation (Maunsell (2008))
- CPT102 - CPT (Te Kauwhata Bypass (2009))
- HA201 - Hand Auger (Te Kauwhata Bypass (2009))
- 20 - CPT (Earthtech (2016))
- (e) - Standpipe (Earthtech (2016))
- 13 - Hand Auger (Earthtech (2016))
- TP2-02 - Test Pit (Earthtech (2017))
- HA201 - Hand Auger (Sales Precinct) (Earthtech (2017))
- HA2-01 - Hand Auger (Earthtech (2017))
- CPT2-01 - CPT (Earthtech (2017))
- BH2-01 - Machine Borehole (Earthtech (2017))

Note: 2008/2009 and Sales Precinct investigation locations are approximate.

- Old River Channel (Blue arrow)
- Floodline from Candor 3 (2016) (Blue line)
- Whangamarino Formation (Wg) (Brown contour lines)
- Holocene Alluvium Floodplain Alluvium (Fa) (Light green)
- Holocene Alluvium Gully Floor Alluvium (ga) (Dark green)

0m 25 50 75 100m
Scale 1:2500
4036-AHN-Stage Drawing Base-Flg 1 Series-A



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P.O. Box 721, Pukekohe
Phone: 64 9 238 3669
Email: admin@earthtech.co.nz

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Stage 1 Site Plan

DRAWN:	A.N	CHECKED:	A.N
TRACED:	C.M	DATE:	21/12/17

SCALE (A3):
1:2500

DRAWING NO.:	FIG. 1.1
VERSION:	A
REF:	4036

LEGEND

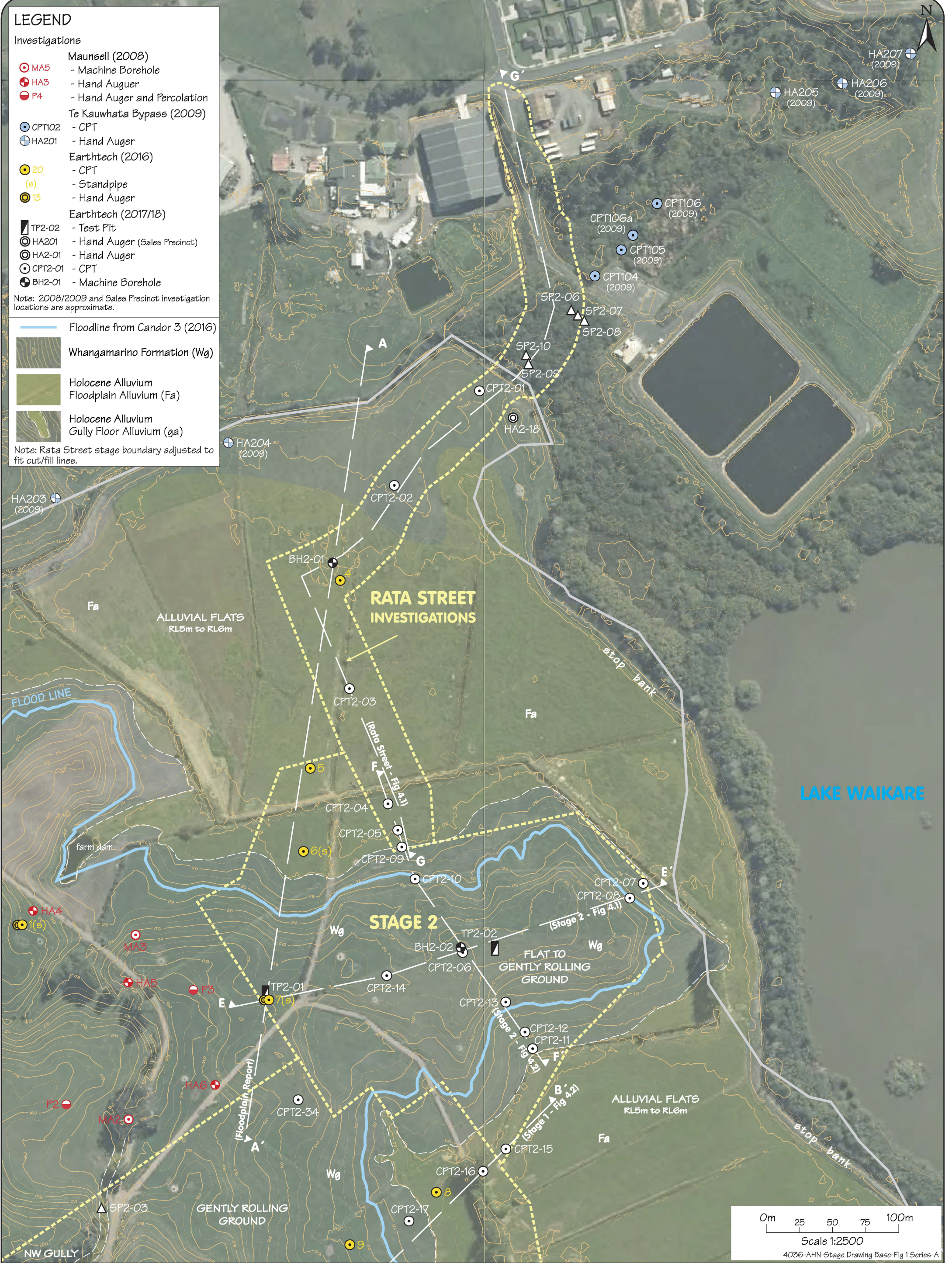
Investigations

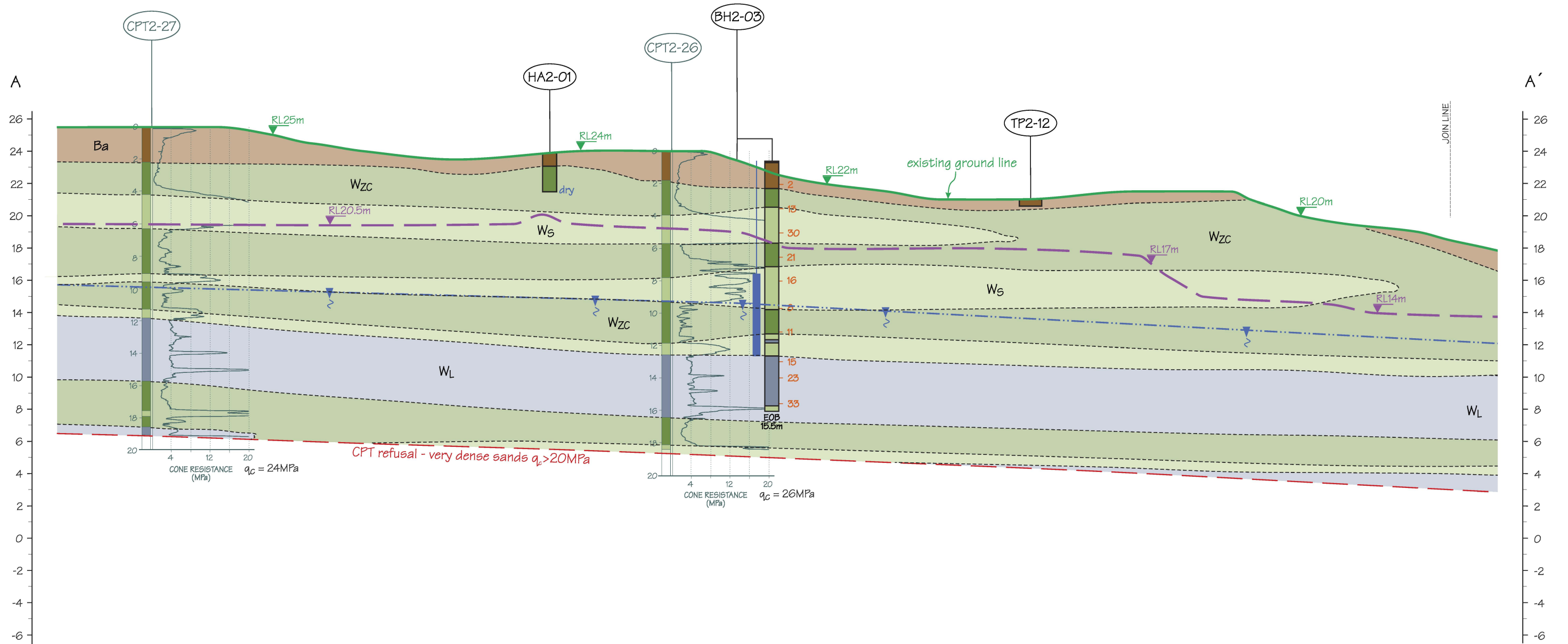
- MA5 - Maunsell (2008) - Machine Borehole
- HA3 - Maunsell (2008) - Hand Auger
- P4 - Maunsell (2008) - Hand Auger and Percolation
- CPT102 - Te Kauwhata Bypass (2009) - CPT
- HA201 - Te Kauwhata Bypass (2009) - Hand Auger
- Earthtech (2016)
 - 20 - CPT
 - 6 - Standpipe
 - 13 - Hand Auger
- Earthtech (2017/18)
 - TP2-02 - Test Pit
 - HA201 - Hand Auger (Sales Precinct)
 - HA2-01 - Hand Auger
 - CPT2-01 - CPT
 - BH2-01 - Machine Borehole

Note: 2008/2009 and Sales Precinct investigation locations are approximate.

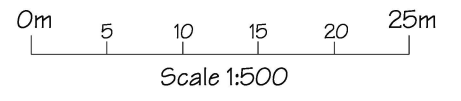
- Floodline from Candor 3 (2016)
- Whangamarino Formation (Wg)
- Holocene Alluvium Floodplain Alluvium (Fa)
- Holocene Alluvium Gully Floor Alluvium (ga)

Note: Rata Street stage boundary adjusted to fit cut/fill lines.





Whangamarino Formation		Holocene Alluvium	
Ba	Brown Ash	Upper Holocene	
Wzc	Whangamarino Silts and Clays	Lower Holocene	
Ws	Whangamarino Sands		
WL	Lignite		



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4036-AHN-R4036-3-Stage 1-Fig 4.1-A_C-A



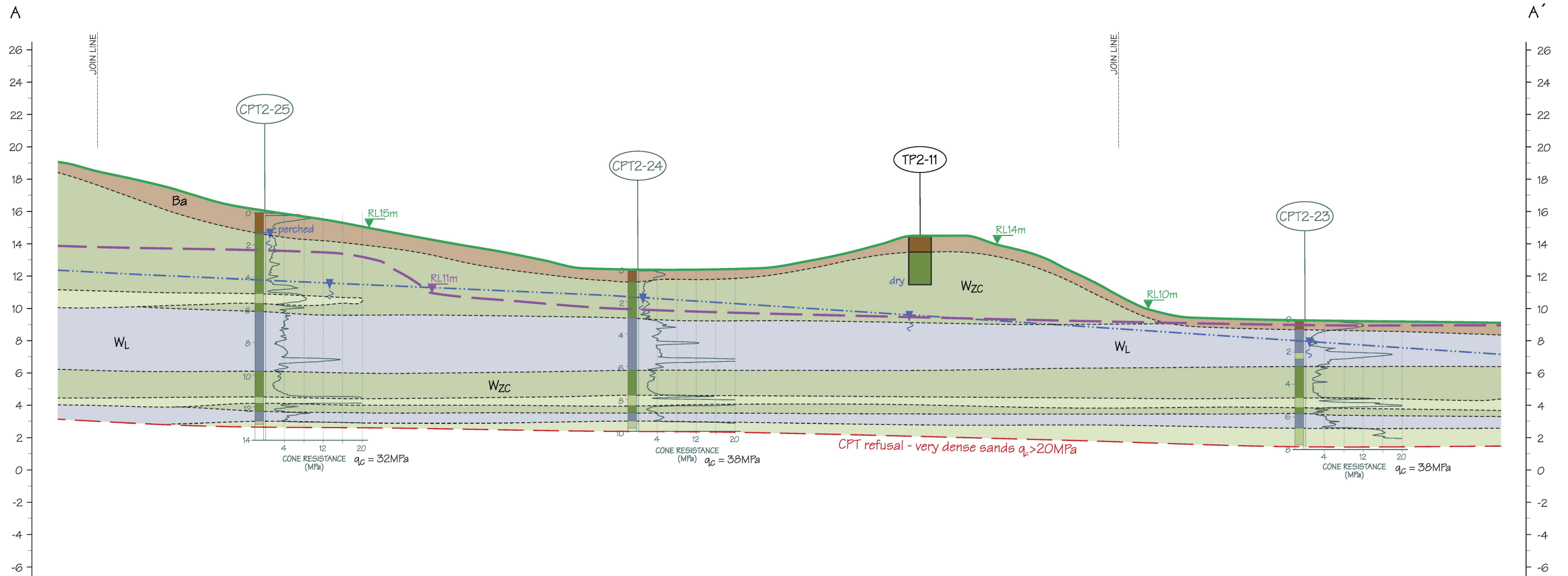
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Stage 1 Cross Section A-A' (Page 1)

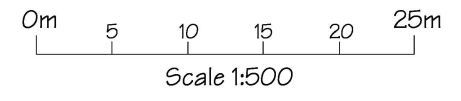
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DRAWING NO.:	FIG. 4.1A
VERSION:	A
REF:	4036



LEGEND

Whangamarino Formation		Holocene Alluvium	
Ba	Brown Ash	Upper Holocene	
Wzc	Whangamarino Silts and Clays	Lower Holocene	
Ws	Whangamarino Sands		
Wl	Lignite		



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4036-AHN-R4036-3-Stage 1-Fig 4.1A_C-A



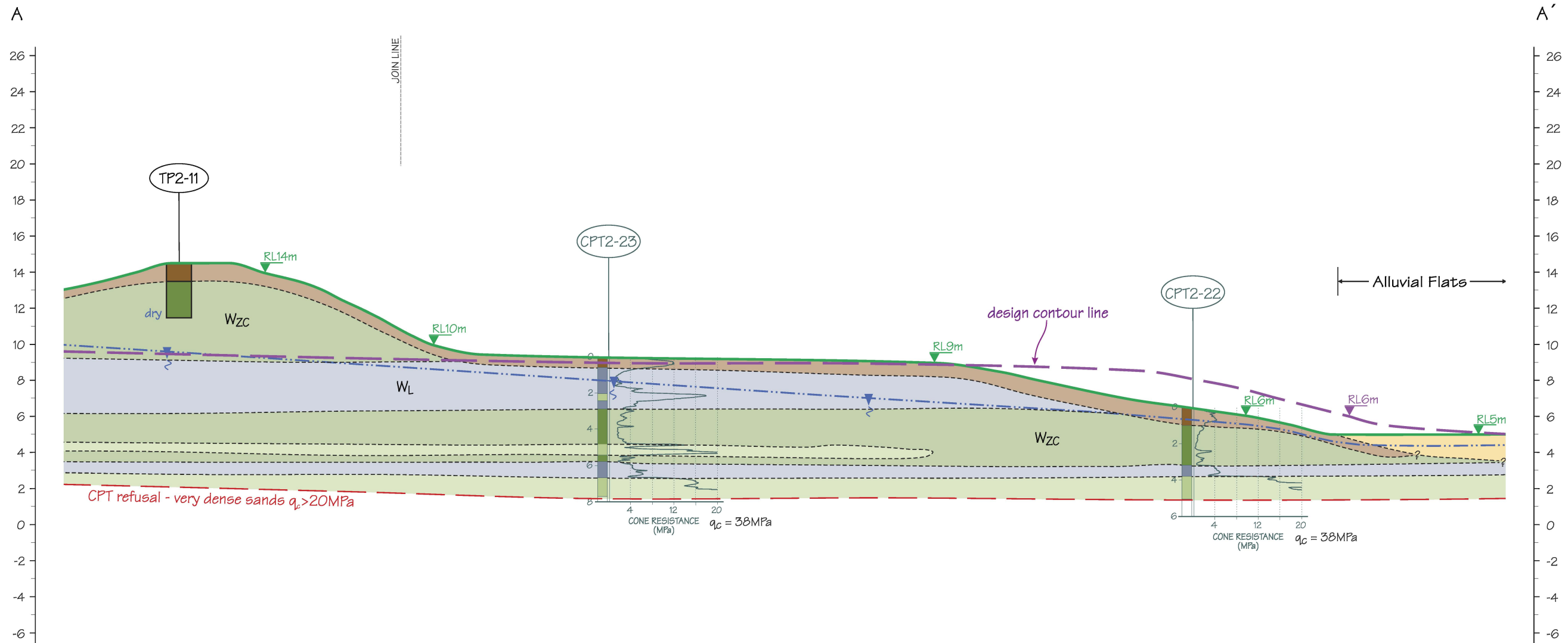
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Stage 1 Cross Section A-A' (Page 2)

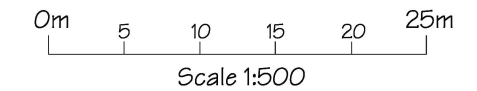
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DRAWING NO.:	FIG. 4.1B
VERSION:	A
REF:	4036



LEGEND

Whangamarino Formation		Holocene Alluvium	
Ba	Brown Ash	Upper Holocene	
Wzc	Whangamarino Silts and Clays	Lower Holocene	
Ws	Whangamarino Sands		
Wl	Lignite		



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4036-AHN-R4036-3-Stage 1-Fig 4.1A_C-A



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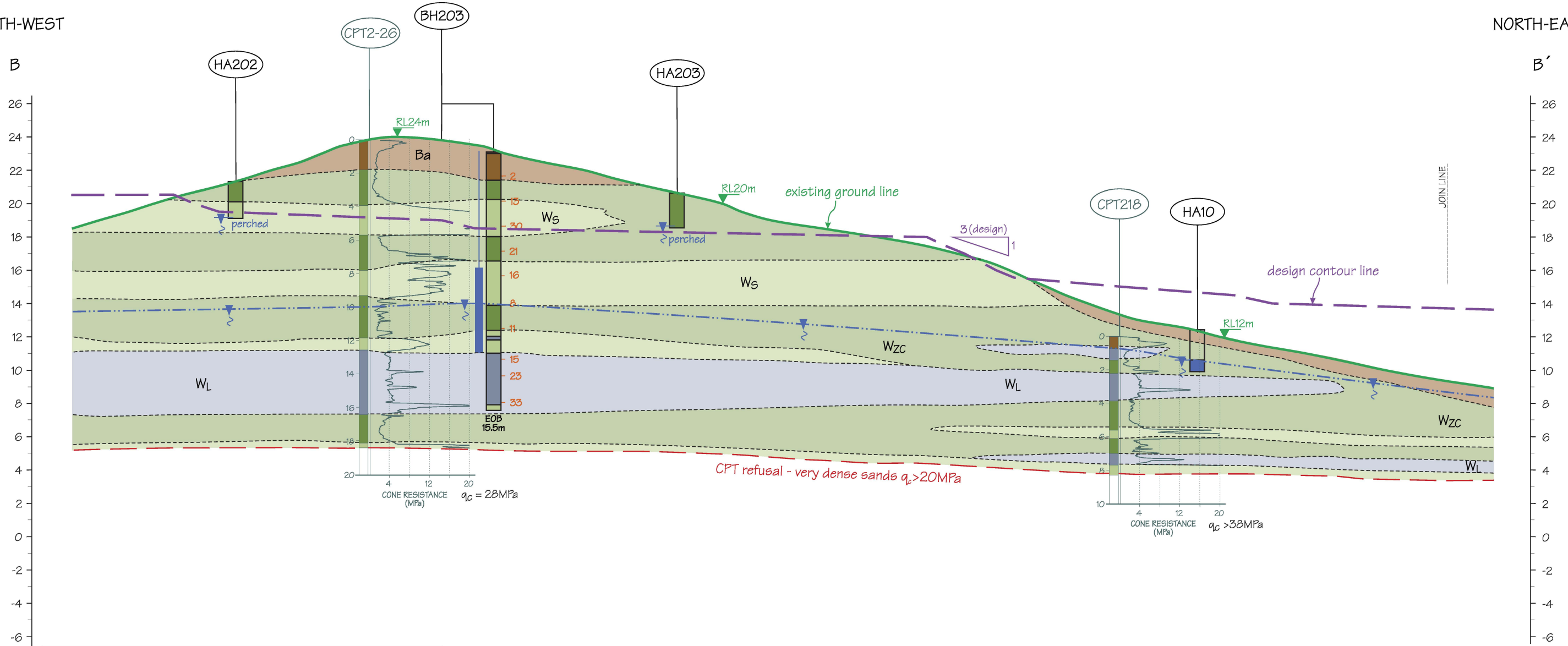
Stage 1 Cross Section A-A' (Page 3)

DRAWING NO.:
FIG. 4.1C
 VERSION: A
 REF: 4036

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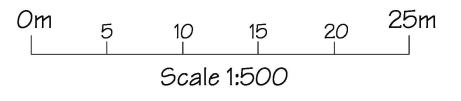
SOUTH-WEST

NORTH-EAST



LEGEND

Whangamarino Formation		Holocene Alluvium	
Ba	Brown Ash	Upper Holocene	
WzC	Whangamarino Silts and Clays	Lower Holocene	
Ws	Whangamarino Sands		
WL	Lignite		



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4036-AHN-R4036-3-Stage 1-Fig 4.2A_B-A



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Stage 1 Cross Section B-B' (Page 1)

DRAWING NO.:

FIG. 4.2A

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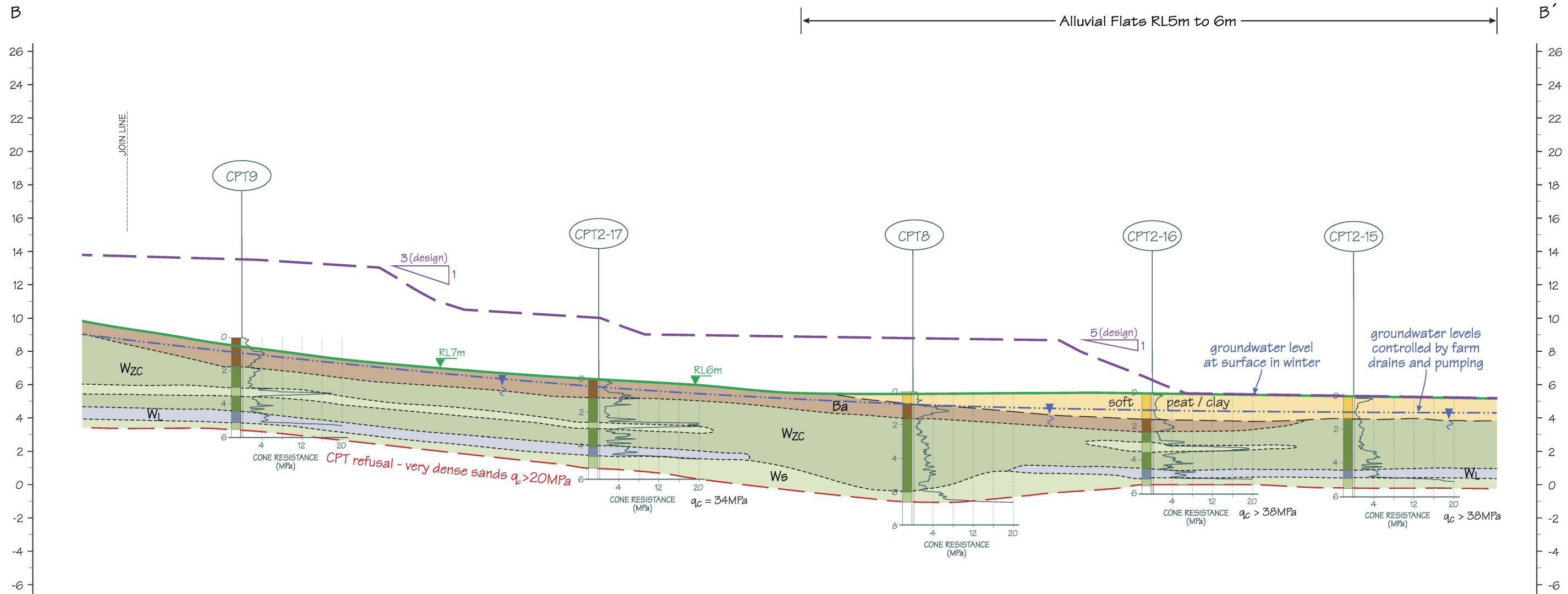
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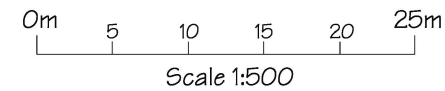
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SOUTH-WEST

NORTH-EAST



Whangamarino Formation		Holocene Alluvium	
Ba	Brown Ash	Upper Holocene	
Wzc	Whangamarino Silts and Clays	Lower Holocene	
Ws	Whangamarino Sands		
Wl	Lignite		



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4036-AHN-R4036-3-Stage 1-Fig 4.2A_B-A



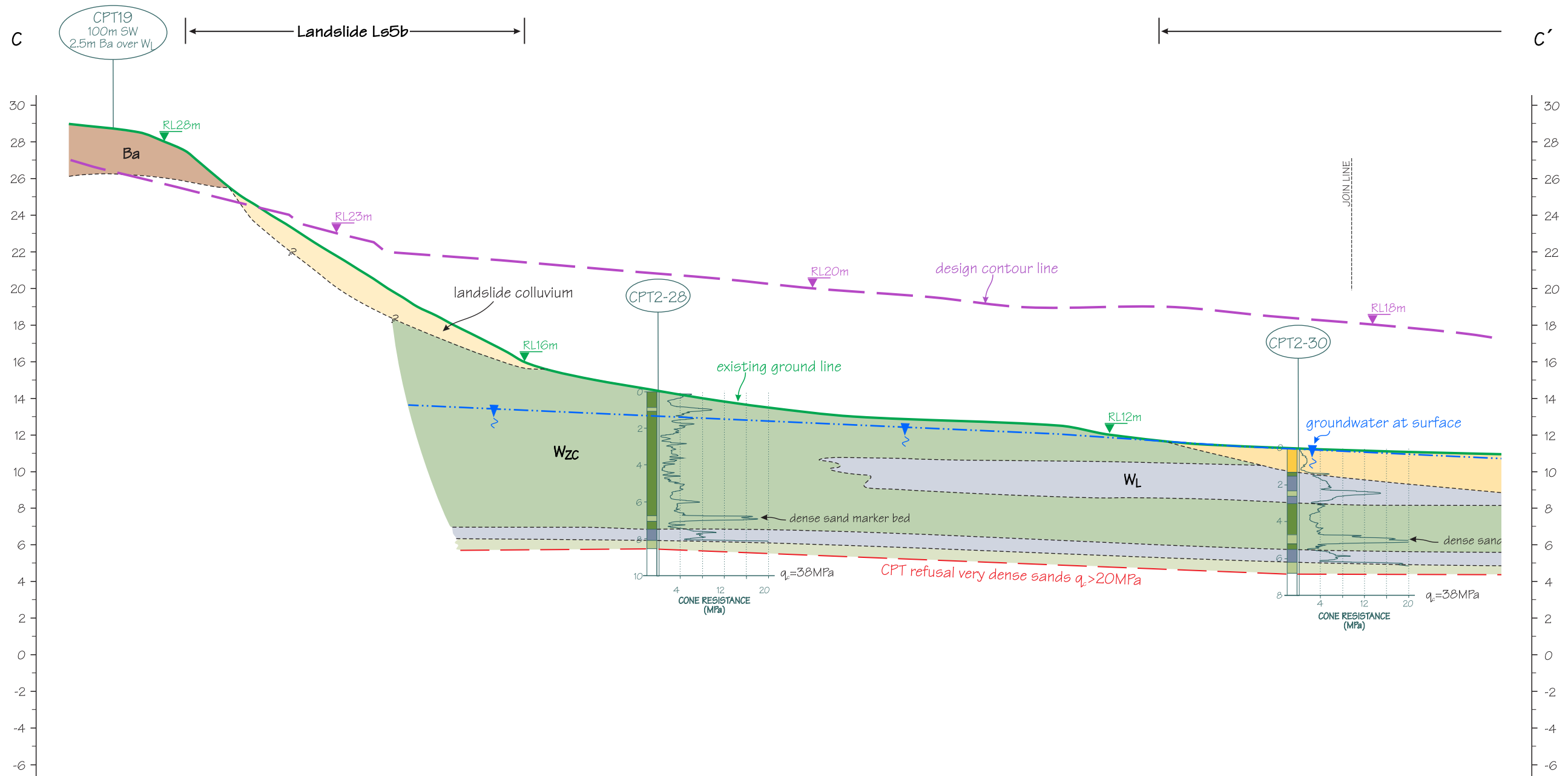
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Stage 1 Cross Section B-B' (Page 2)

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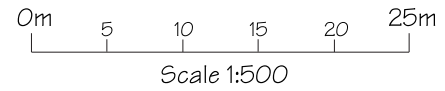
FIG. 4.2B

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LEGEND

Whangamarino Formation		Holocene Alluvium	
Ba	Brown Ash	Upper Holocene	
Wzc	Whangamarino Silts and Clays	Lower Holocene	
Ws	Whangamarino Sands		
Wl	Lignite		



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4036-AHN-R4036-3-Stage 1-Fig 4.3A_B-A



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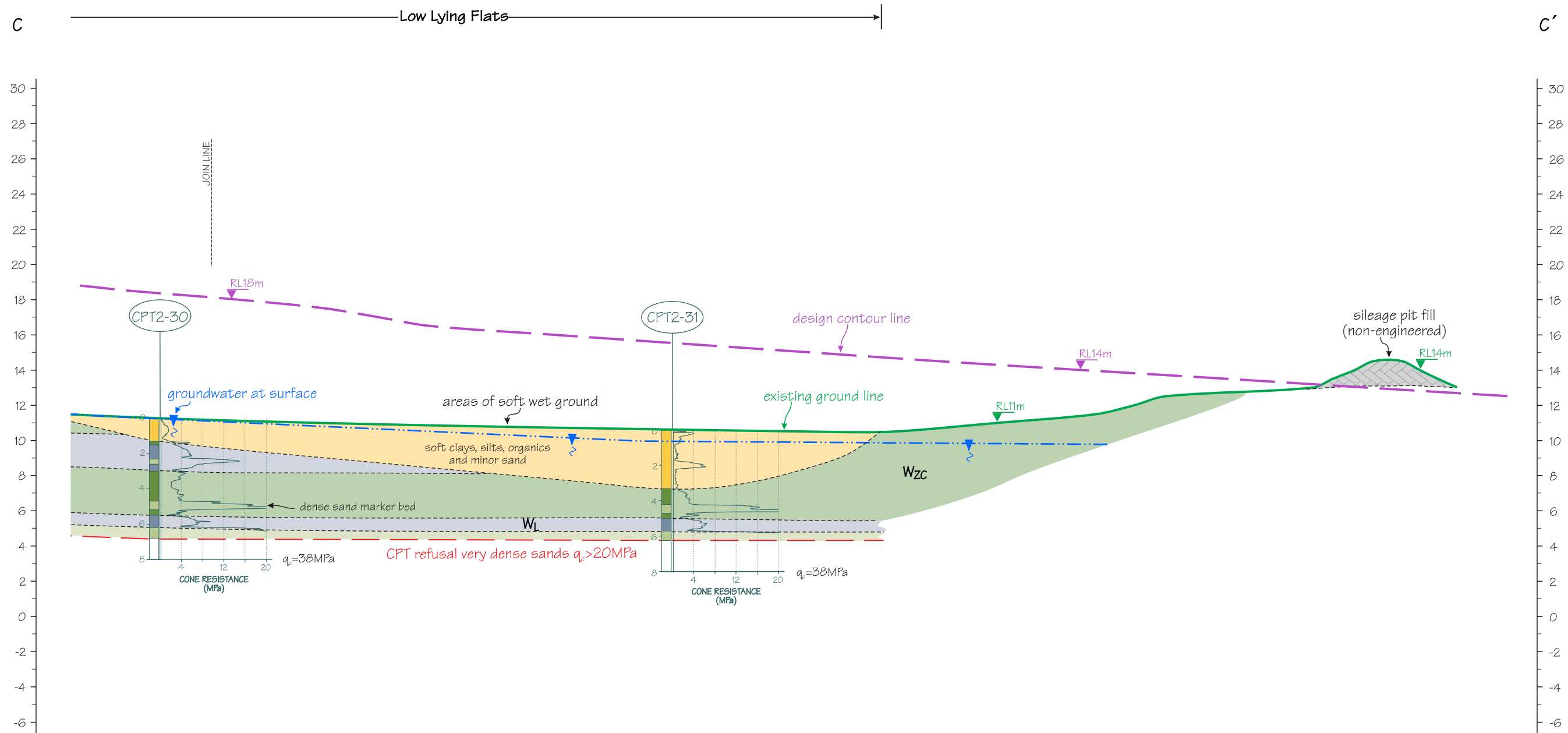
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Stage 1 Cross Section C-C' - Page 1

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TRACED: C.M/S.H	DATE: 21/12/17	1:500(h) 1:250(v)	REF: 4036

DRAWING NO.:

FIG. 4.3A



LEGEND

Whangamarino Formation		Holocene Alluvium	
Ba	Brown Ash	Upper Holocene	
Wzc	Whangamarino Silts and Clays	Lower Holocene	
Ws	Whangamarino Sands		
Wl	Lignite		

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4036-AHN-R4036-3-Stage 1-Fig 4.3A_B-A



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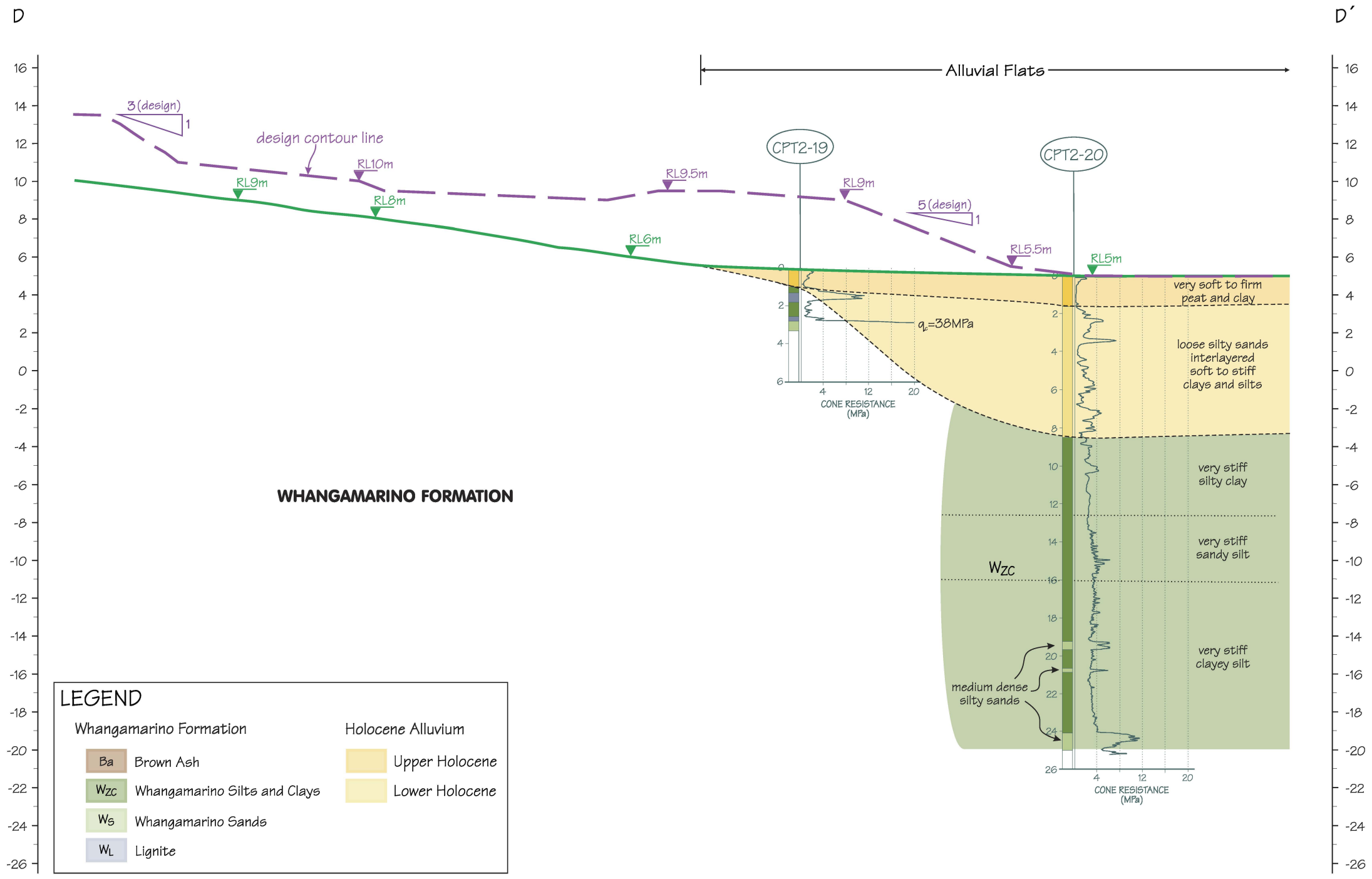
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Stage 1 Cross Section C-C' - Page 2

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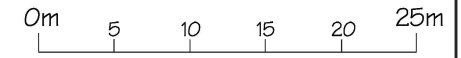
FIG. 4.3B

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LEGEND

Whangamarino Formation		Holocene Alluvium	
Ba	Brown Ash	Upper	Upper Holocene
Wzc	Whangamarino Silts and Clays	Lower	Lower Holocene
Ws	Whangamarino Sands		
Wl	Lignite		



Scale 1:500

4036-AHN-R4036-3-Stage 1-Fig 4.4-A

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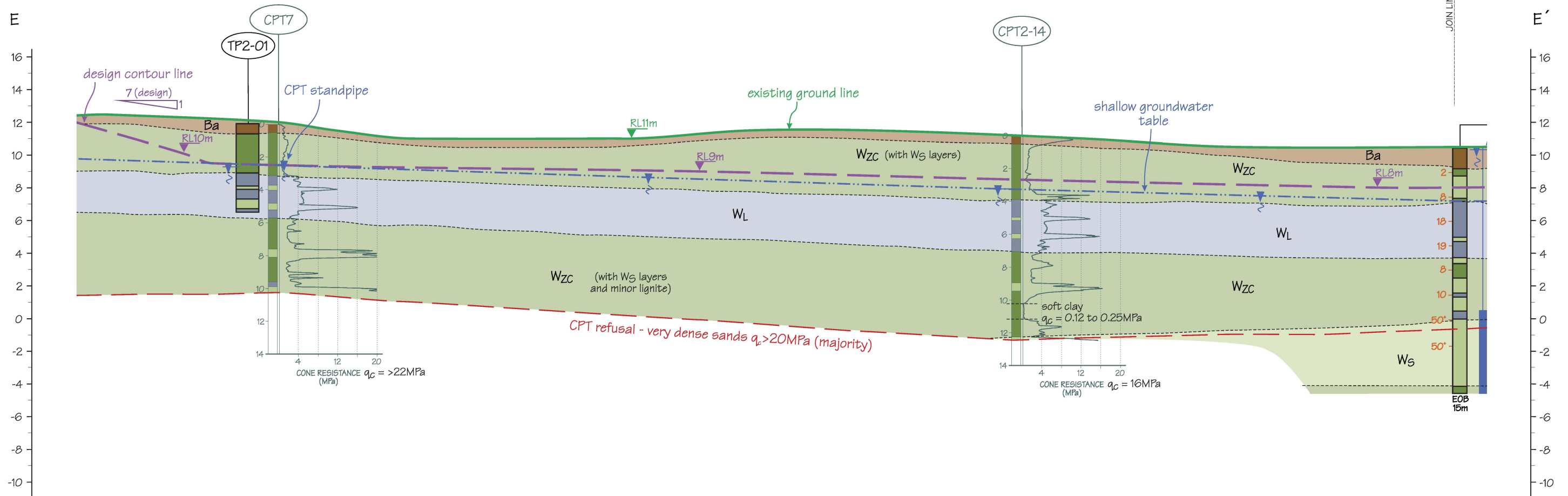
Stage 1 Cross Section D-D'

DRAWN:	RK	CHECKED:	RK	SCALE (A3):
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DRAWING NO.:	FIG. 4.4
VERSION:	A
REF:	4036

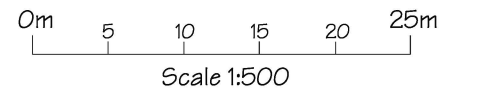
WEST

EAST



LEGEND

Whangamarino Formation		Holocene Alluvium	
Ba	Brown Ash	Hu	Upper Holocene
Wzc	Whangamarino Silts and Clays	Hl	Lower Holocene
Ws	Whangamarino Sands		
Wl	Lignite		



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4036-AHN-R4036-4-Stage 2-Fig 4.1A_B-A



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Stage 2 Cross Section E-E' (Page 1)

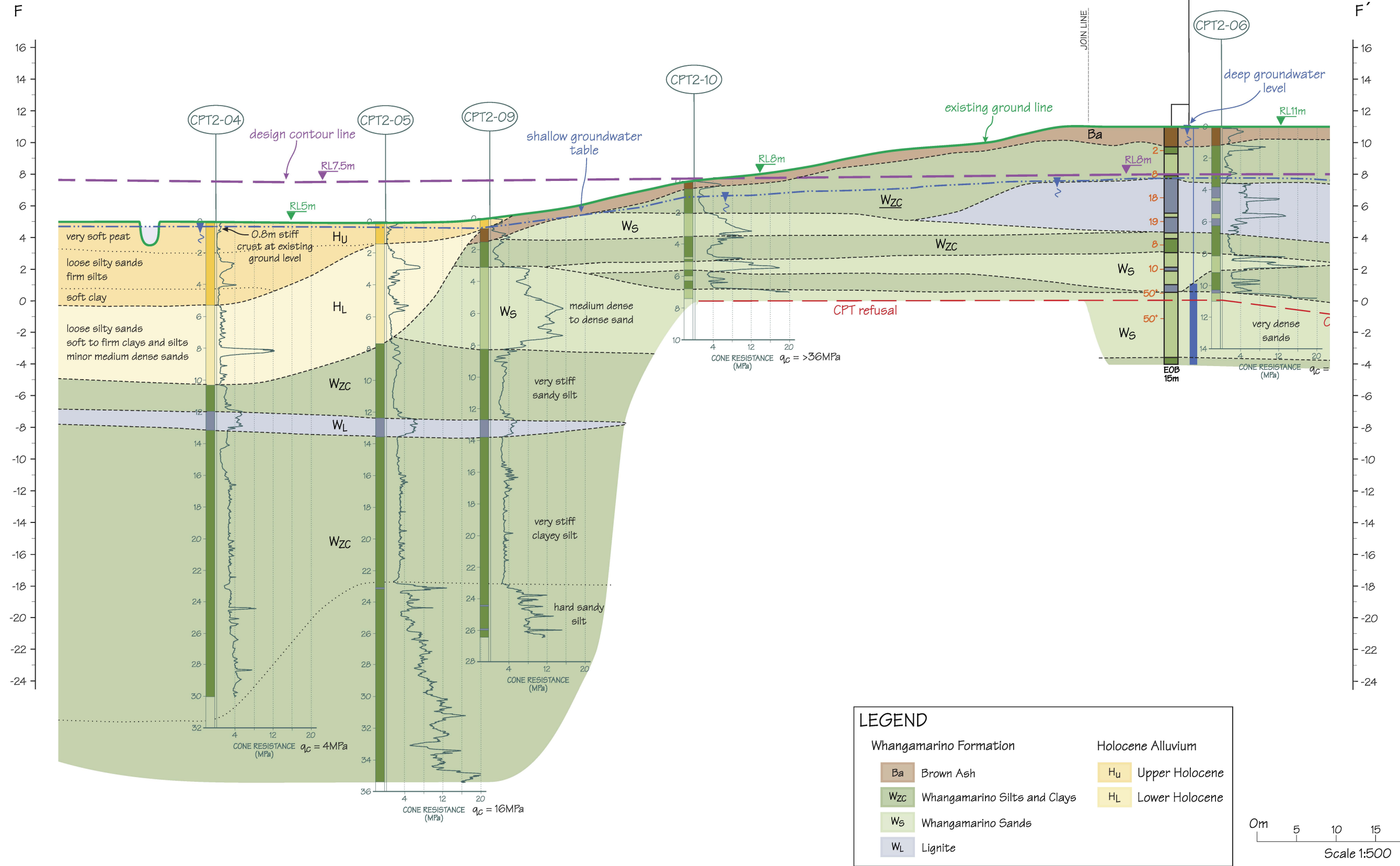
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FIG. 4.1A

DRAWN: PK	CHECKED: PK	SCALE (A3):	VERSION: A
TRACED: C.M/S.H	DATE: 17/01/18	1:500(h) 1:250(v)	REF: 4036

NORTH

SOUTH



LEGEND

Whangamarino Formation		Holocene Alluvium	
Ba	Brown Ash	H _u	Upper Holocene
W _{zc}	Whangamarino Silts and Clays	H _L	Lower Holocene
W _s	Whangamarino Sands		
W _L	Lignite		

NOT FOR CONSTRUCTION

4036-AHN-R4036-4-Stage 2-Fig 4.2A_B-A



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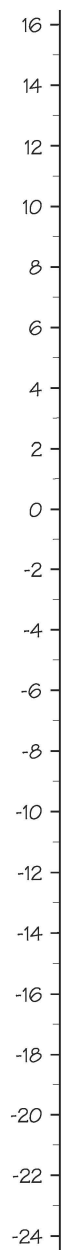
Stage 2 Cross Section F - F' (Page 1)

DRAWN:	PK	CHECKED:	PK	SCALE (A3):
TRACED:	C.M/S.H	DATE:	17/01/18	1:500(h) 1:250(v)

DRAWING NO.:	FIG. 4.2A
VERSION:	A
REF:	4036

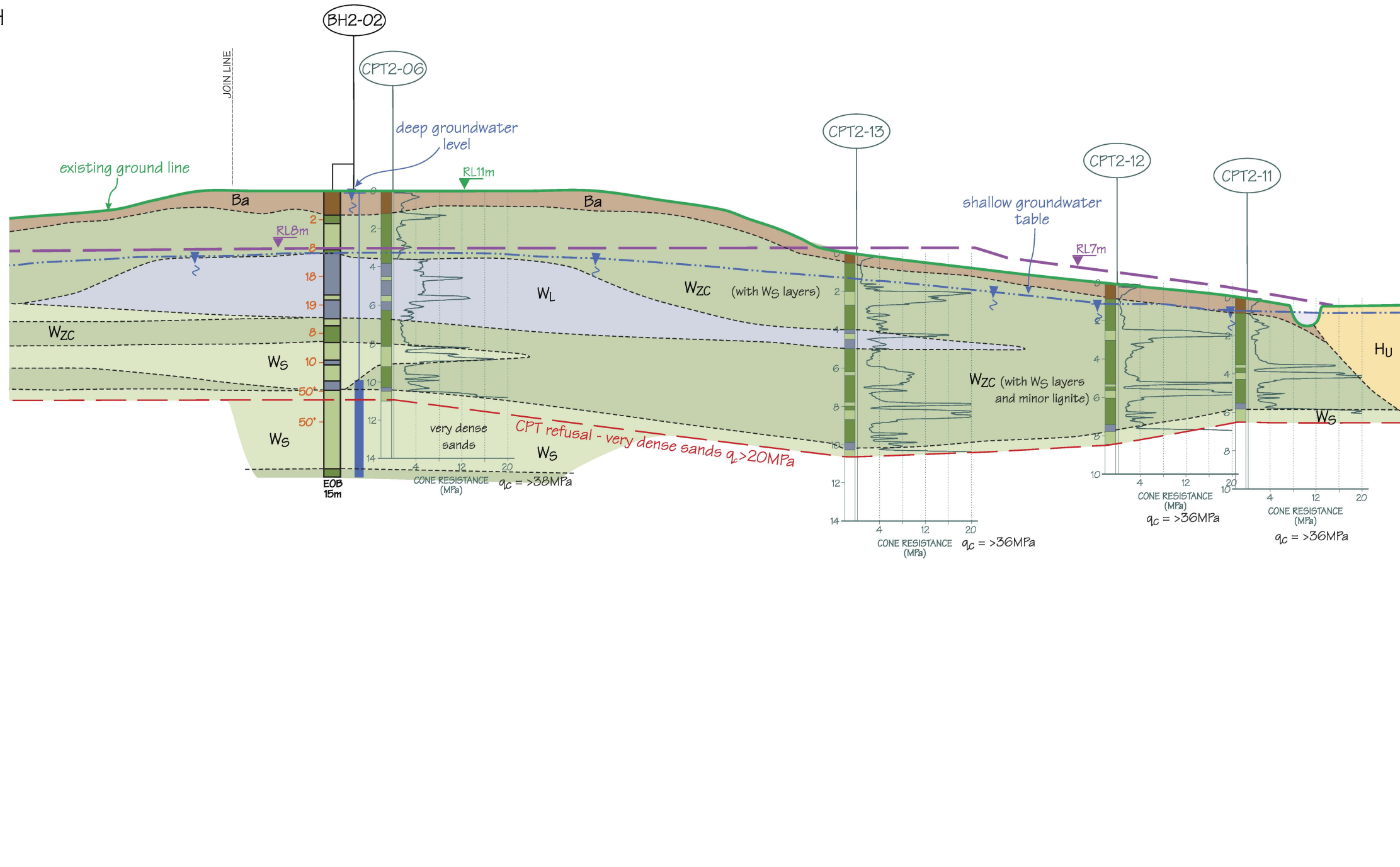
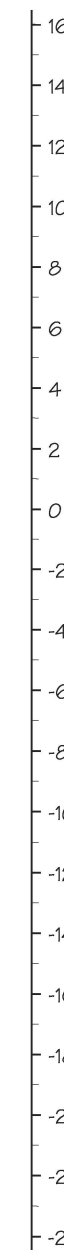
NORTH

F



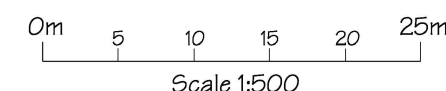
SOUTH

F'



LEGEND

Whangamarino Formation		Holocene Alluvium	
Ba	Brown Ash	Hu	Upper Holocene
Wzc	Whangamarino Silts and Clays	Hl	Lower Holocene
Ws	Whangamarino Sands		
WL	Lignite		



NOT FOR CONSTRUCTION

4036-AHN-R4036-4-Stage 2-Fig 4.2A_B-A



Earthtech Consulting Ltd.
 P.O. Box 721, Pukekohe
 Phone: 64 9 238 3669
 Email: admin@earthtech.co.nz

LAKESIDE DEVELOPMENTS, TE KAUWHATA
 Lakeside Developments (2017) Limited

Stage 2 Cross Section F - F' (Page 2)				DRAWING NO.: FIG. 4.2B	
DRAWN:	PK	CHECKED:	PK	SCALE (A3):	VERSION: A
TRACED:	C.M/S.H	DATE:	17/01/18	1:500(h) 1:250(v)	REF: 4036

HAND-AUGER LOG

Bore No.: **HA07**

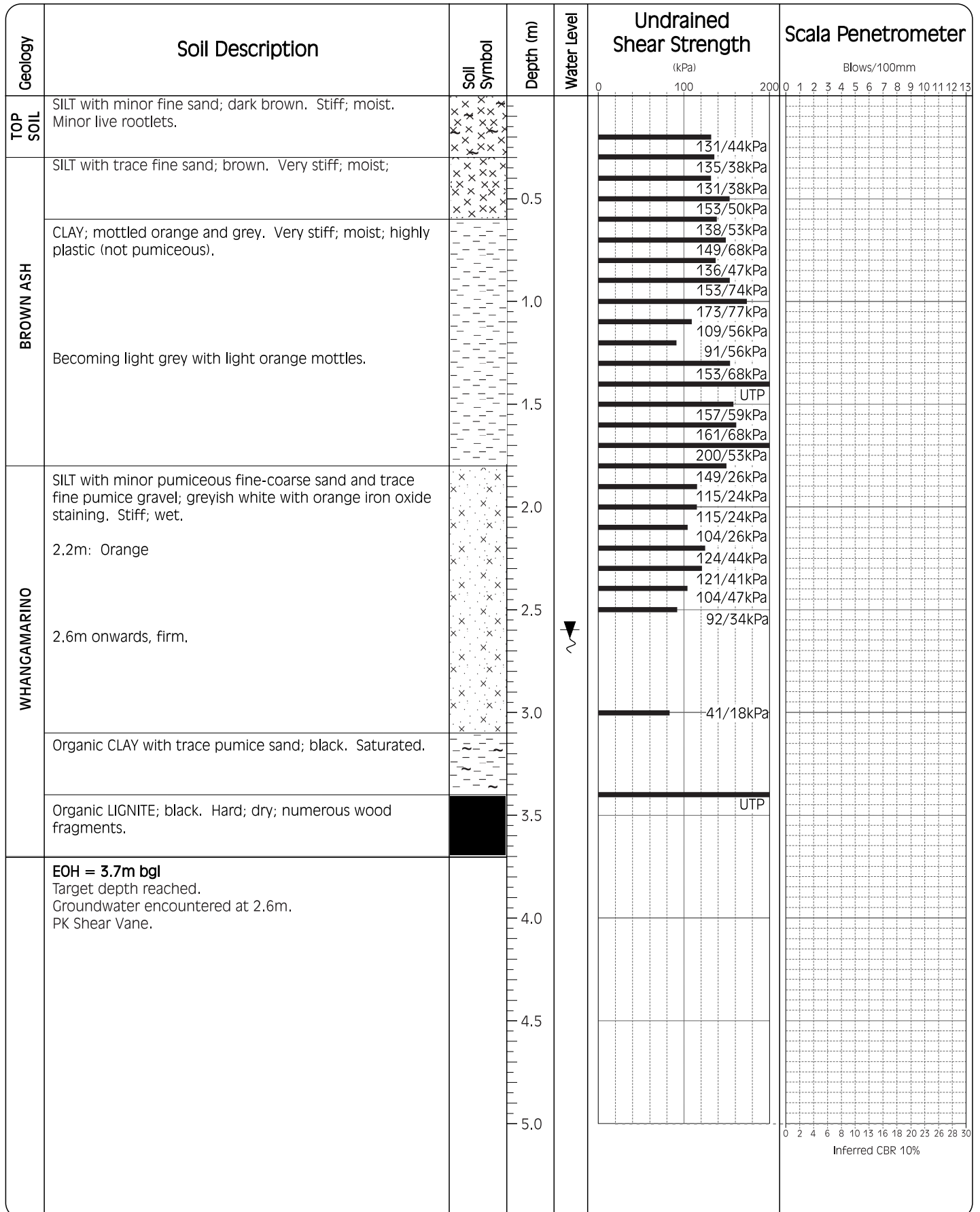
Project: Scott Road, Te Kauwhata

Augered by: MW/SLH

Checked by: MW

Date: 11/10/2016

Ref: 4036



HAND-AUGER LOG

Bore No.: **HA10**

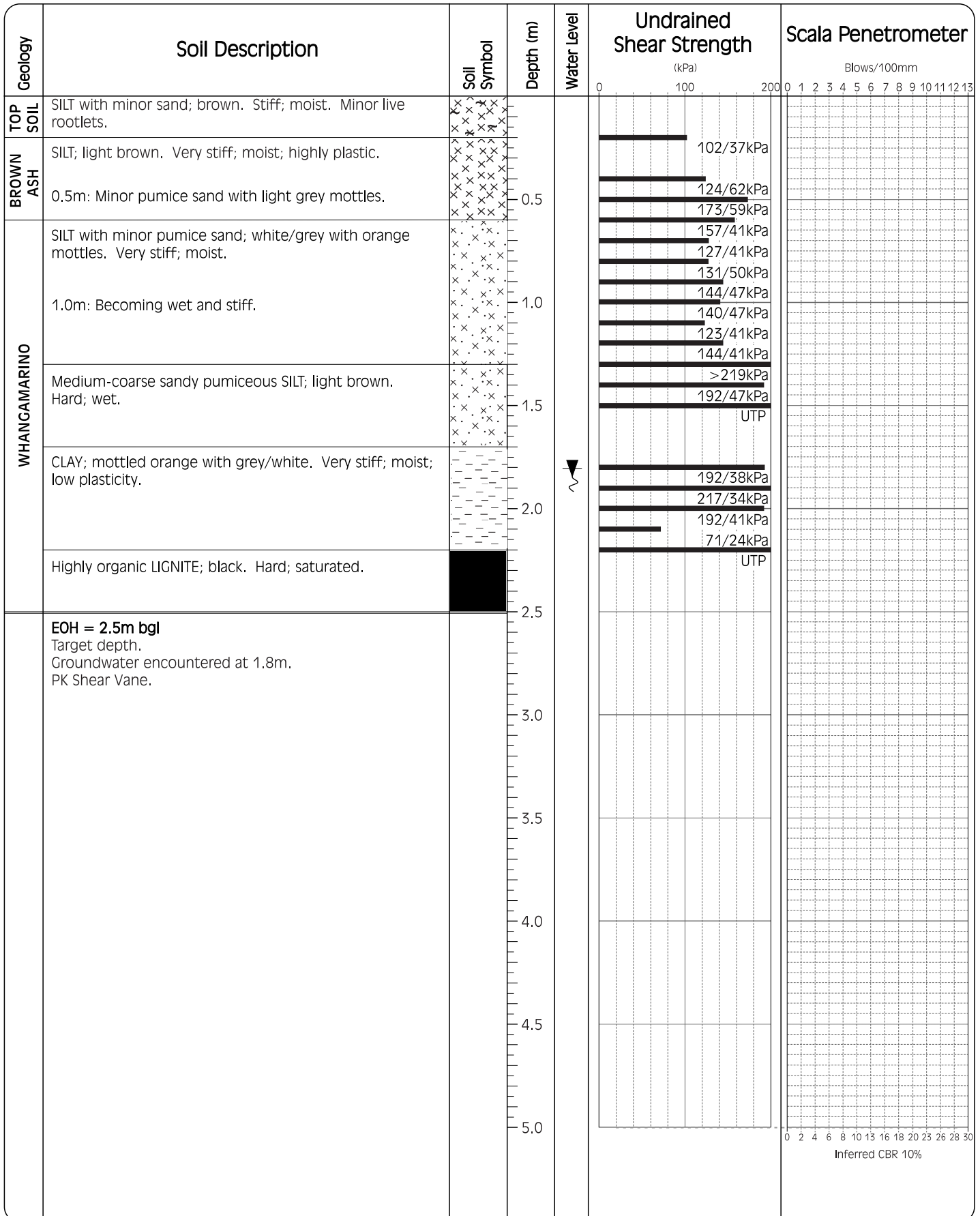
Project: Scott Road, Te Kauwhata

Augered by: MW/SLH

Checked by: MW

Date: 12/10/2016

Ref: 4036



HAND-AUGER LOG

Bore No.: **HA201**

Project: Scott Road, Te Kauwhata

Augered by: AHN/SH

Checked by: AHN

Date: 07/03/2017

Ref: 4036

Geology	Soil Description	Soil Symbol	Depth (m)	Water Level	Undrained Shear Strength	Scala Penetrometer
					(kPa)	Blows/100mm
HAMILTON-KAUROA ASH	TOPSOIL; dry.		0.0 - 0.1			
	Sandy SILT; light brown. Hard; dry.					
PUKETOKA ALLUVIUM	Sandy CLAY; dark orange brown. Hard; slightly moist; plastic.		0.1 - 0.5		UTP	
	Clayey SAND; mottled yellow and white. Hard; slightly moist; slightly plastic.		0.5 - 1.0		UTP	
	Sandy CLAY; mottled orange and yellow, flecked red. Moist; plastic.		1.0 - 1.5		>219/104kPa	
	Clayey SILT (ignimbrite silt?); pale yellow white. Wet; plastic.		1.5 - 2.0		>219/89kPa	
	No auger recovery below 2.4m		2.0 - 2.4		192/62kPa	
		?	2.4 - 2.5		>219/62kPa	
			2.5 - 3.0		UTP	
			3.0 - 3.5		192/93kPa	
			3.5 - 4.0		192/83kPa	
			4.0 - 4.5			
			4.5 - 5.0			
			5.0 - 5.5			
			5.5 - 6.0			
			6.0 - 6.5			
			6.5 - 7.0			
			7.0 - 7.5			
			7.5 - 8.0			
			8.0 - 8.5			
			8.5 - 9.0			
			9.0 - 9.5			
			9.5 - 10.0			
			10.0 - 10.5			
			10.5 - 11.0			
			11.0 - 11.5			
			11.5 - 12.0			
			12.0 - 12.5			
			12.5 - 13.0			
			13.0 - 13.5			
			13.5 - 14.0			
			14.0 - 14.5			
			14.5 - 15.0			
			15.0 - 15.5			
			15.5 - 16.0			
			16.0 - 16.5			
			16.5 - 17.0			
			17.0 - 17.5			
			17.5 - 18.0			
			18.0 - 18.5			
			18.5 - 19.0			
			19.0 - 19.5			
			19.5 - 20.0			
			20.0 - 20.5			
			20.5 - 21.0			
			21.0 - 21.5			
			21.5 - 22.0			
			22.0 - 22.5			
			22.5 - 23.0			
			23.0 - 23.5			
			23.5 - 24.0			
			24.0 - 24.5			
			24.5 - 25.0			
			25.0 - 25.5			
			25.5 - 26.0			
			26.0 - 26.5			
			26.5 - 27.0			
			27.0 - 27.5			
			27.5 - 28.0			
			28.0 - 28.5			
			28.5 - 29.0			
			29.0 - 29.5			
			29.5 - 30.0			

EOH =2.4m bgl
No recovery.
Groundwater not encountered.
PK Shear Vane.



HAND-AUGER LOG

Bore No.: **HA202**

Project: Scott Road, Te Kauwhata

Augered by: AHN/SH

Checked by: AHN

Date: 07/03/2017

Ref: 4036

Geology	Soil Description	Soil Symbol	Depth (m)	Water Level	Undrained Shear Strength	Scala Penetrometer
					(kPa)	Blows/100mm
PUKETOKA ALLUVIUM	TOPSOIL; dry.		0.0			
	Sandy SILT; pale yellow brown. Hard; slightly moist.		0.5		UTP	
	Sandy SILT; mottled yellow, orange and brown. Very stiff; moist; plastic.		1.0		UTP	
	Fine clean SAND; pale yellow white. Medium dense; non plastic; becomes grey white with occasional orange staining.		1.5		>219/59kPa	
	Wet below 2.1m		2.0			
	EOH =2.2m bgl Target depth reached. Groundwater encountered at 2.1m. PK Shear Vane.		2.5			
			3.0			
			3.5			
			4.0			
			4.5			
			5.0			



HAND-AUGER LOG

Bore No.: **HA203**

Project: Scott Road, Te Kauwhata

Augered by: AHN/SH

Checked by: AHN

Date: 07/03/2017

Ref: 4036

Geology	Soil Description	Soil Symbol	Depth (m)	Water Level	Undrained Shear Strength	Scala Penetrometer
					(kPa)	Blows/100mm
PUKETOKA ALLUVIUM	TOPSOIL; dry.		0.0 - 0.1			
	Sandy SILT; light orange brown. Stiff; slightly moist; moderately plastic; minor grit from hardpan layers. Becomes more sandy with depth.		0.1 - 1.0		UTP 131/29kPa	
	Silty SAND; yellow, white and orange. Medium dense; slightly moist; slightly plastic.		1.0 - 1.5		UTP UTP	
	Sandy CLAY; pale yellow and white. Very stiff; moist; highly plastic.		1.5 - 2.0		UTP 199/95kPa	
	Wet below 2.1m; poor recovery; purplish brown; possibly top of lignite?		2.0 - 2.1		>219/62kPa	
	EOH =2.1m bgl Poor recovery. Groundwater encountered at 2.1m. PK Shear Vane.		2.1 - 5.0			



SCALA PENETROMETER TEST SHEET				Project: Lakeside Developments			
Augered By: NH/JP		Checked By: NH		Date: 27-11-17		Job No.: 4036	

Test No.		SP2-03		SP2-04		SP2-05											
0.05	2.05	Push		Push		Push	5										
0.10	2.10								5								
0.15	2.15								4								
0.20	2.20								4								
0.25	2.25								5								
0.30	2.30								7								
0.35	2.35	1		Push		Push	7										
0.40	2.40	1						7									
0.45	2.45	1						9									
0.50	2.50	1						E S 2.45m									
0.55	2.55	1															
0.60	2.60																
0.65	2.65	1															
0.70	2.70	2						1									
0.75	2.75	1						1									
0.80	2.80	1						1									
0.85	2.85	1				1											
0.90	2.90	1		1		1											
0.95	2.95	1		1		1											
1.00	3.00	3		1		2											
1.05	3.05	1		1		3											
1.10	3.10	2				2											
1.15	3.15	2		1		2											
1.20	3.20	2		3		1											
1.25	3.25	2		4		2											
1.30	3.30	2		3		2											
1.35	3.35	5		3		4											
1.40	3.40	4		2		3											
1.45	3.45	3		1		3											
1.50	3.50	5		1		3											
1.55	3.55	6		3		3											
1.60	3.60	7		2		4											
1.65	3.65	7		4		4											
1.70	3.70	8		6		5											
1.75	3.75	E S 1.7m		3		5											
1.80	3.80			8		7											
1.85	3.85			9		4											
1.90	3.90			E S 1.85m		3											
1.95	3.95						4										
2.00	4.00					7											

EARTHTECH CONSULTING LIMITED

TEST PIT LOG

Test Pit No.: **TP2-01**

Project: Lakeside Developments (Stage 2)

Excavator: 12t - SB

Logged by: PK

Date: 09/11/17

Ref: 4036

Geology	Soil Description	Soil Symbol	Depth (m)	Sample Type	Undrained Shear Strength (kPa)	Water Content %	Testing
5857295.67mN 1790357.826mE					0 100 200		
BROWN ASH	TOPSOIL.		0.28		169/47kPa		
	CLAY with some fine sand; dark brown. Massive; very stiff; moist; friable.		0.5		206/95kPa	43	
WHANGAMARINO FORMATION	CLAY with minor sand; mottled grey and light yellowish brown. Massive; very stiff; moist; moderately plastic.		0.6		165/71kPa		
			1.0		112/79kPa	48	
		1.5		92/56kPa			
		2.0		121/63kPa	60		
		2.5		118/71kPa			
		3.0		104/71kPa	62		
	SILT with some fine-medium sand and trace gravel; cream and light yellowish brown. Stiff; wet.		2.5		77/47kPa		
	2.6m: Groundwater seepage.				92/62kPa	67	
	Organic CLAY; black. Stiff. Fine-medium SAND.				136/48kPa		
	LIGNITE with wood fragments; black. Hard; moist.		3.0		UTP	215	
	(Peaty odour when excavating lignite.)		3.5		UTP	204	
	Medium-coarse SAND; light grey. Pumiceous.		3.8				

MACHINE TYPE:

TEST PIT TERMINATED AT:

Target Depth Refusal
Near Refusal Flooding

SAMPLE TYPE:

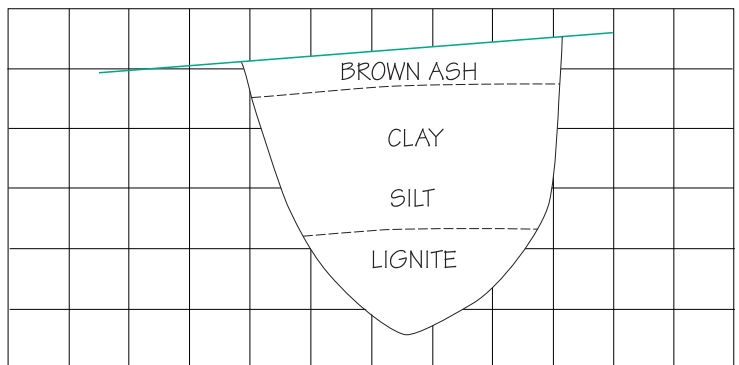
- bulk sample
- tube sample
- disturbed profile sample

FIELD SHEAR STRENGTH:

- Shear vane
- Hand penetrometer
- Estimate only

TEST PIT SECTION

SCALE:



TEST PIT LOG

Test Pit No.: **TP2-01** - Page 2

Project: Lakeside Developments (Stage 2)

Excavator: 12t - SB

Logged by: PK

Date: 09/11/17

Ref: 4036

Geology	Soil Description	Soil Symbol	Depth (m)	Sample Type	Undrained Shear Strength	Water Content %	Testing
					(kPa)		
WHANGAMARINO FORMATION	LIGNITE; black. Hard; moist.		4.5	UTP	241		
	Fine-medium SAND with trace silt. Medium dense; pumiceous.		5.0	UTP	45		
	LIGNITE; black. Hard; moist.		5.5		168		
EOP = 5.4m Target depth reached. Groundwater encountered at 2.6m PK shear vane.			5.5				
			6.0				
			6.5				
			7.0				
			7.5				

MACHINE TYPE:

TEST PIT TERMINATED AT:

- Target Depth Refusal
 Near Refusal Flooding

SAMPLE TYPE:

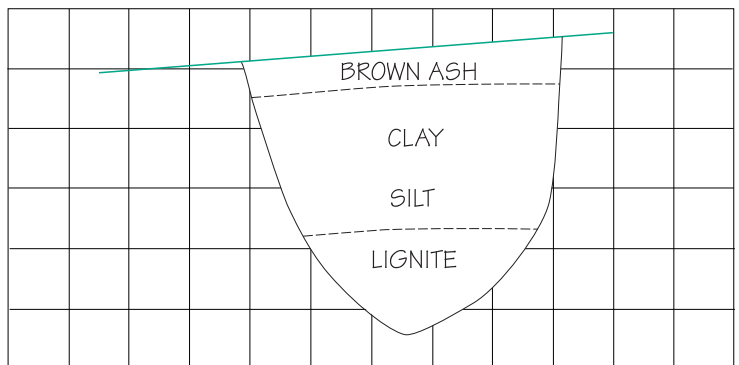
- bulk sample
 tube sample
 disturbed profile sample

FIELD SHEAR STRENGTH:

- Shear vane
 Hand penetrometer
 Estimate only

TEST PIT SECTION

SCALE:



TEST PIT LOG

Test Pit No.: **TP2-02**

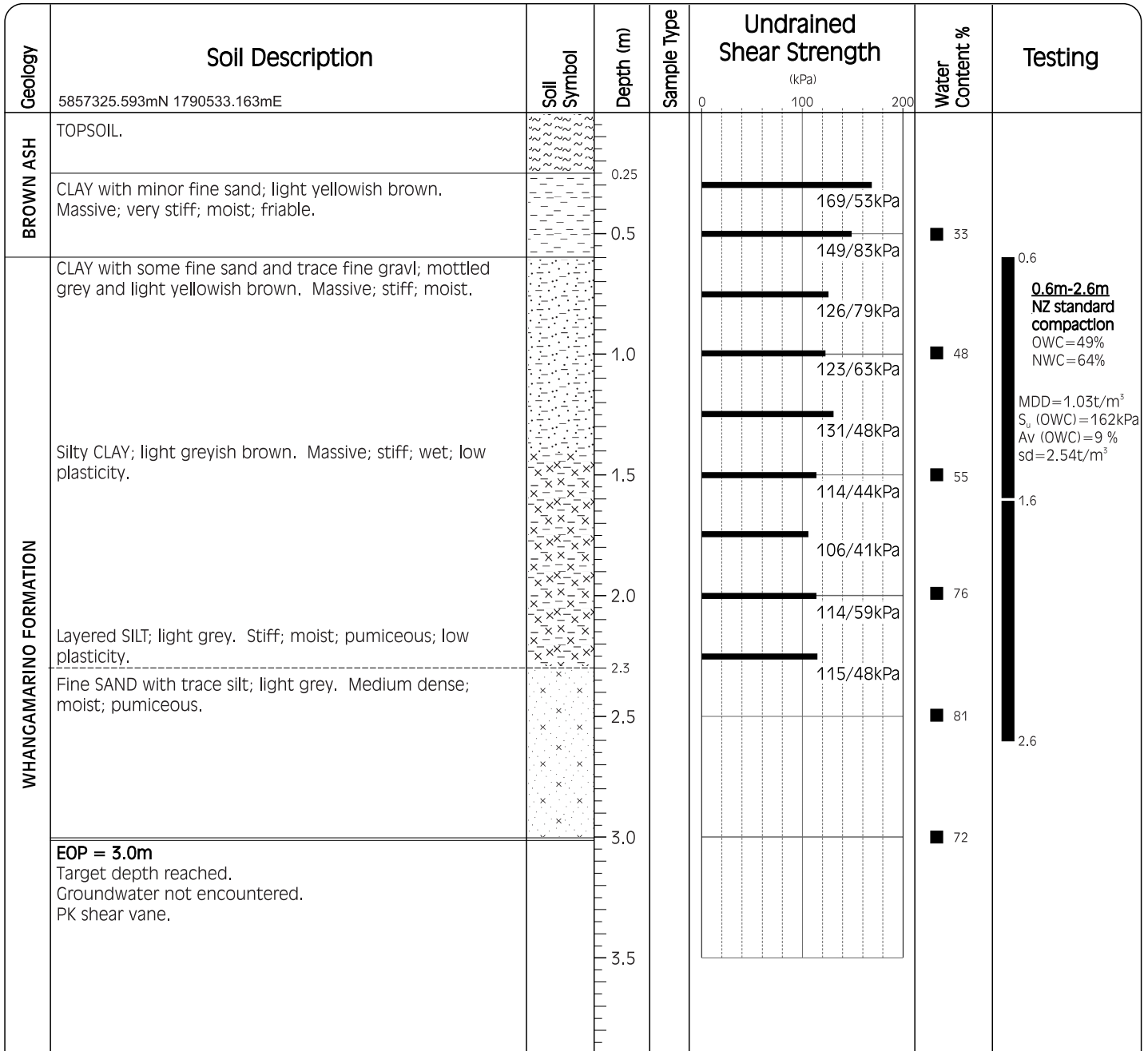
Project: Lakeside Developments (Stage 2)

Excavator: 12t - SB

Logged by: PK

Date: 09/11/17

Ref: 4036



MACHINE TYPE:

TEST PIT TERMINATED AT:

- Target Depth Refusal
 Near Refusal Flooding

SAMPLE TYPE:

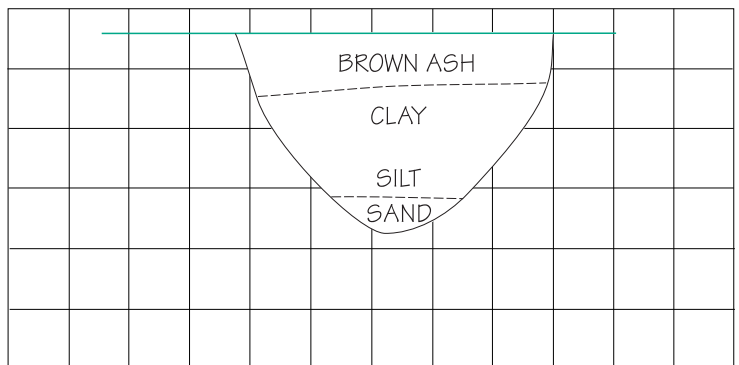
- bulk sample
 tube sample
 disturbed profile sample

FIELD SHEAR STRENGTH:

- Shear vane
 Hand penetrometer
 Estimate only

TEST PIT SECTION

SCALE:



TEST PIT LOG

Test Pit No.: **TP2-03**

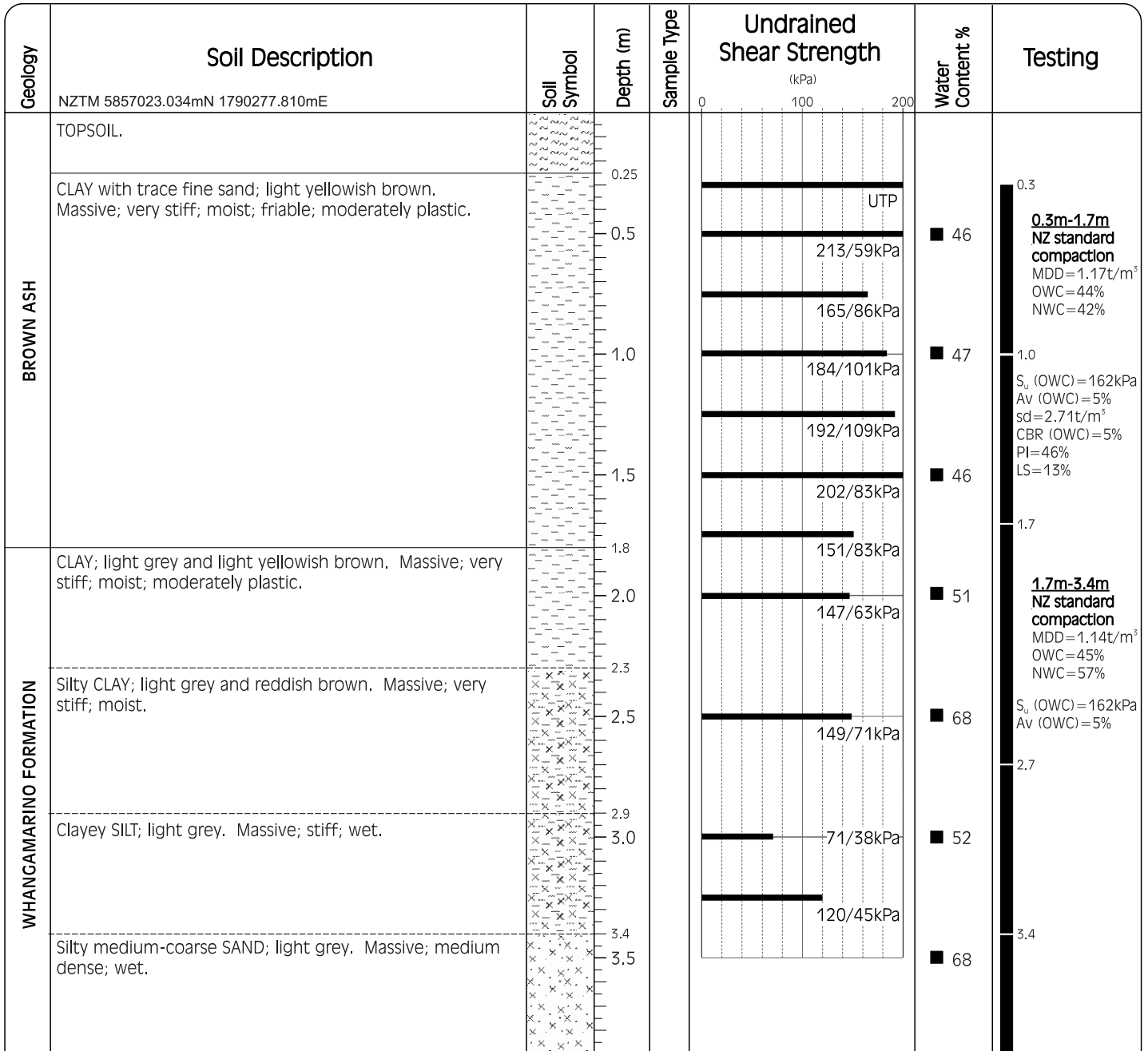
Project: Lakeside Developments - Stage 1

Excavator: 12t SB

Logged by: PK

Date: 08/11/17

Ref: 4036



MACHINE TYPE:

TEST PIT TERMINATED AT:

- Target Depth Refusal
 Near Refusal Flooding

SAMPLE TYPE:

- bulk sample
 tube sample
 disturbed profile sample

FIELD SHEAR STRENGTH:

- Shear vane
 Hand penetrometer
 Estimate only

TEST PIT SECTION

SCALE:



TEST PIT LOG

Test Pit No.: **TP2-03** - Page 2

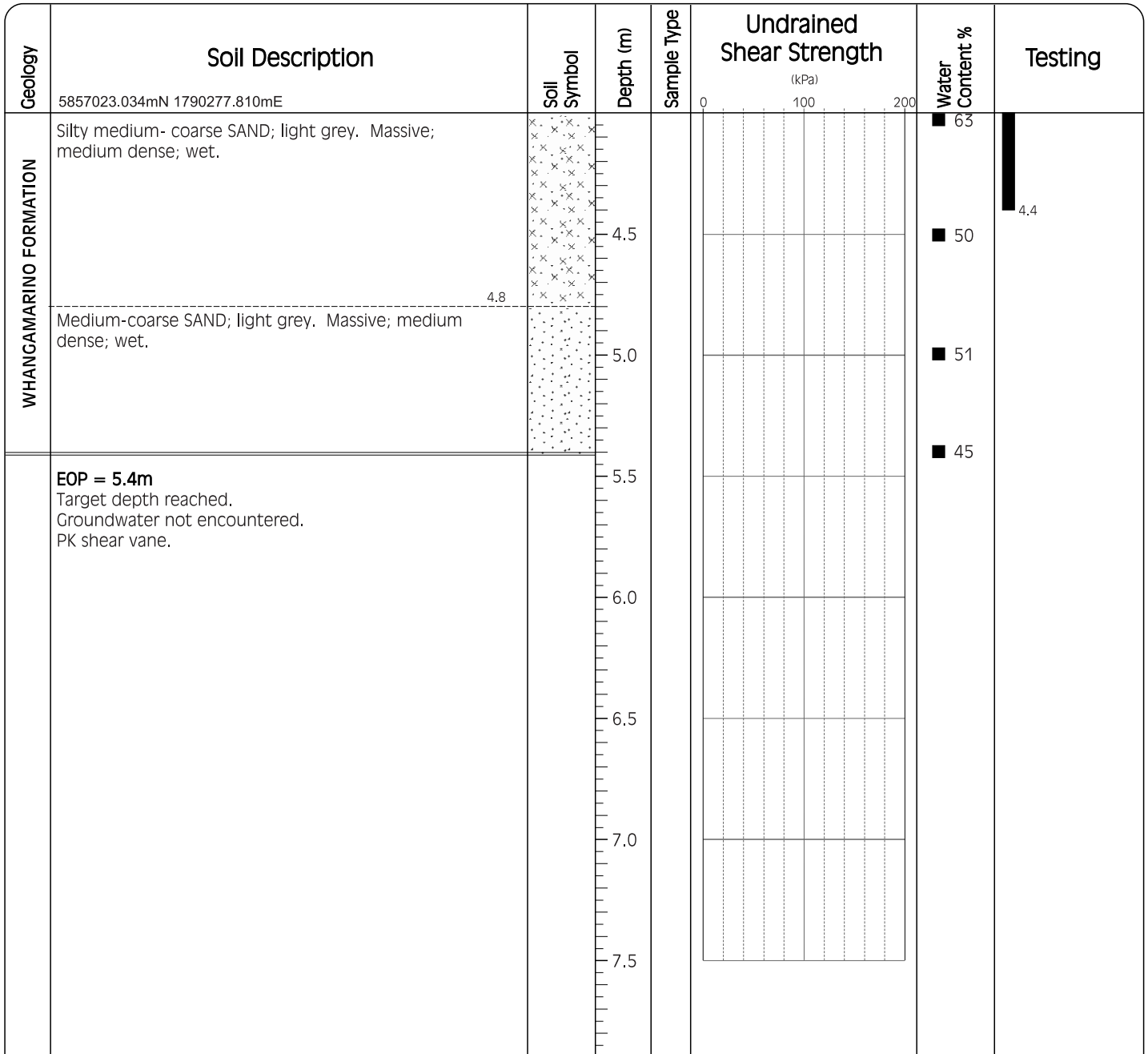
Project: Lakeside Developments

Excavator:

Logged by: PK

Date: 08/11/17

Ref: 4036



MACHINE TYPE:

TEST PIT TERMINATED AT:

- Target Depth Refusal
 Near Refusal Flooding

SAMPLE TYPE:

- bulk sample
 tube sample
 disturbed profile sample

FIELD SHEAR STRENGTH:

- Shear vane
 Hand penetrometer
 Estimate only

TEST PIT SECTION

SCALE:



TEST PIT LOG

Test Pit No.: **TP2-11**

Project: Lakeside Developments - Stage 1

Excavator: 12t - SB

Logged by: PK

Date: 09/11/17

Ref: 4036

Geology	Soil Description	Soil Symbol	Depth (m)	Sample Type	Undrained Shear Strength (kPa)		Water Content %	Testing
					0	100		
BROWN ASH	TOPSOIL.		0.25		161/48kPa		35	
	CLAY with minor fine sand; dark yellowish brown. Massive; very stiff; moist; moderately plastic; friable; quartz; mica.				151/89kPa			
WHANGAMARINO FORMATION	CLAY; mottled grey and light yellowish brown. Massive; stiff; moist; moderately plastic.		1.0		96/48kPa		49	
					90/48kPa			
	Silty CLAY; cream and light yellowish brown. Massive; stiff; moist; low plasticity.		2.0		114/63kPa		58	
					123/48kPa			
	SILT; light grey. Massive; stiff; moist; low plasticity.		2.5		106/47kPa		58	
					118/47kPa			
EOP = 3m Target depth reached. Groundwater not encountered. PK shear vane.			3.0				58	3.0m NWC=59% PI=15% LS=3%
			3.5					

MACHINE TYPE:

TEST PIT TERMINATED AT:

- Target Depth Refusal
 Near Refusal Flooding

SAMPLE TYPE:

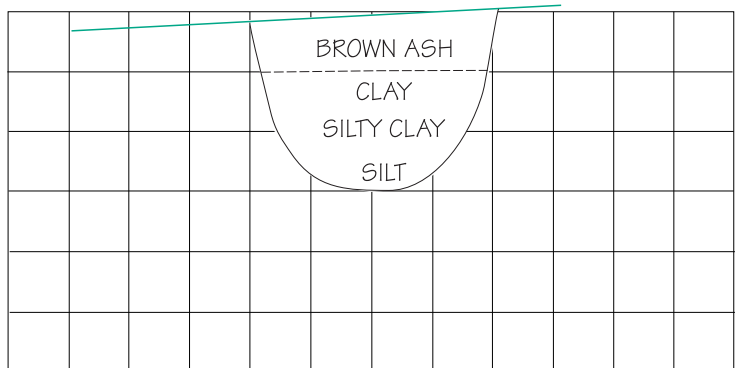
- bulk sample
 tube sample
 disturbed profile sample

FIELD SHEAR STRENGTH:

- Shear vane
 Hand penetrometer
 Estimate only

TEST PIT SECTION

SCALE:



TEST PIT LOG

Test Pit No.: **TP2-12**

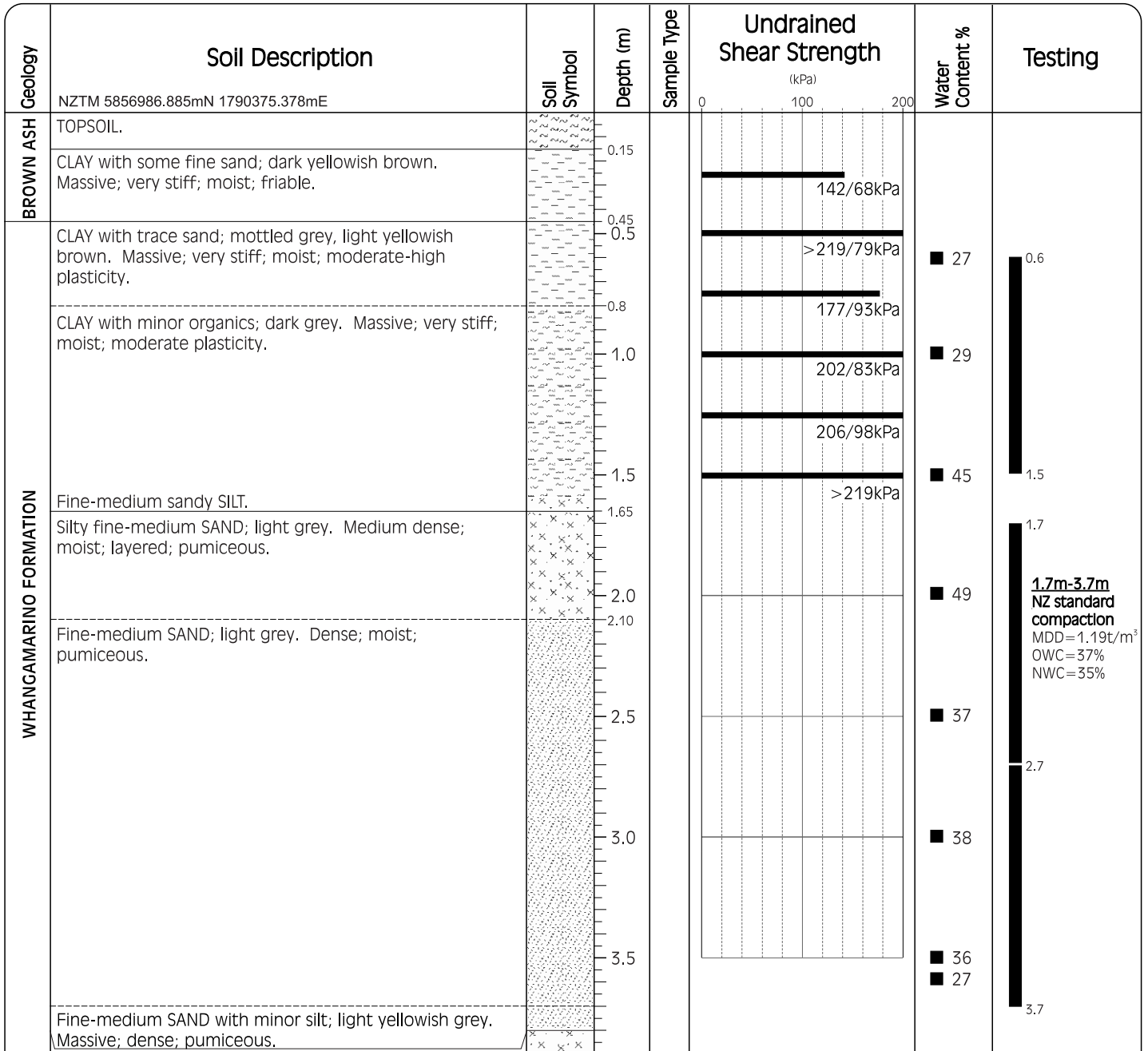
Project: Lakeside Developments - Stage 1

Excavator: 12t - SB

Logged by: PK

Date: 09/11/17

Ref: 4036



MACHINE TYPE:

TEST PIT TERMINATED AT:

Target Depth Refusal
Near Refusal Flooding

SAMPLE TYPE:

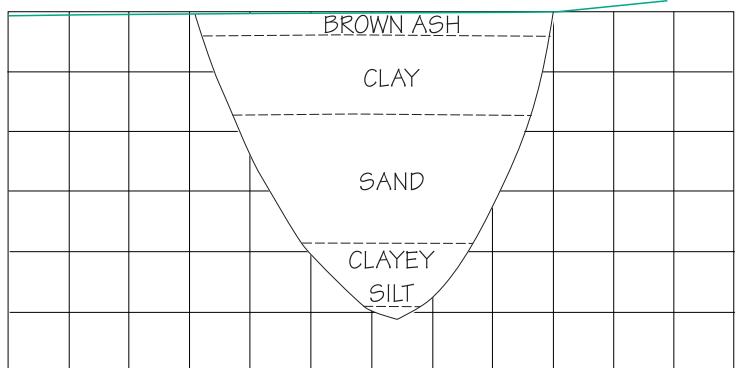
bulk sample
 tube sample
 disturbed profile sample

FIELD SHEAR STRENGTH:

Shear vane
 Hand penetrometer
 Estimate only

TEST PIT SECTION

SCALE:



TEST PIT LOG

Test Pit No.: **TP2-12** - Page 2

Project: Lakeside Developments

Excavator:

Logged by: PK

Date: 09/11/17

Ref: 4036

Geology	Soil Description	Soil Symbol	Depth (m)	Sample Type	Undrained Shear Strength (kPa)	Water Content %	Testing
5856986.885mN 1790375.378mE					0 100 200		
WHANCMARINO FORMATION	Clayey SILT; light brownish grey. Massive; very stiff; moist; low plasticity.		4.5		151/48kPa	42	
	Fine-medium SAND; light grey. Massive; medium dense; moist.		5.0		118/38kPa	83	
	EOP = 5.2m Target depth reached. Groundwater not encountered. PK shear vane.		5.5			63	
			6.0				
			6.5				
			7.0				
			7.5				

MACHINE TYPE:

TEST PIT TERMINATED AT:

Target Depth Refusal
Near Refusal Flooding

SAMPLE TYPE:

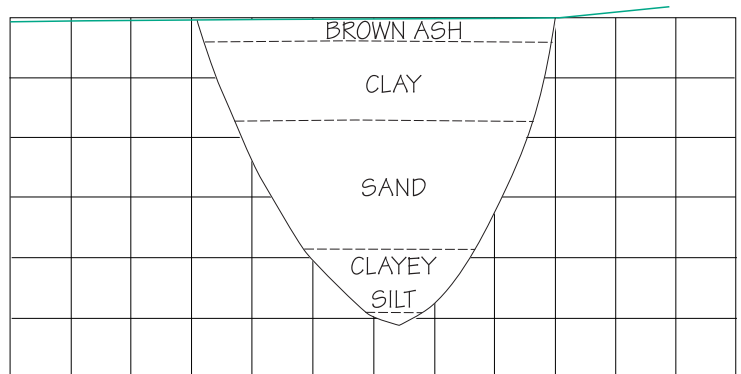
- bulk sample
- tube sample
- disturbed profile sample

FIELD SHEAR STRENGTH:

- Shear vane
- Hand penetrometer
- Estimate only

TEST PIT SECTION

SCALE:



TEST PIT LOG

Test Pit No.: **TP2-13**

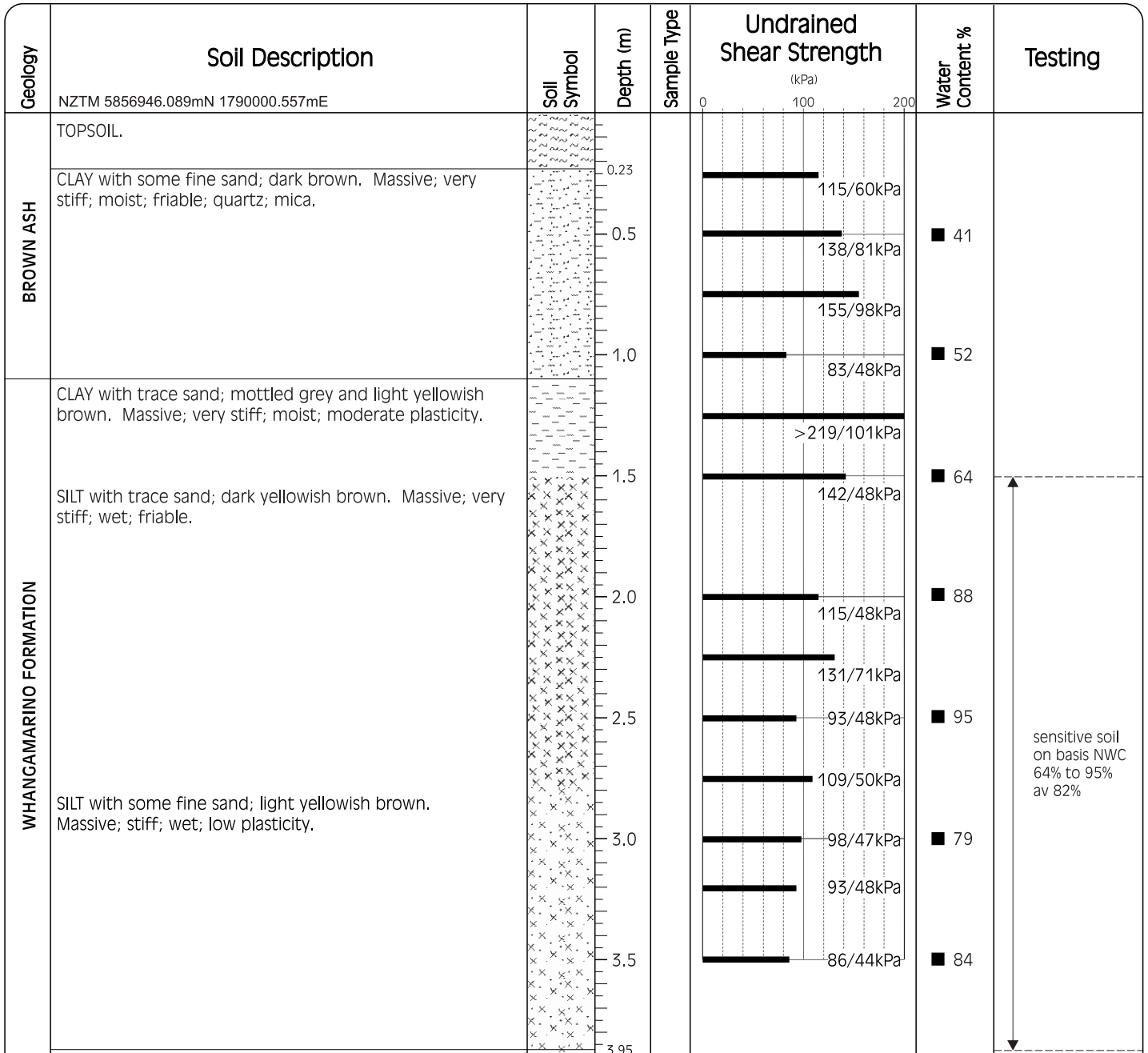
Project: Lakeside Developments - Stage 1

Excavator: 12t - SB

Logged by: PK

Date: 09/11/17

Ref: 4036



MACHINE TYPE:

TEST PIT TERMINATED AT:

- Target Depth Refusal
 Near Refusal Flooding

SAMPLE TYPE:

- bulk sample
 tube sample
 disturbed profile sample

FIELD SHEAR STRENGTH:

- Shear vane
 Hand penetrometer
 Estimate only

TEST PIT SECTION

SCALE:

Level site
soils subhorizontally layered



TEST PIT LOG

Test Pit No.: **TP2-13** - Page 2

Project: Lakeside Developments

Excavator:

Logged by: PK

Date: 09/11/17

Ref: 4036

Geology	Soil Description	Soil Symbol	Depth (m)	Sample Type	Undrained Shear Strength (kPa)	Water Content %	Testing
WHANGAMARINO FORMATION	CLAY with minor sand; cream. Massive; very stiff; moist; moderate plasticity; mica.		4.5		153/93kPa	42	
	SILT with some fine sand; cream and pink. Massive; stiff; moist; low plasticity; pumiceous.		5.0		127/95kPa 121/74kPa	50 58	
EOP = 5.2m Target depth reached. Groundwater not encountered. PK shear vane.			5.5				■ 5.0m NWC = 58% PI = 40% LS = 15%
			6.0				
			6.5				
			7.0				
			7.5				

MACHINE TYPE:

TEST PIT TERMINATED AT:

Target Depth Refusal
 Near Refusal Flooding

SAMPLE TYPE:

- bulk sample
- tube sample
- disturbed profile sample

FIELD SHEAR STRENGTH:

- Shear vane
- Hand penetrometer
- Estimate only

TEST PIT SECTION

SCALE:

Level site
soils subhorizontally layered



DRILL HOLE LOG

Bore No.: BH2-02

Sheet 1 of 2

Client: WINTON PARTNERS

Drilled by: DrillForce

Project: LAKESIDE, TE KAUWHATA

Ref: 4036

Collar Level:
Co-ordinates (mPD): 5857329mN 1790504mE

Date Started: 27/11/17 Date Finished: 28/11/17

Drilling Progress	Sample Type	Casing Depth (m)	Drill Run (m)	TCR 25 50 75	Weathered (rock only) sw mw hw	Fracture Log (cm) 50 10 5 1	Natural Water Content (%)	Piezometer Construction	Depth (m)	Legend	DESCRIPTION OF STRATA	Geology
	HQ								0		TOPSOIL: Slightly sandy SILT with minor clay; brown.	BROWN ASH
									0.5		Slightly silty CLAY with trace mica; light yellowish brown. Very stiff.	
	SPT		1.5						1		Fine SAND with some silt; light yellowish grey. Very stiff. 1.4m-1.45m: Medium SAND.	WHANGAMARINO FORMATION
			1.95						1.5		SPT 1/1/1/0/1/0 N=2 Silty CLAY; mottled yellowish brown.	
	HQ								2		Medium SAND; light grey. Trace fine disseminated blackish brown flecks.	
	SPT		3						2.5		1.95m: clay clasts to 100mmØ; medium dense-dense. Trace black and dark yellowish orange ferruginous staining.	
			3.45						3		SPT 0/0/1/2/2/3 N=8 SILT with minor clay; yellowish orange. Fe oxide on irregular fracture planes.	
	HQ								3.5		LIGNITE; black, hard.	
	SPT		4.5						4		3.5m-3.55m: Coarse SAND; grey. 3.65m: 50mm SILT clast; dark brown.	
			4.95						4.5		4.5m-4.55m: medium SAND; grey.	
	HQ								5		SPT 1/2/2/5/4/7 N=18 Core fractures on 85° to core axis (bedding).	
	SPT		6						5.5		Medium SAND; light grey. Veinlets of organic black material.	
			6.45						6		LIGNITE; black, hard.	
	HQ								6.5		SPT 2/4/4/5/4/6 N=19 6.15m: 10mm sand band; medium with clasts in lignite above sand horizon.	
	SPT		7.5						7		Medium SAND with minor clay; graduating to fine SAND.	
			7.95						7.5		SILT with minor clay; brownish grey. Very stiff.	
	HQ								8		SPT 1/1/1/2/2/3 N=8 Thin black organic flecks disseminated throughout (1%-2%); wood fragments (2mm-3mmØ twigs).	
	SPT		9						8		Coarse pumiceous SAND; light grey with brown organic flecks. Loose.	
			9.45						8.25		8.25m: 100mm lignite band.	
	HQ								9		Fine SAND; light grey. Medium dense. Black disseminated organic material.	
	SPT		10.5						9		SPT 3/4/2/2/2/4 N=10 8.85m: Lignite, 250mm	
			10.95						9.8		Slightly clayey fine SAND. Medium dense. Black organic segregations. 9.8m: Clayey SILT band.	
	HQ								10		Coarse SAND; grey. Medium dense.	
	SPT		12						10		LIGNITE; black, hard.	
									10.2		10.2m: 30mm lignite band	
	HQ								11		SPT 4/7/7/10/15/18 35mm N=50* Fine SAND with slight silt; light grey. Localised banding due to fine/very fine sand bands 3mm-5mm width. Very dense.	

Remarks:

Logged By: NH	Water Level Observations During Drilling				
Date:	Date	Time	Depth of Hole	Depth of Casing	Depth of Water
Checked By: PIK					
Scale:					
Hole Length: 15m					
Core Boxes:					



EARTHTECH CONSULTING LIMITED

DRILL HOLE LOG

Bore No.: BH2-02

Sheet 2 of 2

Client: WINTON PARTNERS

Drilled by: DrillForce

Project: LAKESIDE, TE KAUWHATA

Ref: 4036

Collar Level:
Co-ordinates (mPD): 5857329mN 1790504mE

Date Started: 27/11/17 Date Finished: 28/11/17

Drilling Progress	Sample Type	Casing Depth (m)	Drill Run (m)	TCR			Weathered (rock only)			Fracture Log (cm)	Natural Water Content (%)	Piezometer Construction	Depth (m)	Legend	DESCRIPTION OF STRATA	Geology
				25	50	75	sw	mw	hw							
SPT HQ			12.1											CL	SPT 20/30 25mm N=50* Fine SAND; light grey, very dense.	WHANGAMARINO FORMATION
			13.5									13			13.35m: Coarse sand band, 50mm.	
HQ												14			13.8m: Sand becoming medium-coarse, gradational. Dense-very dense.	
												15			Clayey fine SAND; light brownish grey. Stiff-very stiff. Silty CLAY; dark brown. Very stiff.	
												15			EOB @ 15m.	
												16				
												17				
												18				
												19				
												20				
												21				
												22				
												23				

Remarks:

Logged By: NH	Water Level Observations During Drilling				
Date:	Date	Time	Depth of Hole	Depth of Casing	Depth of Water
Checked By: PIK					
Scale:					
Hole Length: 15m					
Core Boxes:					



EARTHTECH CONSULTING LIMITED



0.0m-2.6m



2.6m-5.5m

BOREHOLE BH2-02



5.5m-8.6m



8.6m-11.9m

BOREHOLE BH2-02



11.7m-15m

BOREHOLE BH2-02

Page 3 of 3

DRILL HOLE LOG

Bore No.: BH203

Sheet 1 of 2

Client: WINTON PARTNERS

Drilled by: DrillForce

Project: LAKESIDE, TE KAUWHATA

Ref: 4036

Collar Level:
Co-ordinates (mPD): 5856989mN 1790343mE

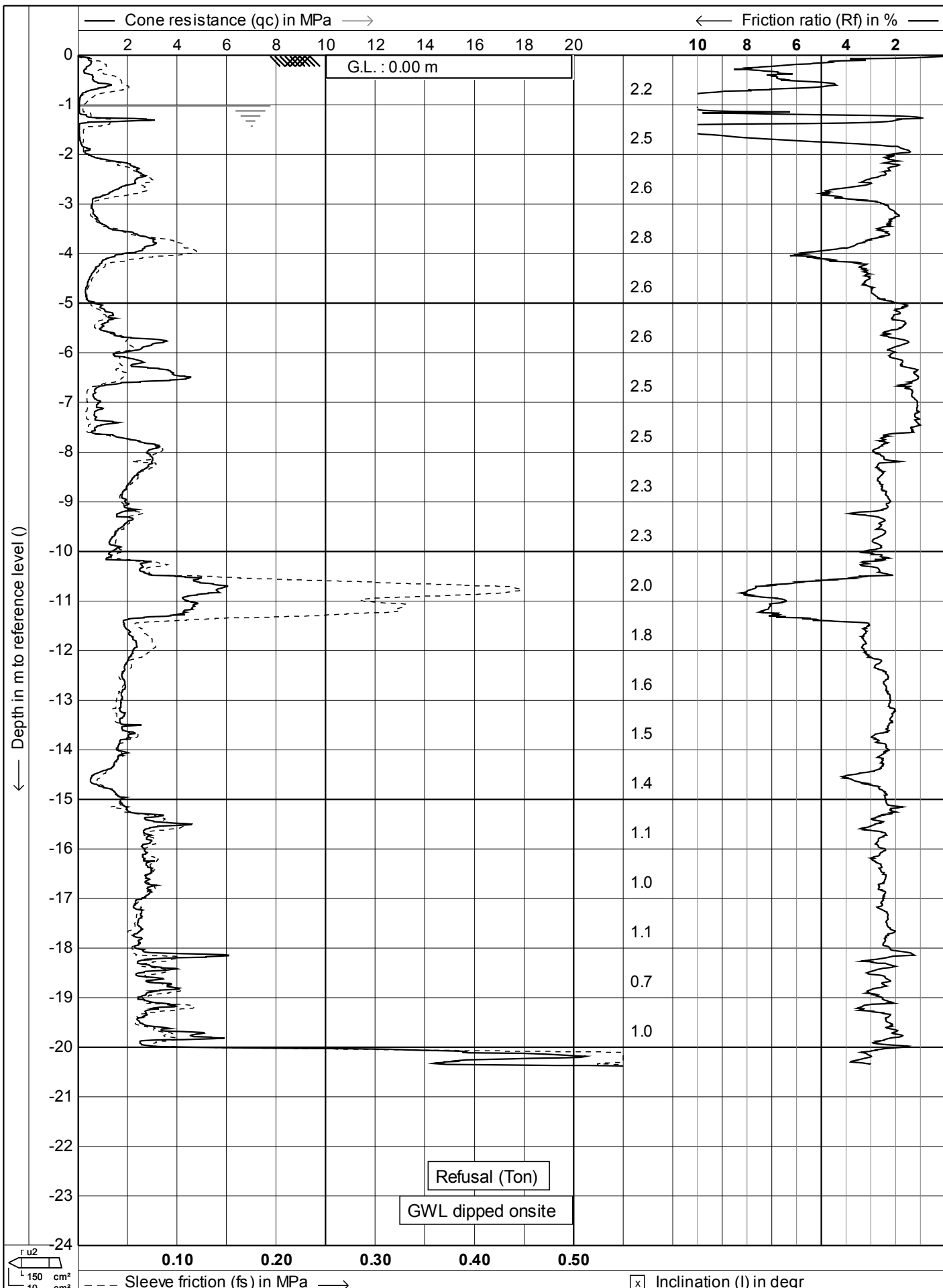
Date Started: 25/11/17 Date Finished: 25/11/17

Drilling Progress	Sample Type	Casing Depth (m)	Drill Run (m)	TCR	Weathered (rock only)	Fracture Log (cm)	Drill Water Loss (%)	Piezometer Construction	Depth (m)	Legend	DESCRIPTION OF STRATA	Geology
	HQ			25 50 75	sw rtw hw	50 10 5 1	25 50 75				TOPSOIL.	BROWN ASH
			1.5						1	Clayey SILT; dark yellowish orange. Loose; firm-soft; Fe mottles; rootlets.		
			1.95						2	Clayey SILT; light grey with orange Fe mottles. Loose. Becoming hematitic brown below 1.2m SPT 0/1/1/0/0/1 N=2 1.6m: oxides; dark yellowish orange staining. Black MnO ₂ disseminated; fine grained.		
	HQ		3						3	Slightly sandy SILT with trace clay; pale yellowish brown. Stiff; clasts, quartz dominated.		
	SPT		3.45	LC					4	Increasing sand towards base, flakes of black organic material. SPT 2/2/2/3/4/4 N=13 Slightly silty SAND; light grey. Medium dense-dense; fine-medium grained. Trace veinlets of organic material, clear quartz; sand with trace pumice fragments; 1% disseminated black mineral.	WHANGAMARINO FORMATION	
	HQ		4.5	LC					5			
	SPT		4.95						6	SPT 6/7/7/7/8/8 N=30		
	HQ		6						7	CLAY; light brown with Greenish brown disseminated mottles. Stiff-very stiff; moderately plastic lacustrine clay.		
	SPT		6.45						8	SILT with trace sand; greenish brown. Medium dense-dense; fine grained. SPT 4/5//5/4/5/7 N=21		
	HQ		7.5						9	Silty SAND with decreasing silt; light yellowish brown. Medium dense; black fine grained disseminated material; fine grained sand.		
	SPT		7.95						10	Fine-medium grained SAND; grey. Medium-dense. SPT 2/3//4/5/4/3 N=16 Fine grained SAND; grey. Medium dense.		
	HQ		9.15						11	Medium grained SAND; grey. Fine grained SAND, slightly silty; light grey to light brownish grey; medium dense; clean sand.		
	SPT		9.6						12	Silty SAND; light grey. Medium dense; very fine grained; becoming organic. SPT 1/2//2/1/2/3 N=8 Sandy SILT; brown. Medium dense; very fine grained sand; organic.		
	HQ		10.7						13	SILT with trace sand; brown. Medium dense; organic with thin lignite bands. 9.9m: 10mm lignite band 10.2m: 30mm lignite band SPT 2/2//3/2/2/4 N=11 Slightly silty SAND; grey. Medium dense; very fine grained.		
	SPT		11.15						14	LIGNITE; black; hard.		
	HQ		12						15	SAND with trace silt; brownish grey. Medium dense; clean; medium-coarse grained.		

Remarks:
Note: Soil strengths from core, SPT and adjacent CPT2-26.

Logged By:	NH	Water Level Observations During Drilling				
Date:		Date	Time	Depth of Hole	Depth of Casing	Depth of Water
Checked By:	PIK					
Scale:	14/12/17					
Hole Length:	15.45m					
Core Boxes:						



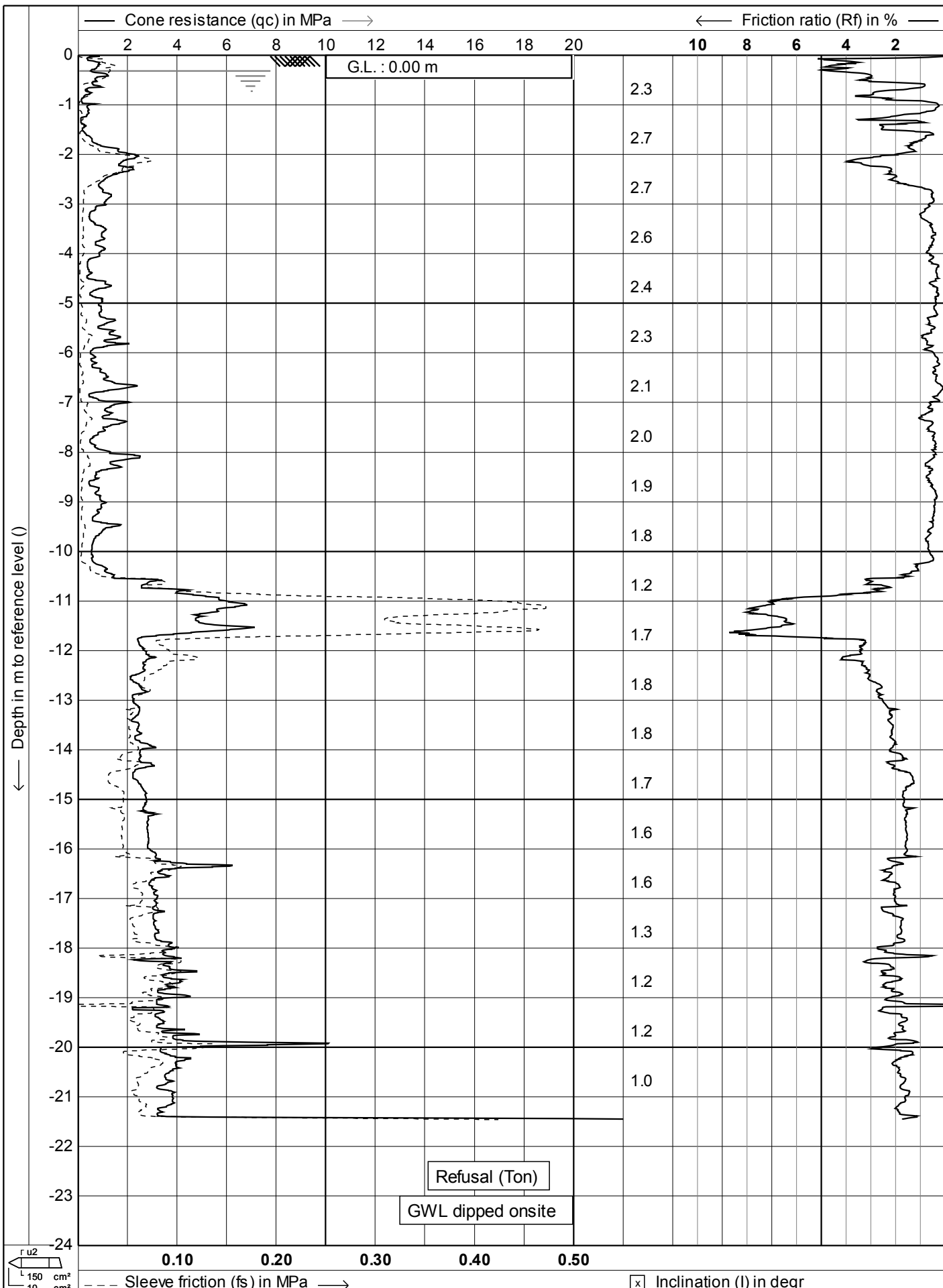


CPTlogk V1.33



Test according A.S.T.M. Standard D 5778-12
 Project : **Site Investigation**
 Location: **94 Scott rd - Te Kauwhata**

Date : **6-10-2016**
 Cone no. : **C10CFIIP.C14432**
 Project no. : **02ET01**
 CPT no. : **05** 1/14



CPTlogk V1.33



Test according A.S.T.M. Standard D 5778-12

Project : **Site Investigation**

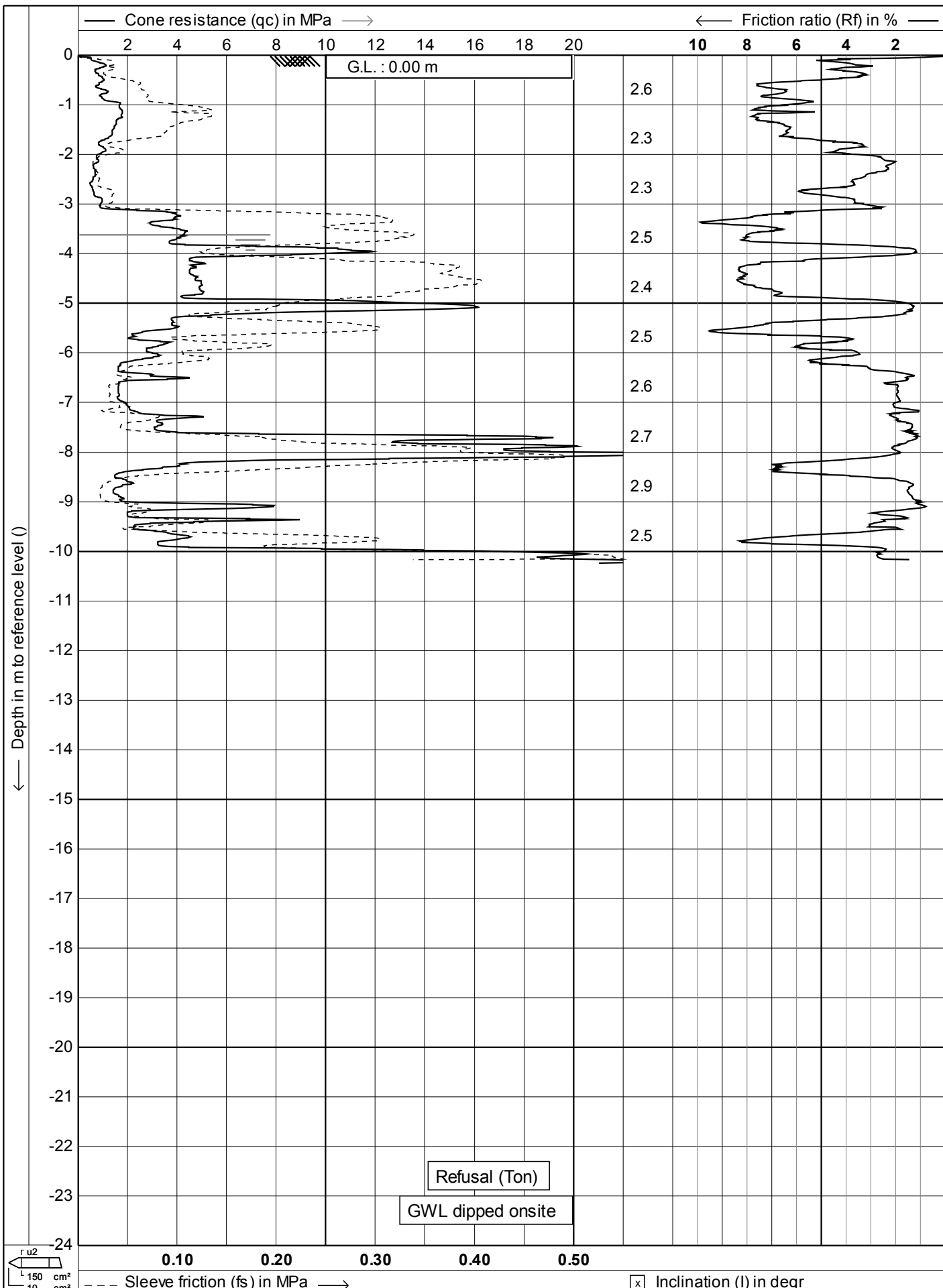
Location: **94 Scott rd - Te Kauwhata**

Date : **6-10-2016**

Cone no. : **C10CFIIP.C14432**

Project no. : **02ET01**

CPT no. : **06** | 1/14



CPTlogk V1.33



Test according A.S.T.M. Standard D 5778-12

Project : **Site Investigation**

Location: **94 Scott rd - Te Kauwhata**

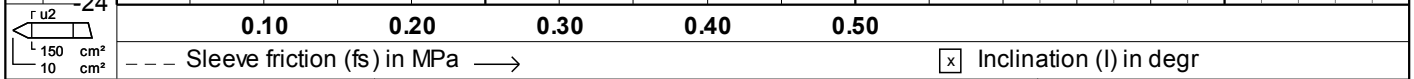
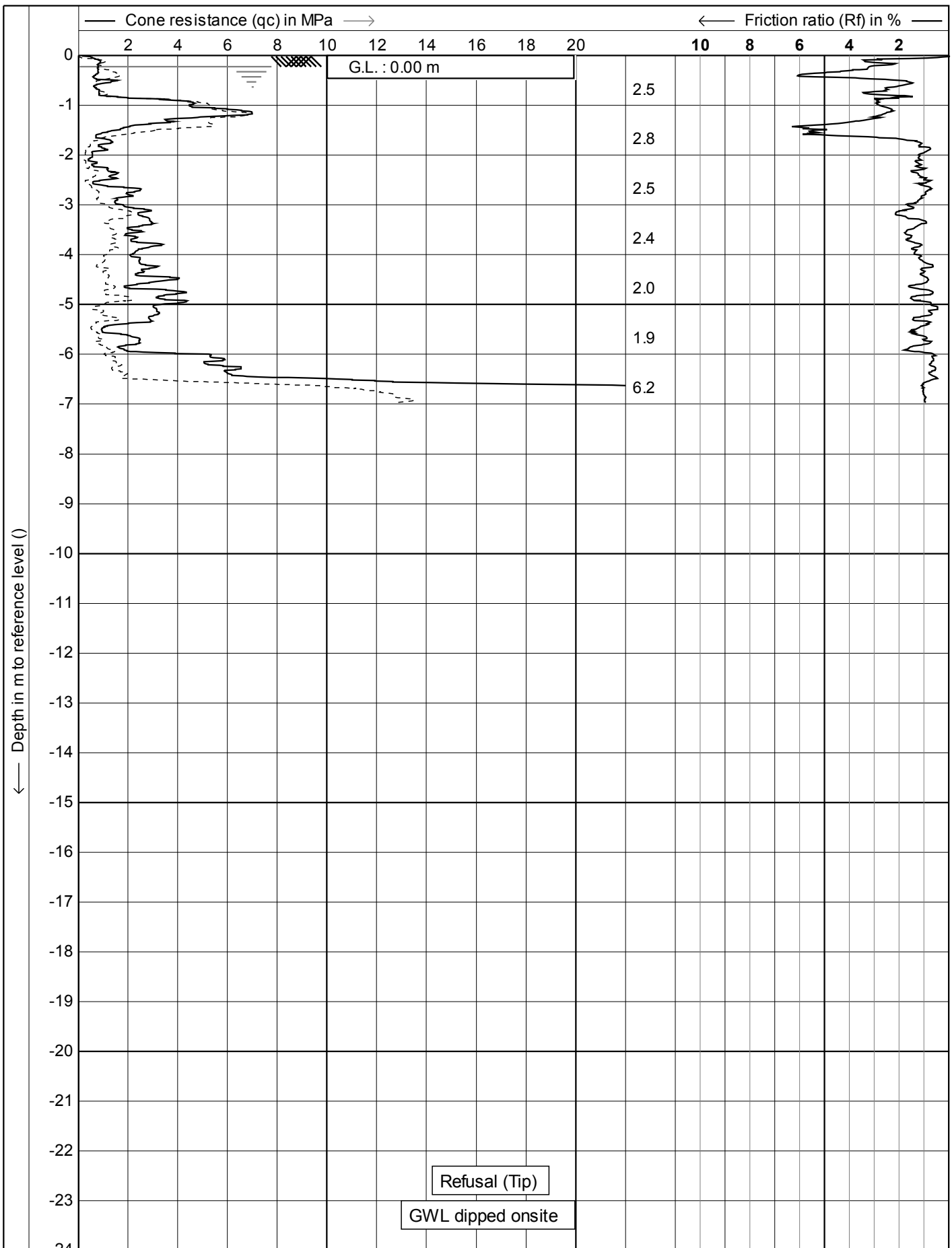
Date : **6-10-2016**

Cone no. : **C10CFIIP.C14432**

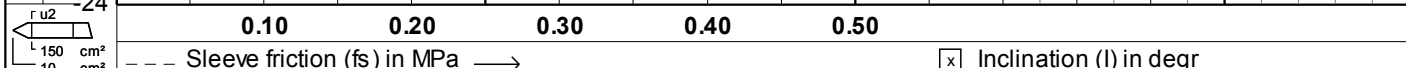
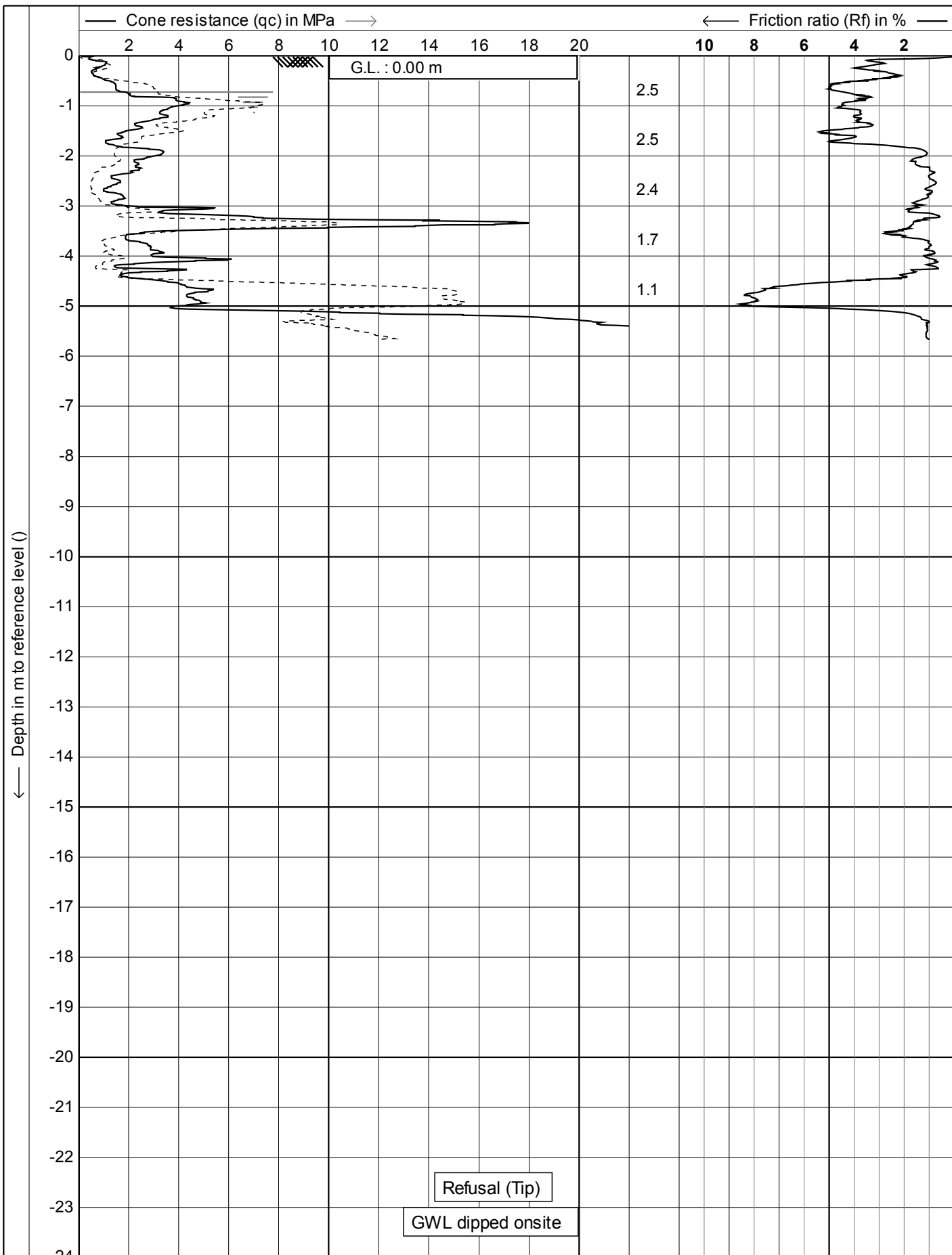
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CPT no. : **07**

1/14

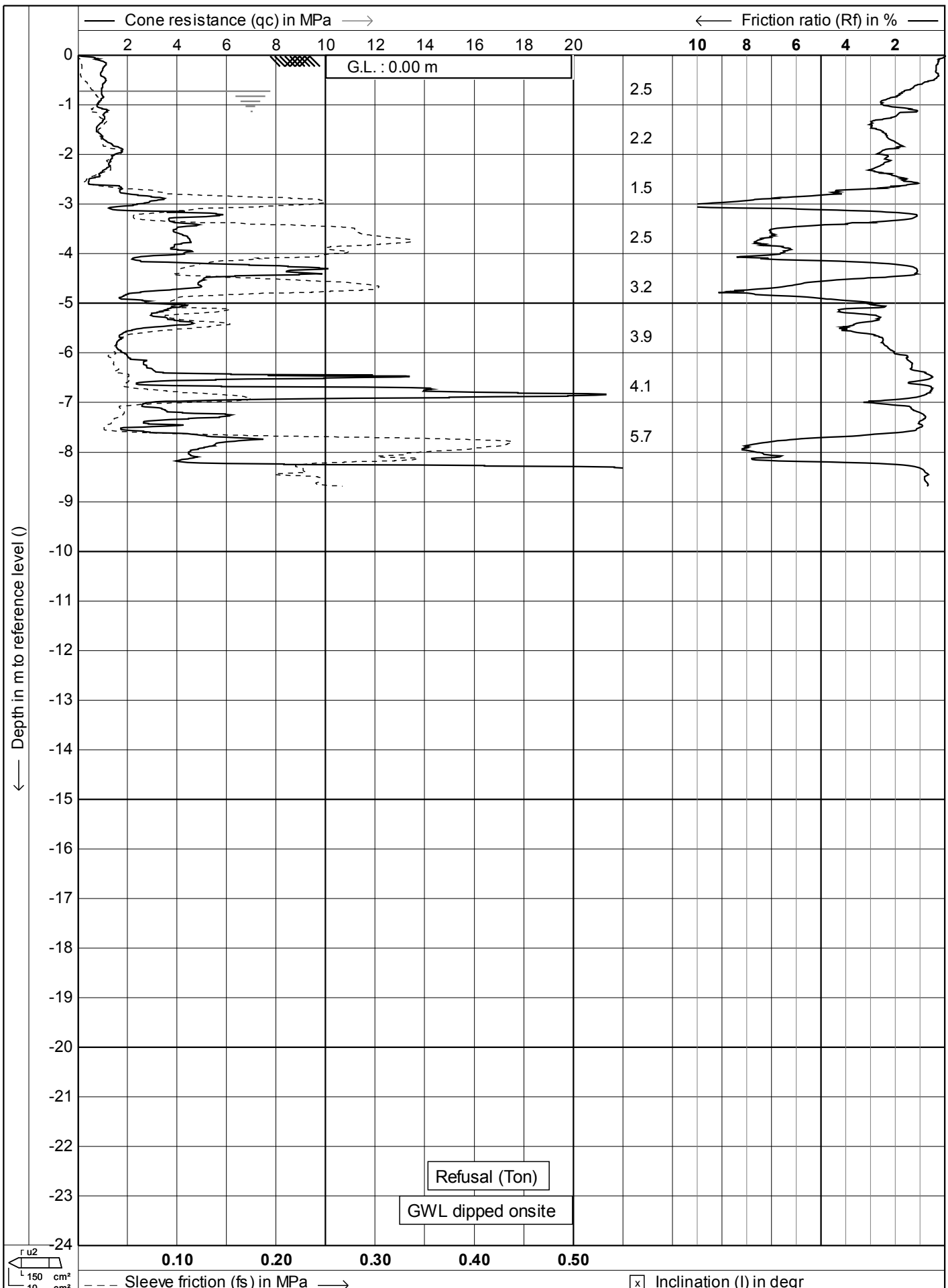


	Test according A.S.T.M. Standard D 5778-12	Date : 6-10-2016
	Project : Site Investigation	Cone no. : C10CFIIP.C14432
	Location: 94 Scott rd - Te Kauwhata	Project no. : 02ET01
		CPT no. : 08
		1/14



	Test according A.S.T.M. Standard D 5778-12	Date : 6-10-2016
	Project : Site Investigation	Cone no. : C10CFIIP.C14432
	Location: 94 Scott rd - Te Kauwhata	Project no. : 02ET01
		CPT no. : 09
		1/14

CPTlogk V1.33



CPTlogk V1.33



Test according A.S.T.M. Standard D 5778-12

Project : **Site Investigation**

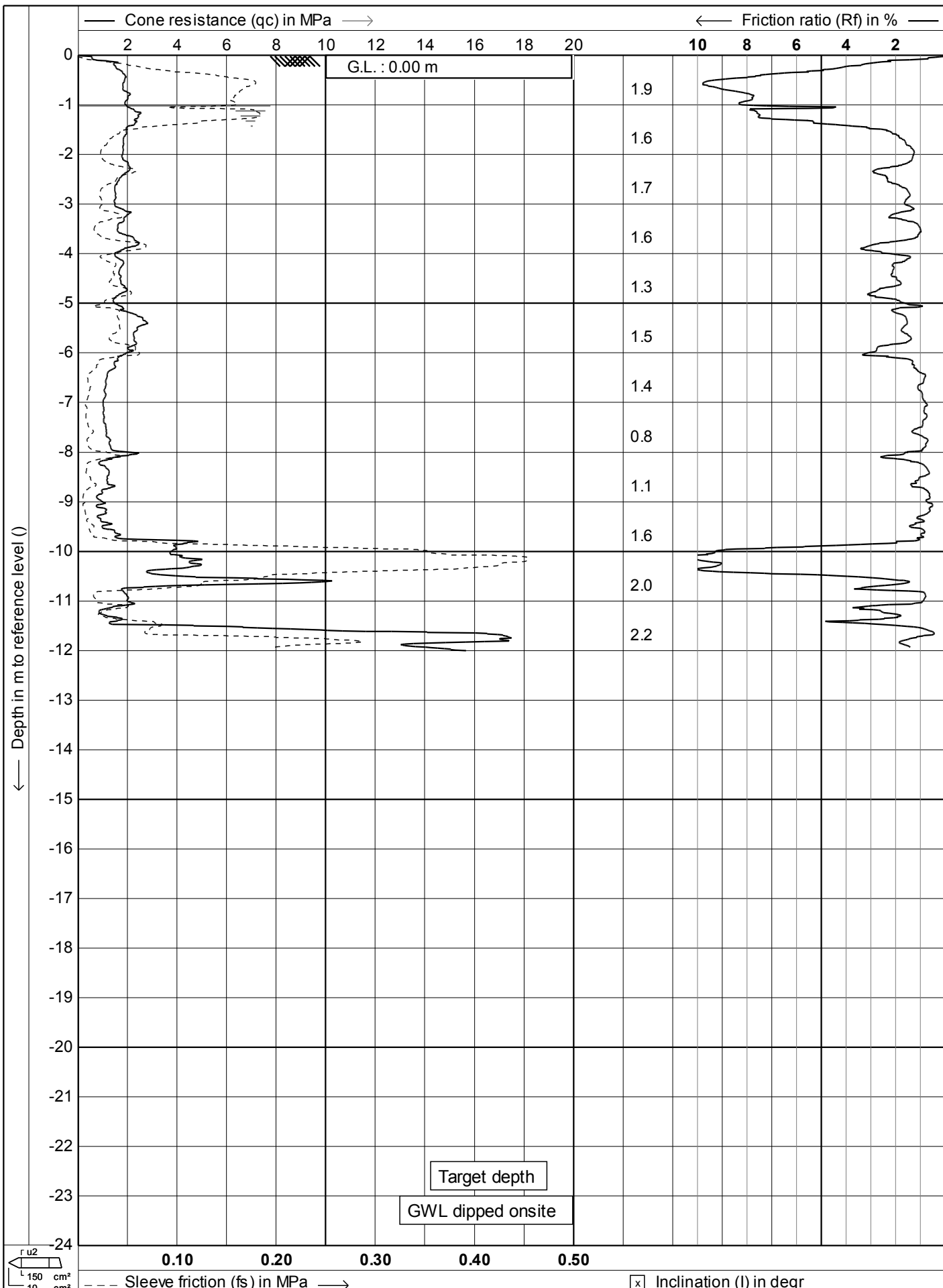
Location: **94 Scott rd - Te Kauwhata**

Date : **6-10-2016**

Cone no. : **C10CFIIP.C14432**

Project no. : **02ET01**

CPT no. : **10**



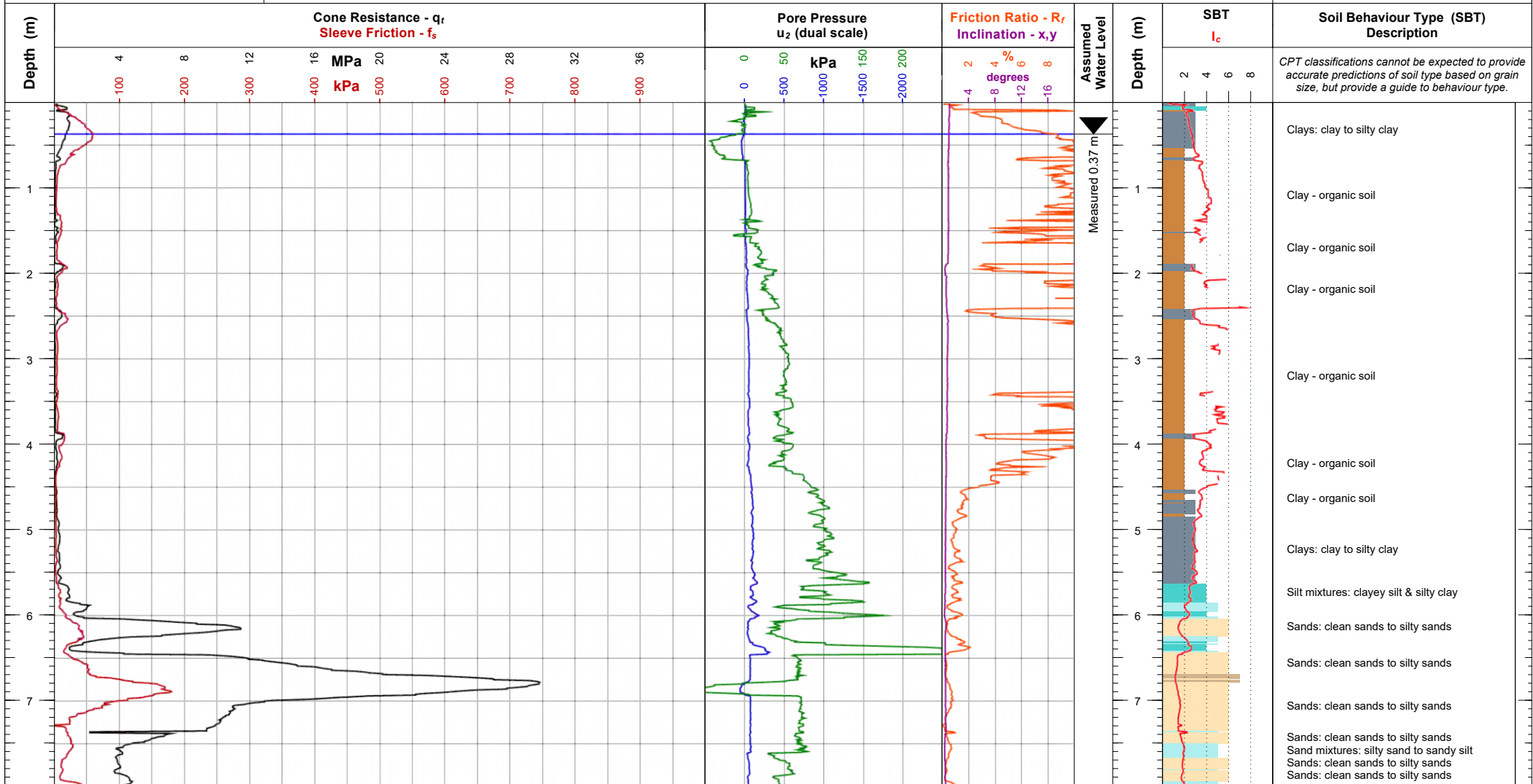
CPTlogk V1.33



Test according A.S.T.M. Standard D 5778-12
 Project : **Site Investigation**
 Location: **94 Scott rd - Te Kauwhata**

Date : **7-10-2016**
 Cone no. : **C10CFIIP.C14432**
 Project no. : **02ET02**
 CPT no. : **19** 1/14

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ540
Cone Type: 10 cm² Compression
Area Ratio: 0.79
Filter Type: u2

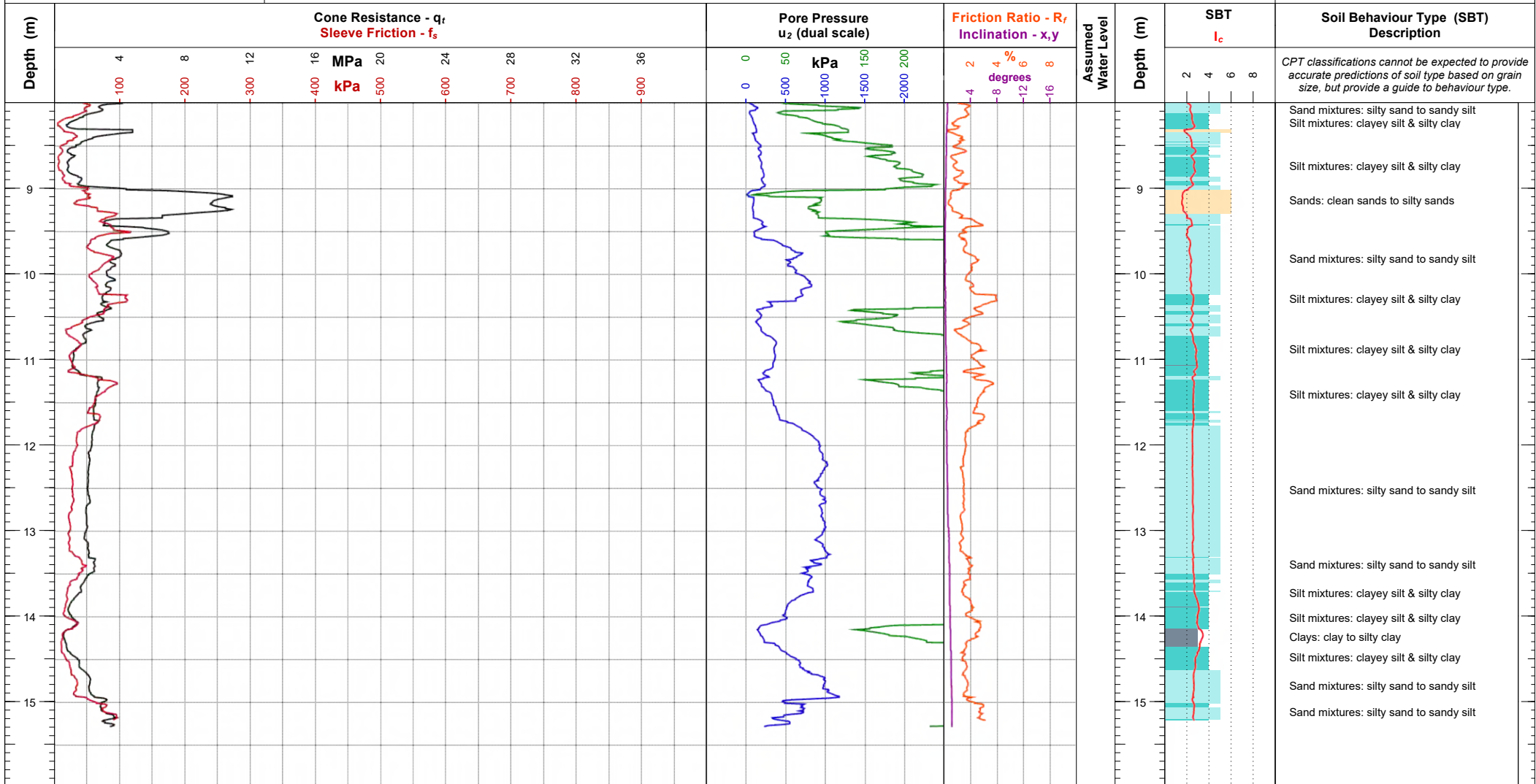
NZTM2000 N,E (m): 5857526.38, 1790428.91
WGS84, (deg): 175.151687, -37.409497
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Target depth

Elevation (m): -
Date of Test: 30/11/2017
Depth (m): 15.29
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-203**
G.I. Job Ref: **17-701**

Remarks:

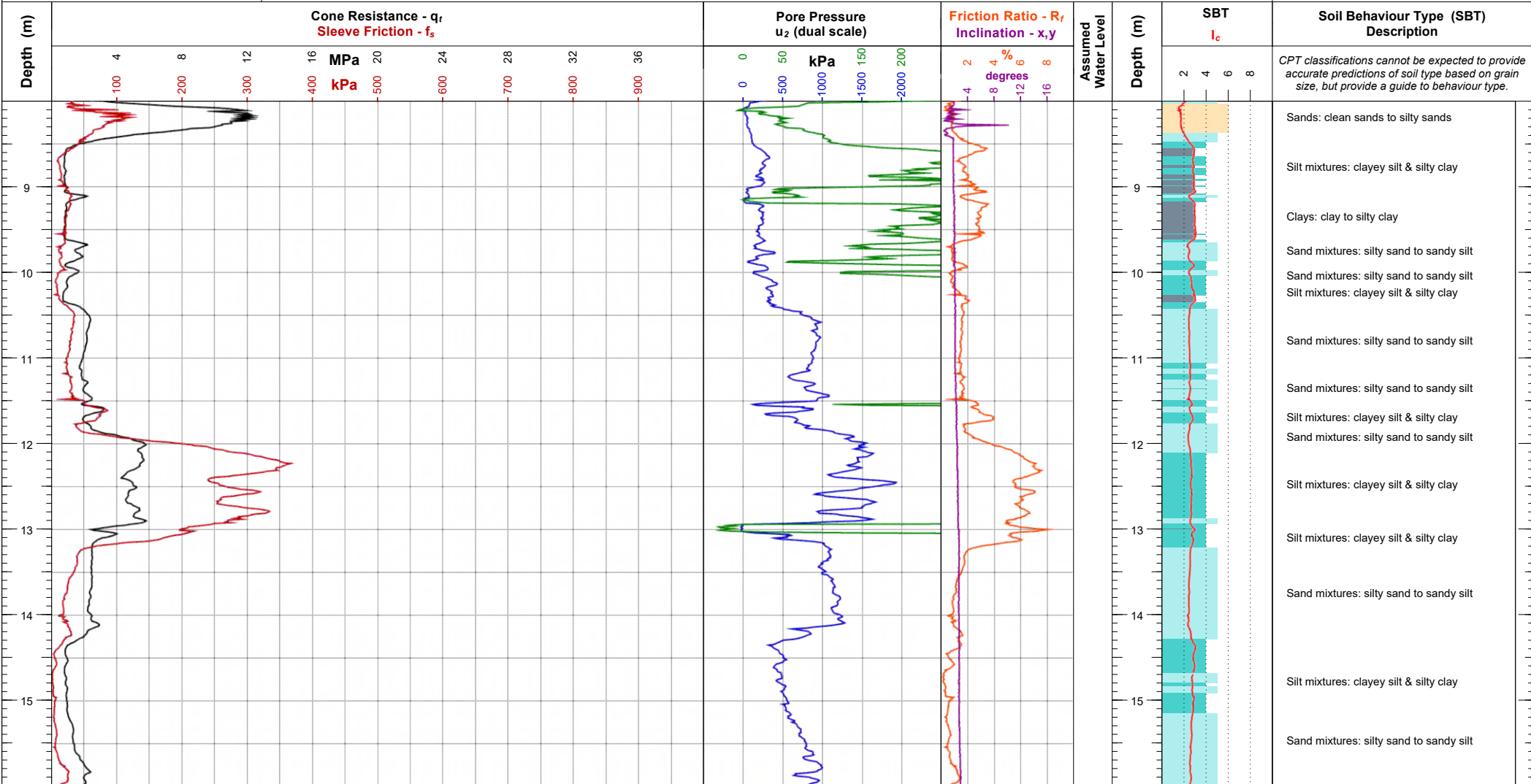
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ540 Cone Type: 10 cm ² Compression Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857526.38, 1790428.91 WGS84, (deg): 175.151687, -37.409497 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Target depth	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 15.29 Pre-Drill (m): N/A	Client Job Ref: CPT Number: CPT-203 G.I. Job Ref: 17-701
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Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Javan Cassidy
Cone Ref: S15CFIIP.1460.cal
Cone Type: 15 cm² Subtraction
Area Ratio: 0.79
Filter Type: u2

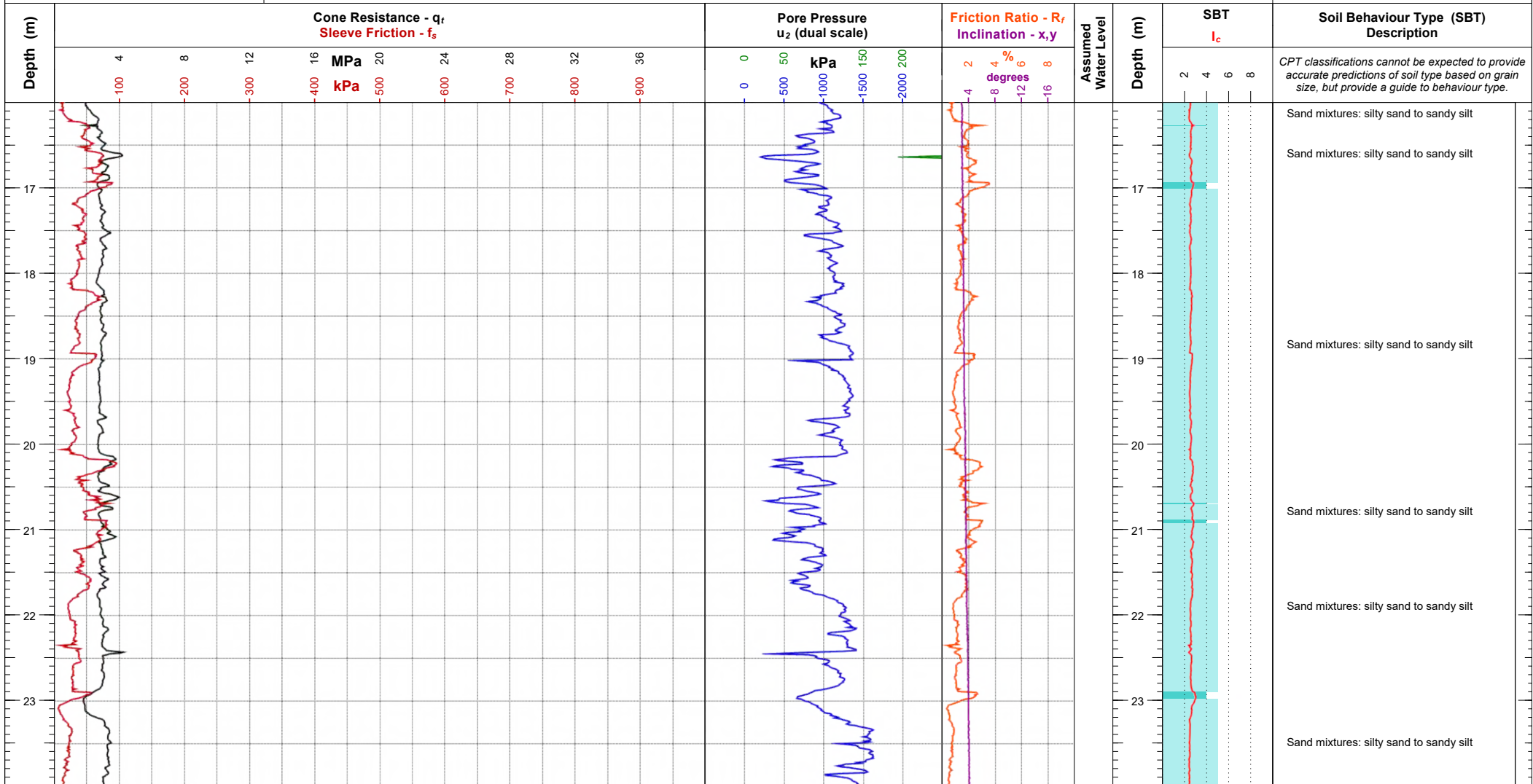
NZTM2000 N,E (m): 5857433.57, 1790453.27
WGS84, (deg): 175.151986, -37.410328
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Target depth

Elevation (m): -
Date of Test: 30/11/2017
Depth (m): 30.01
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-204**
G.I. Job Ref: **17-701**

Remarks:

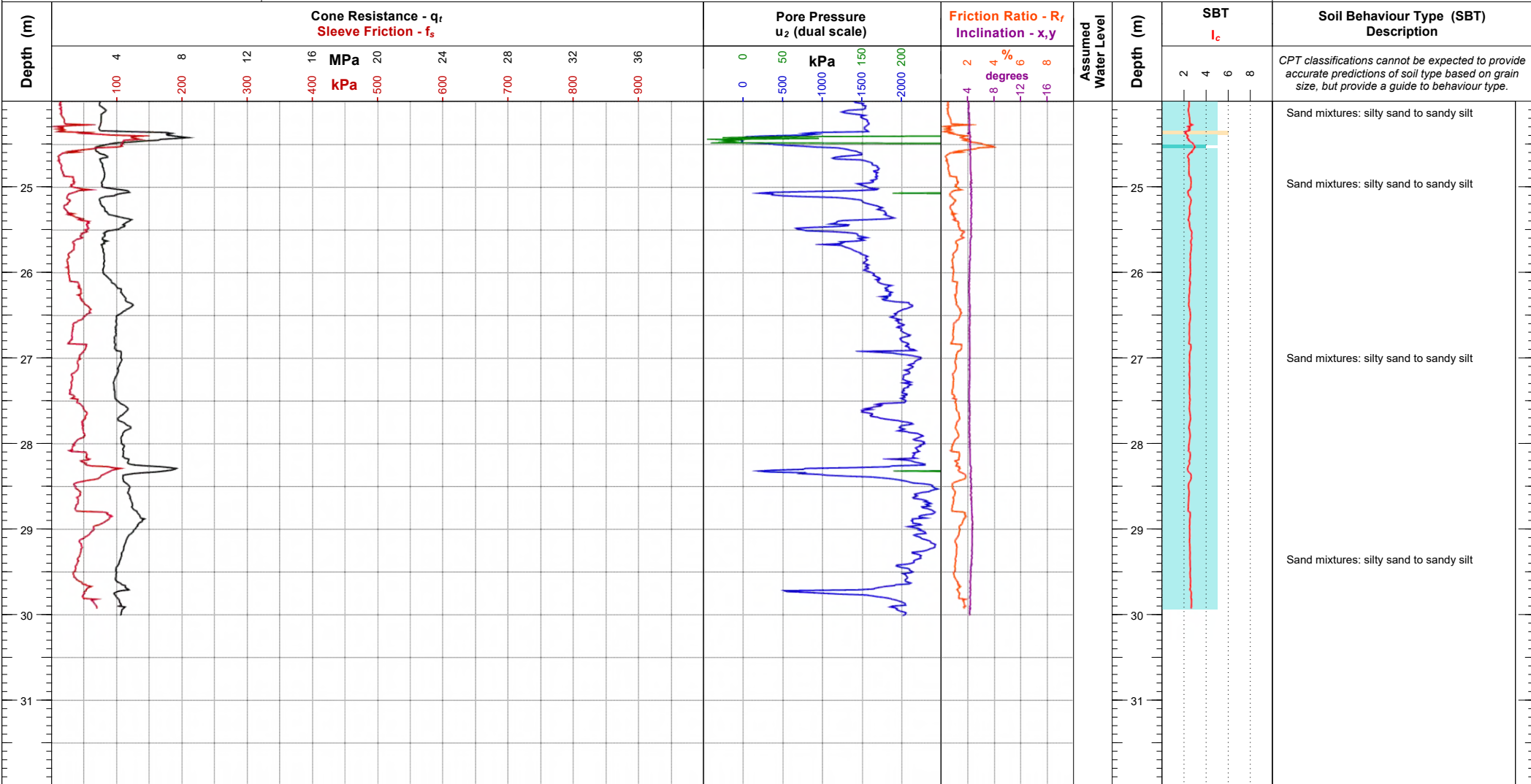
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Javan Cassidy Cone Ref: S15CFIIP.1460.cal Cone Type: 15 cm ² Subtraction Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857433.57, 1790453.27 WGS84, (deg): 175.151986, -37.410328 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Target depth	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 30.01 Pre-Drill (m): N/A	Client Job Ref: CPT Number: CPT-204 G.I. Job Ref: 17-701
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Remarks:

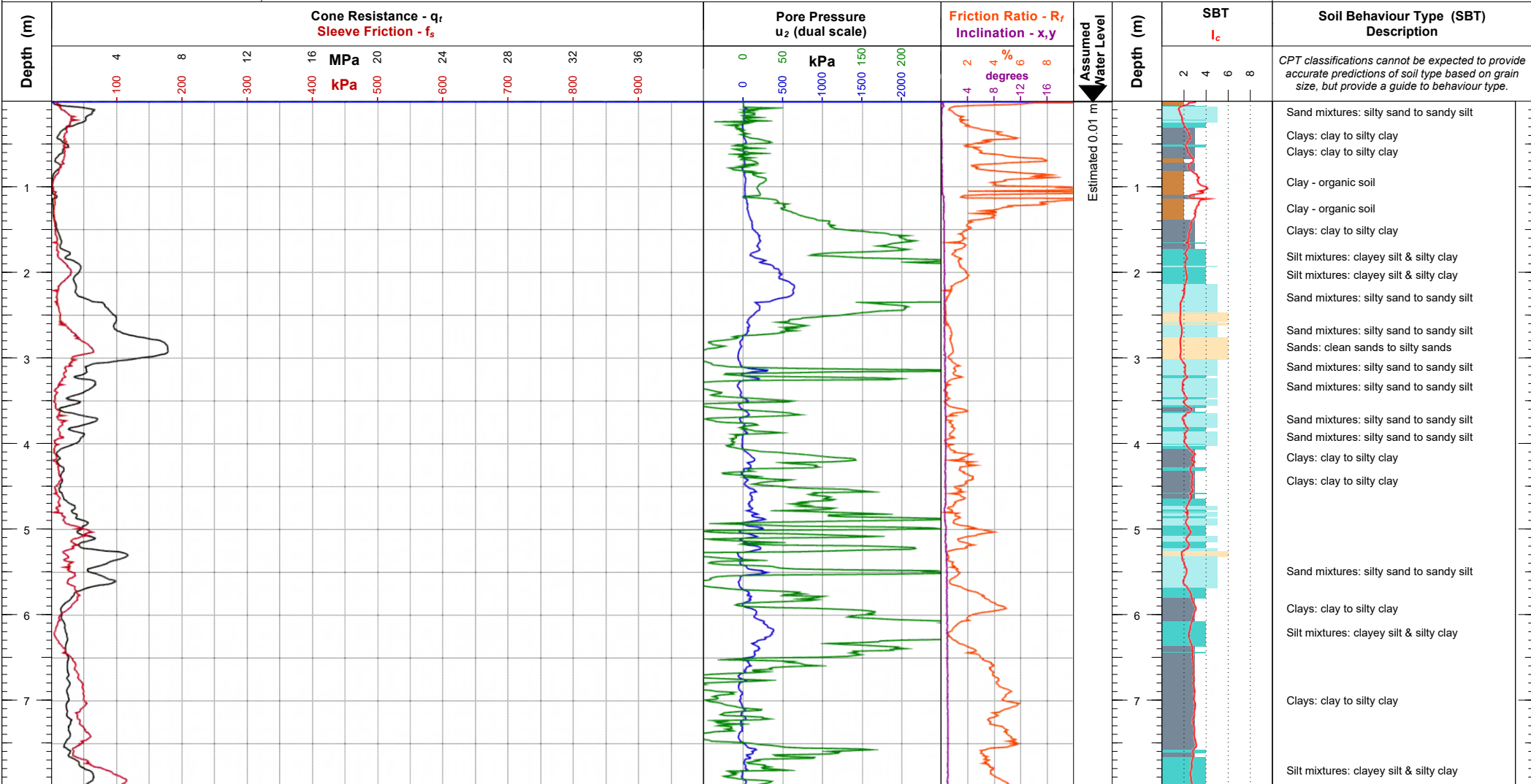
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Javan Cassidy Cone Ref: S15CFIIP.1460.cal Cone Type: 15 cm ² Subtraction Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857433.57, 1790453.27 WGS84, (deg): 175.151986, -37.410328 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Target depth	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 30.01 Pre-Drill (m): N/A	Client Job Ref:
				CPT Number: CPT-204
				G.I. Job Ref: 17-701

Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Javan Cassidy
Cone Ref: S15CFIIP.1460.cal
Cone Type: 15 cm² Subtraction
Area Ratio: 0.79
Filter Type: u2

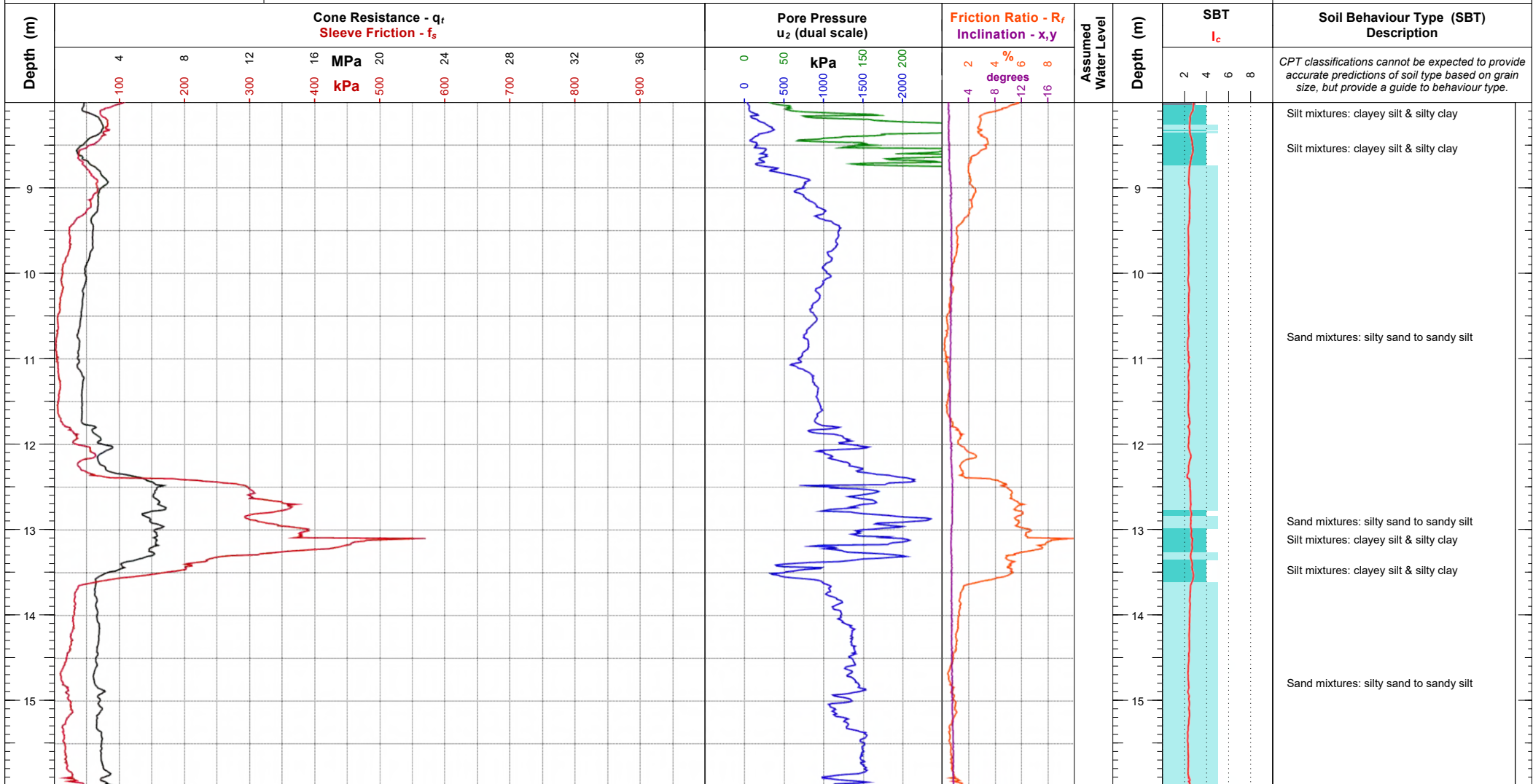
NZTM2000 N,E (m): 5857411.25, 1790458.43
WGS84, (deg): 175.152050, -37.410528
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: High pore water pressure

Elevation (m): -
Date of Test: 30/11/2017
Depth (m): 35.37
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-205**
G.I. Job Ref: **17-701**

Remarks:

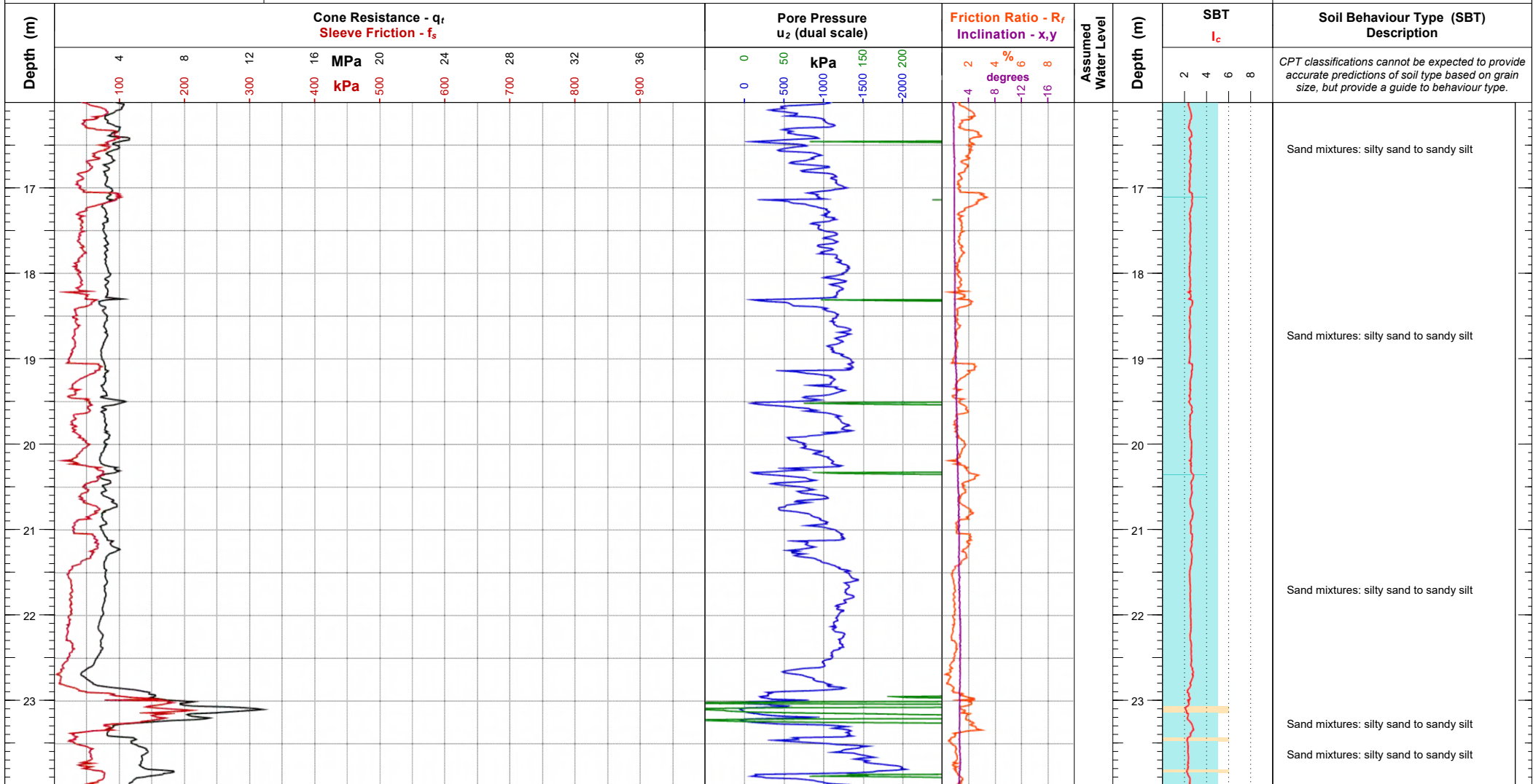
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Javan Cassidy Cone Ref: S15CFIIP.1460.cal Cone Type: 15 cm ² Subtraction Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857411.25, 1790458.43 WGS84, (deg): 175.152050, -37.410528 Location Method: Handheld GPS Surveyor: N/A Termination Reason: High pore water pressure	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 35.37 Pre-Drill (m): N/A	Client Job Ref:
				CPT Number: CPT-205
				G.I. Job Ref: 17-701

Remarks:

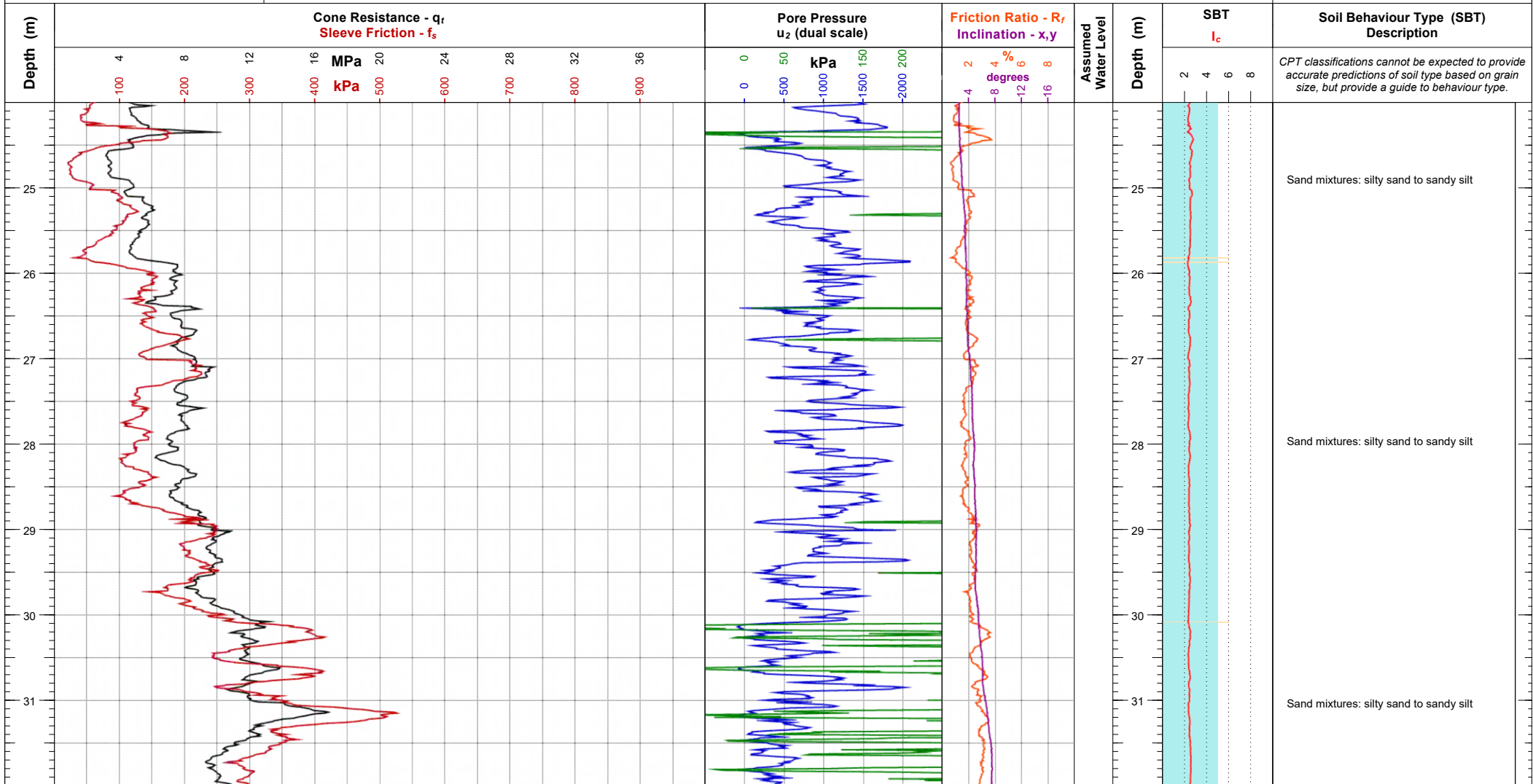
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Javan Cassidy Cone Ref: S15CFIIP.1460.cal Cone Type: 15 cm ² Subtraction Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857411.25, 1790458.43 WGS84, (deg): 175.152050, -37.410528 Location Method: Handheld GPS Surveyor: N/A Termination Reason: High pore water pressure	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 35.37 Pre-Drill (m): N/A	Client Job Ref: CPT Number: CPT-205 G.I. Job Ref: 17-701
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Remarks:

CONE PENETRATION TEST (CPT) LOG



Soil Behaviour Type (SBT) Description

CPT classifications cannot be expected to provide accurate predictions of soil type based on grain size, but provide a guide to behaviour type.

Sand mixtures: silty sand to sandy silt

Sand mixtures: silty sand to sandy silt

Sand mixtures: silty sand to sandy silt

Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Javan Cassidy
Cone Ref: S15CFIIP.1460.cal
Cone Type: 15 cm² Subtraction
Area Ratio: 0.79
Filter Type: u2

NZTM2000 N,E (m): 5857411.25, 1790458.43
WGS84, (deg): 175.152050, -37.410528
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: High pore water pressure

Elevation (m): -
Date of Test: 30/11/2017
Depth (m): 35.37
Pre-Drill (m): N/A

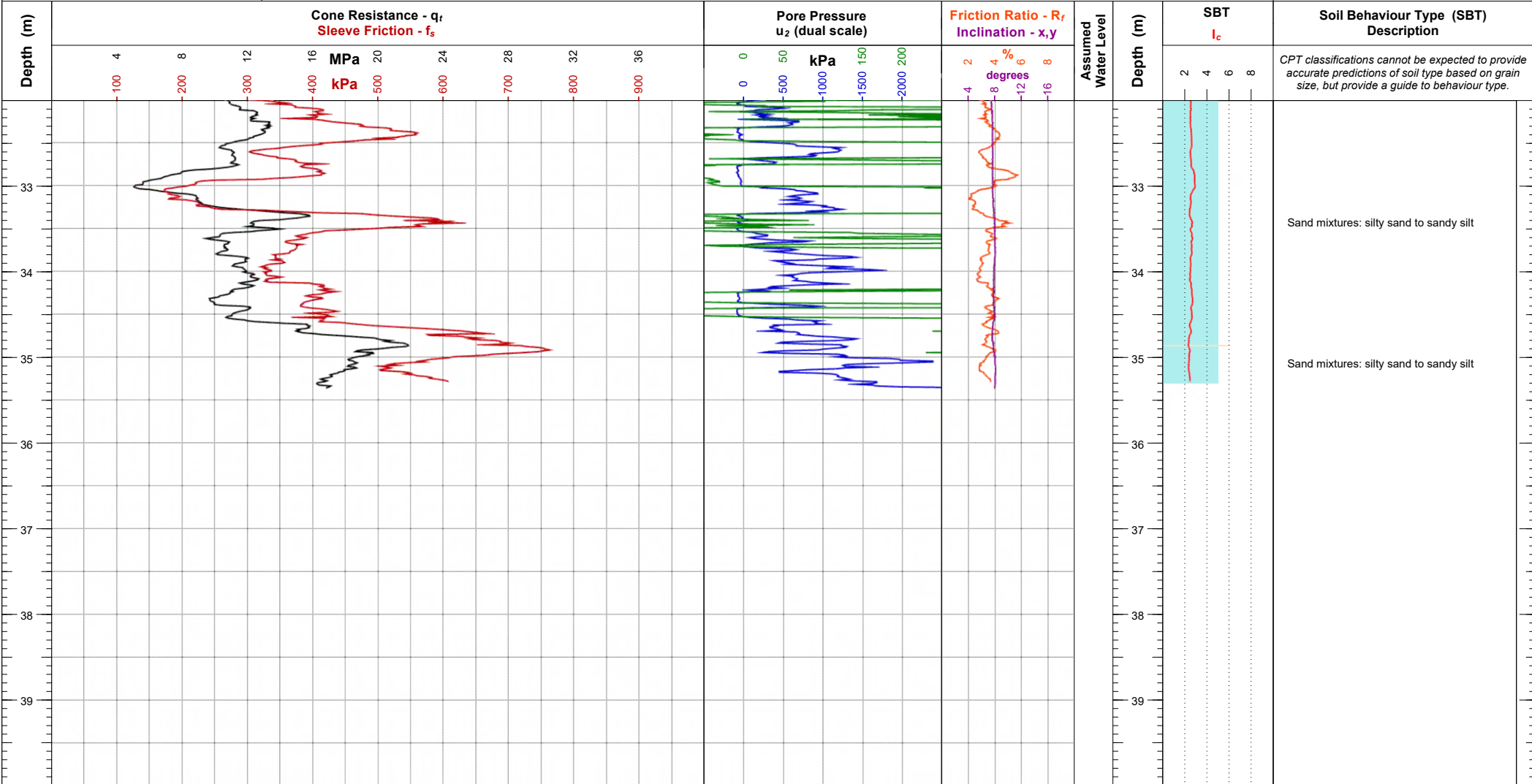
Client Job Ref:

CPT Number: **CPT-205**

G.I. Job Ref: **17-701**

Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Javan Cassidy
Cone Ref: S15CFIIP.1460.cal
Cone Type: 15 cm² Subtraction
Area Ratio: 0.79
Filter Type: u2

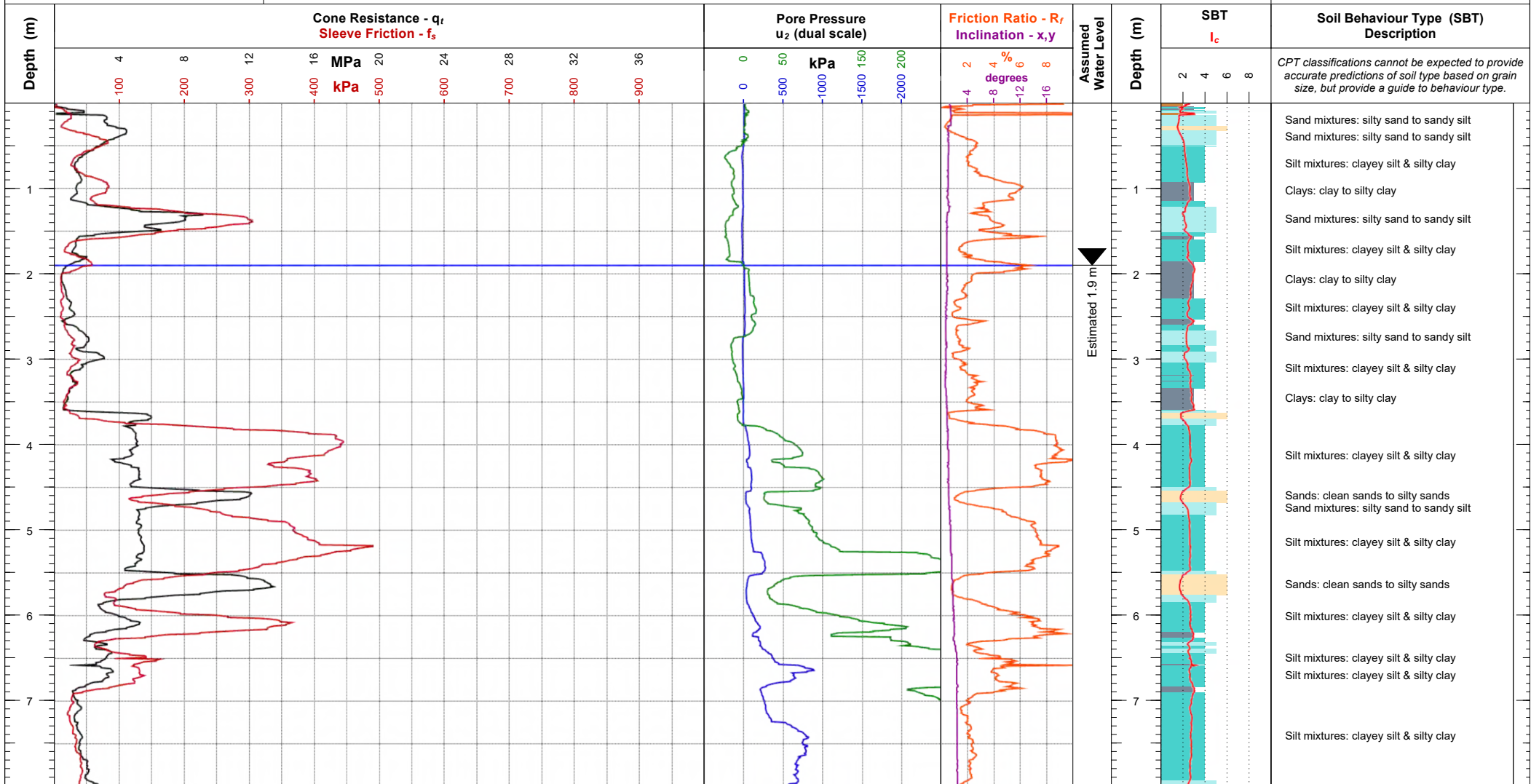
NZTM2000 N,E (m): 5857411.25, 1790458.43
WGS84, (deg): 175.152050, -37.410528
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: High pore water pressure

Elevation (m): -
Date of Test: 30/11/2017
Depth (m): 35.37
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-205**
G.I. Job Ref: **17-701**

Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ333
Cone Type: 10 cm² Compression
Area Ratio: 0.8
Filter Type: u2

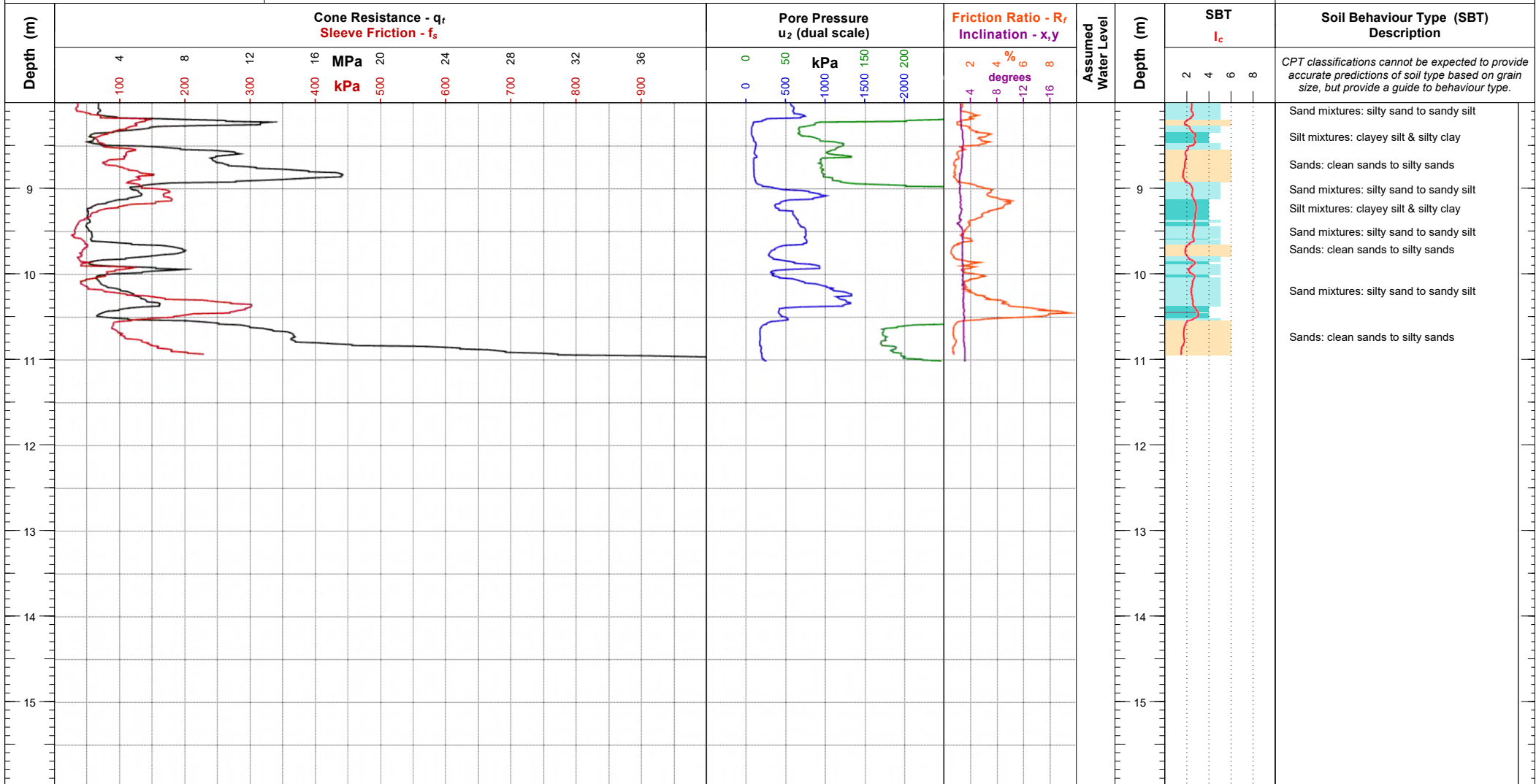
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WGS84, (deg): 175.152599, -37.411308
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: High cone end resistance

Elevation (m): -
Date of Test: 29/11/2017
Depth (m): 11.02
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-206**
G.I. Job Ref: **17-701**

Remarks:

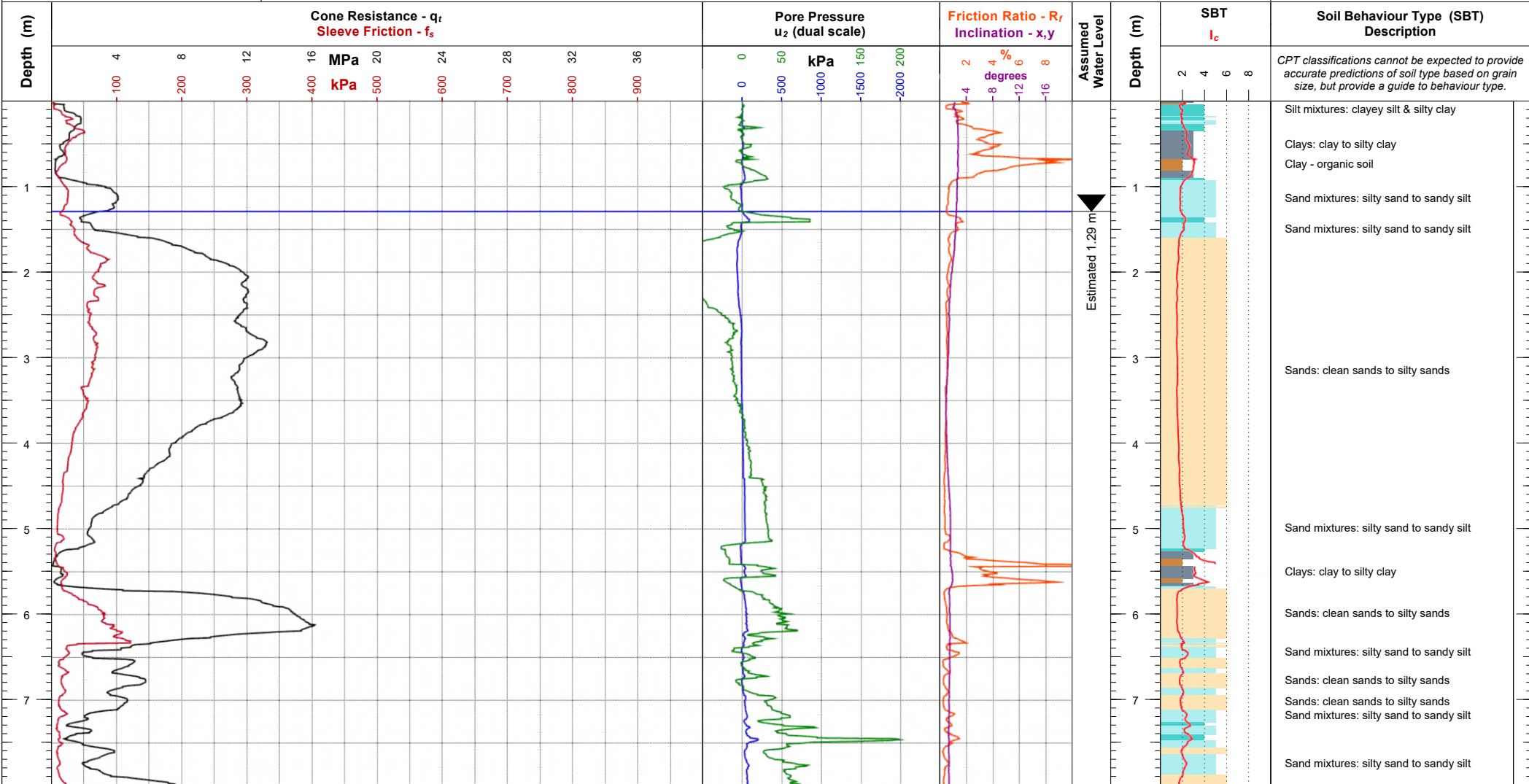
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ333 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5857323.59, 1790505.05 WGS84, (deg): 175.152599, -37.411308 Location Method: Handheld GPS Surveyor: N/A Termination Reason: High cone end resistance	Elevation (m): - Date of Test: 29/11/2017 Depth (m): 11.02 Pre-Drill (m): N/A	Client Job Ref: <div style="text-align: center;">CPT Number: CPT-206</div> G.I. Job Ref: 17-701
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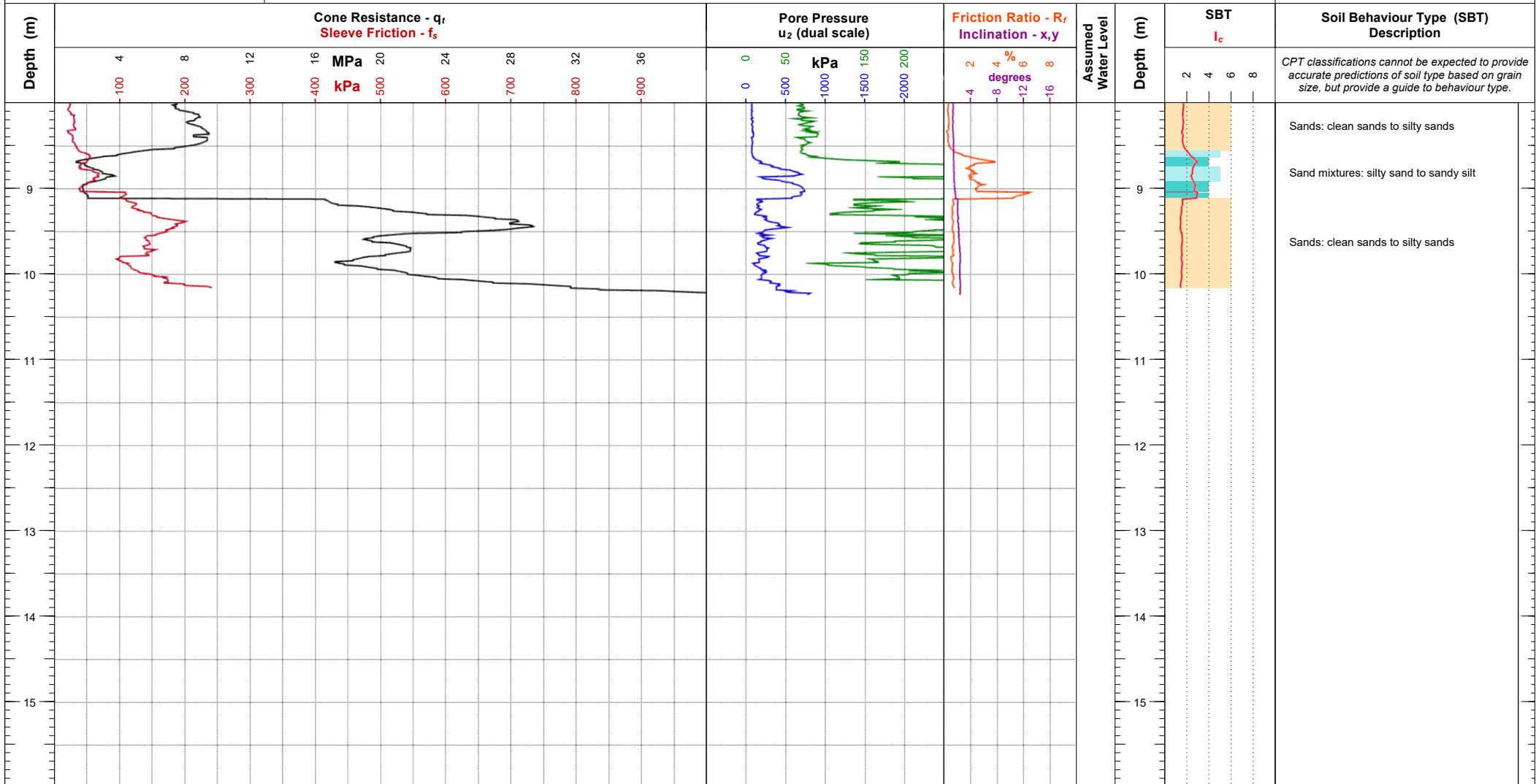
Remarks:

CONE PENETRATION TEST (CPT) LOG



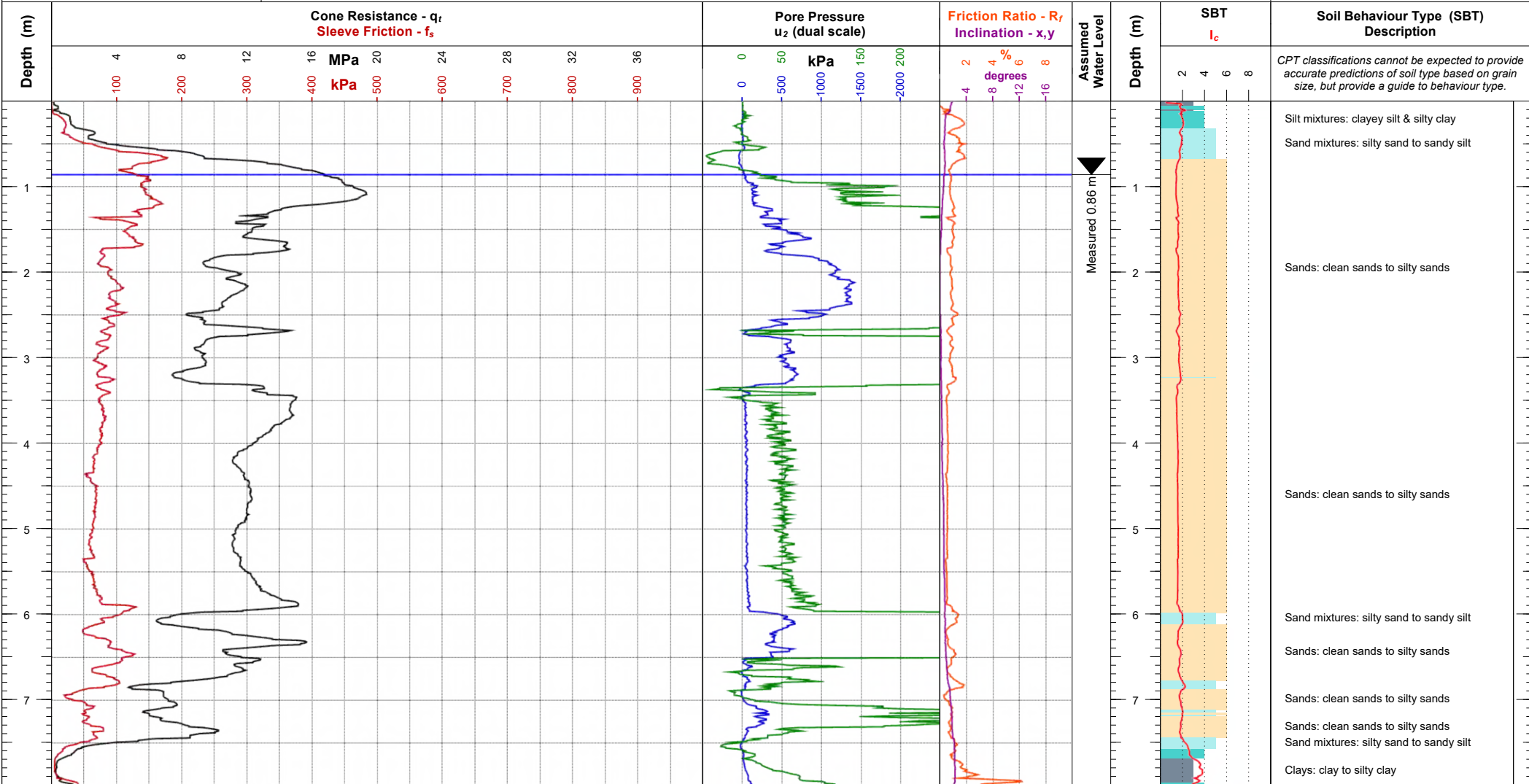
Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Tomas Cone Ref: MKJ540 Cone Type: 10 cm ² Compression Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857374.81, 1790644.46 WGS84, (deg): 175.154160, -37.410818 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 10.24 Pre-Drill (m): N/A
Client Job Ref:		CPT Number: CPT-207	
Remarks:		G.I. Job Ref: 17-701	

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Tomas Cone Ref: MKJ540 Cone Type: 10 cm ² Compression Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857374.81, 1790644.46 WGS84, (deg): 175.154160, -37.410818 Location Method: Handheld GPS Surveyor: N/A	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 10.24 Pre-Drill (m): N/A
Remarks:			Client Job Ref: CPT Number: CPT-207 G.I. Job Ref: 17-701

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ540
Cone Type: 10 cm² Compression
Area Ratio: 0.79
Filter Type: u2

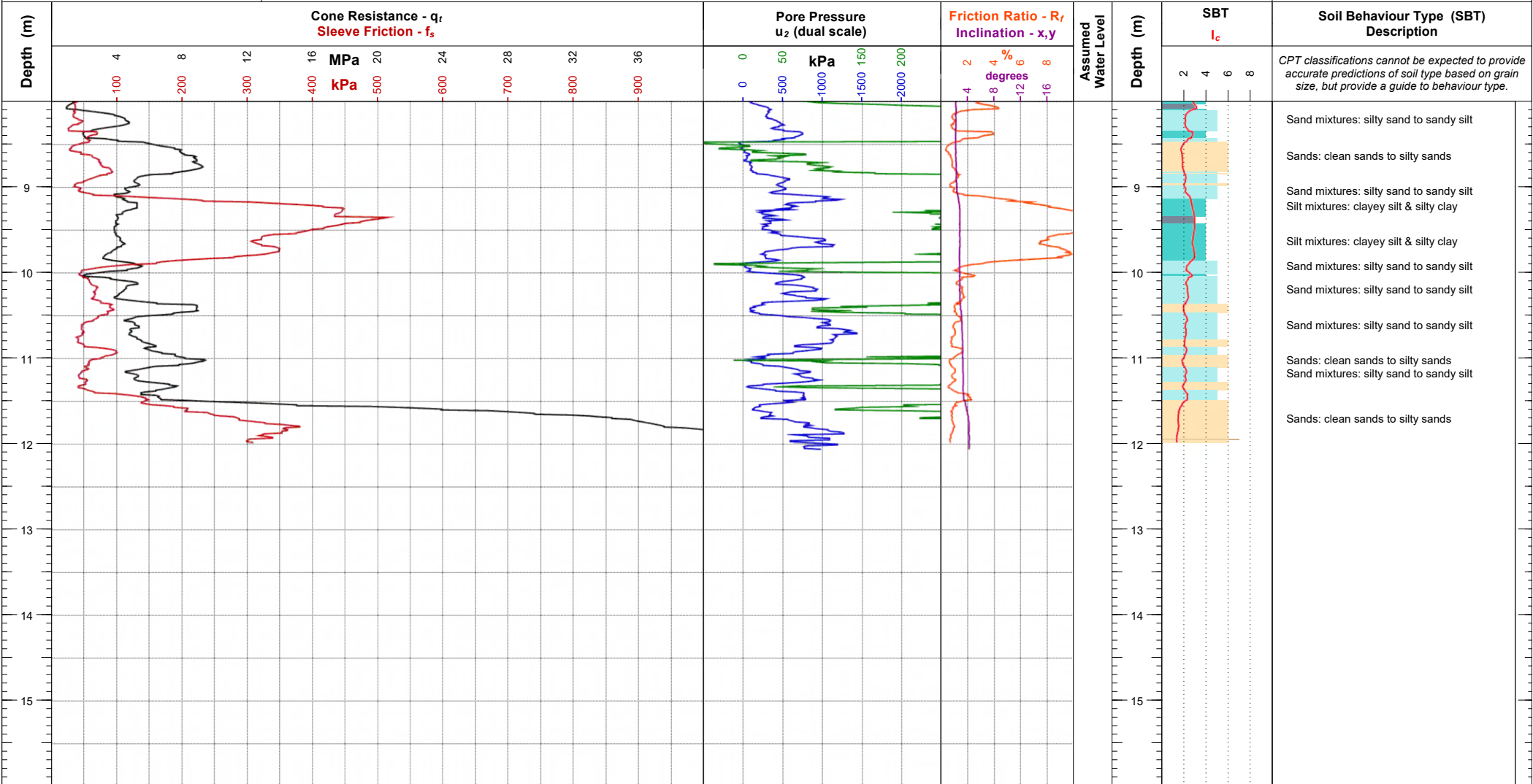
NZTM2000 N,E (m): 5857361.5, 1790634.14
WGS84, (deg): 175.154047, -37.410940
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Limit of reaction force

Elevation (m): -
Date of Test: 30/11/2017
Depth (m): 12.06
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-208**
G.I. Job Ref: **17-701**

Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ540
Cone Type: 10 cm² Compression
Area Ratio: 0.79
Filter Type: u2

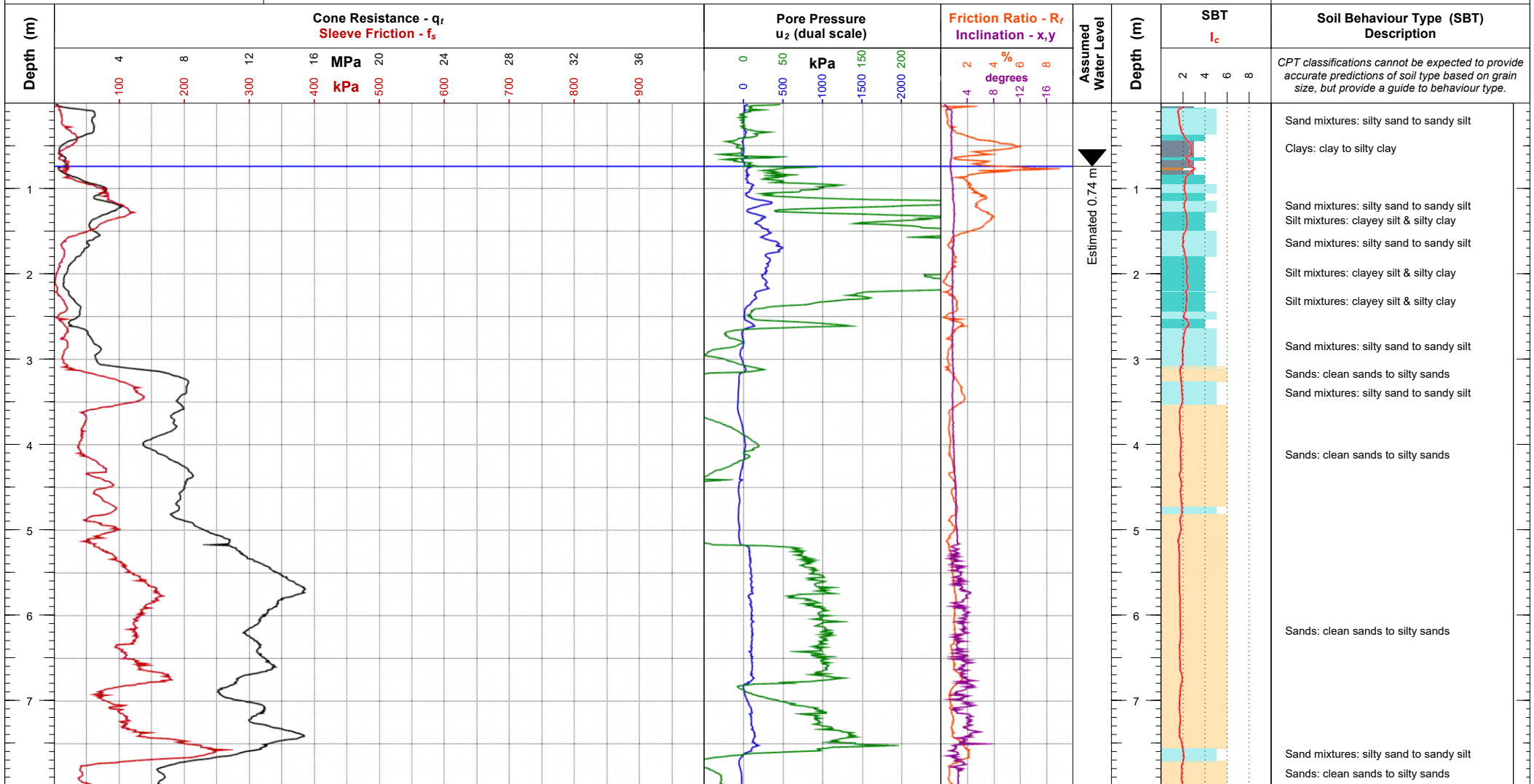
NZTM2000 N,E (m): 5857361.5, 1790634.14
WGS84, (deg): 175.154047, -37.410940
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Limit of reaction force

Elevation (m): -
Date of Test: 30/11/2017
Depth (m): 12.06
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-208**
G.I. Job Ref: **17-701**

Remarks:

CONE PENETRATION TEST (CPT) LOG



CPT classifications cannot be expected to provide accurate predictions of soil type based on grain size, but provide a guide to behaviour type.

Sand mixtures: silty sand to sandy silt
 Clays: clay to silty clay

Sand mixtures: silty sand to sandy silt
 Silt mixtures: clayey silt & silty clay
 Sand mixtures: silty sand to sandy silt
 Silt mixtures: clayey silt & silty clay
 Silt mixtures: clayey silt & silty clay

Sand mixtures: silty sand to sandy silt
 Sands: clean sands to silty sands
 Sand mixtures: silty sand to sandy silt

Sands: clean sands to silty sands

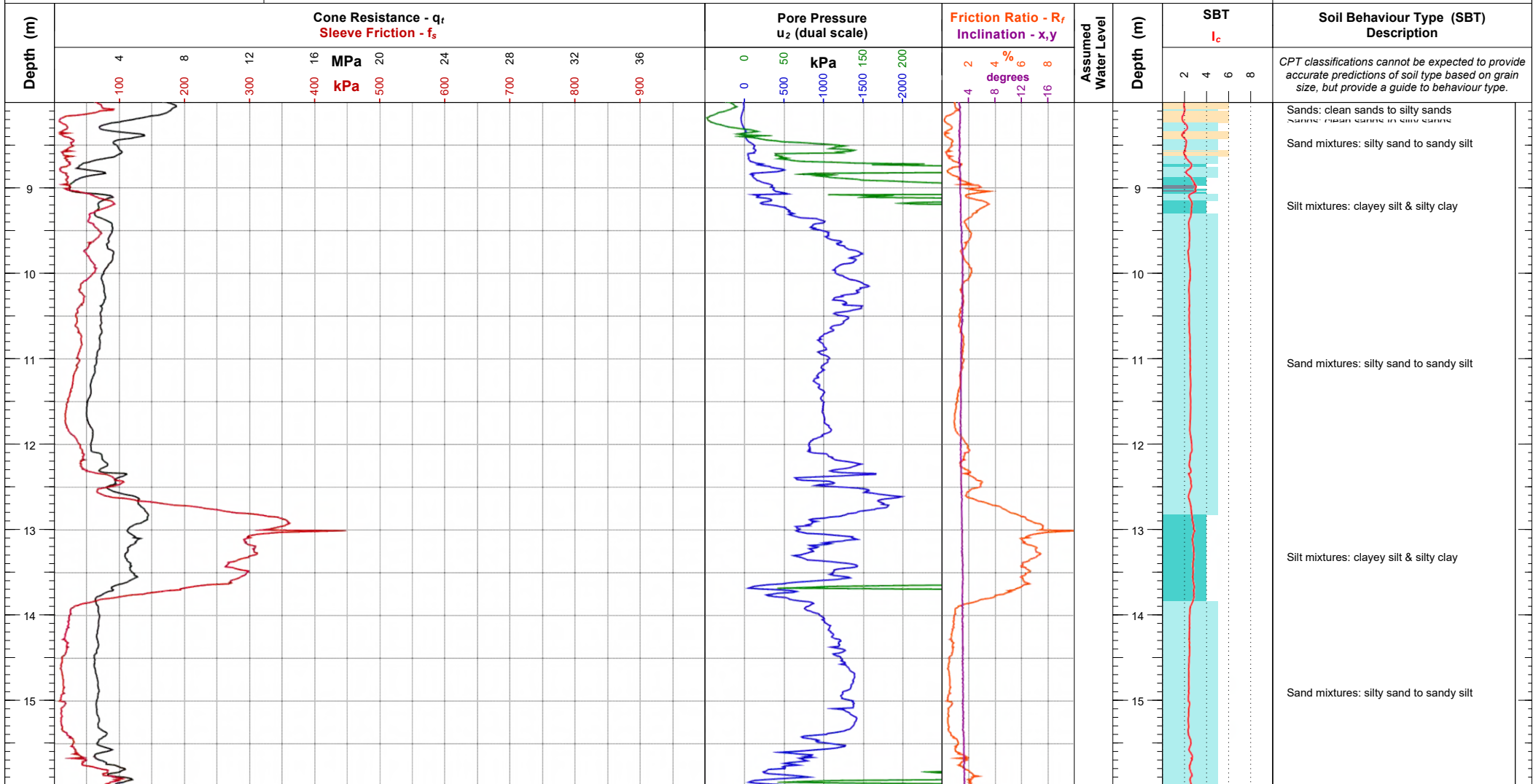
Sands: clean sands to silty sands

Sand mixtures: silty sand to sandy silt
 Sands: clean sands to silty sands

Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Javan Cassidy Cone Ref: S15CFIIP.1460.cal Cone Type: 15 cm ² Subtraction Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857395.59, 1790463.39 WGS84, (deg): 175.152110, -37.410668 Location Method: Handheld GPS Surveyor: N/A Termination Reason: High pore water pressure	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 26.45 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-209
G.I. Job Ref:			17-701

Remarks:

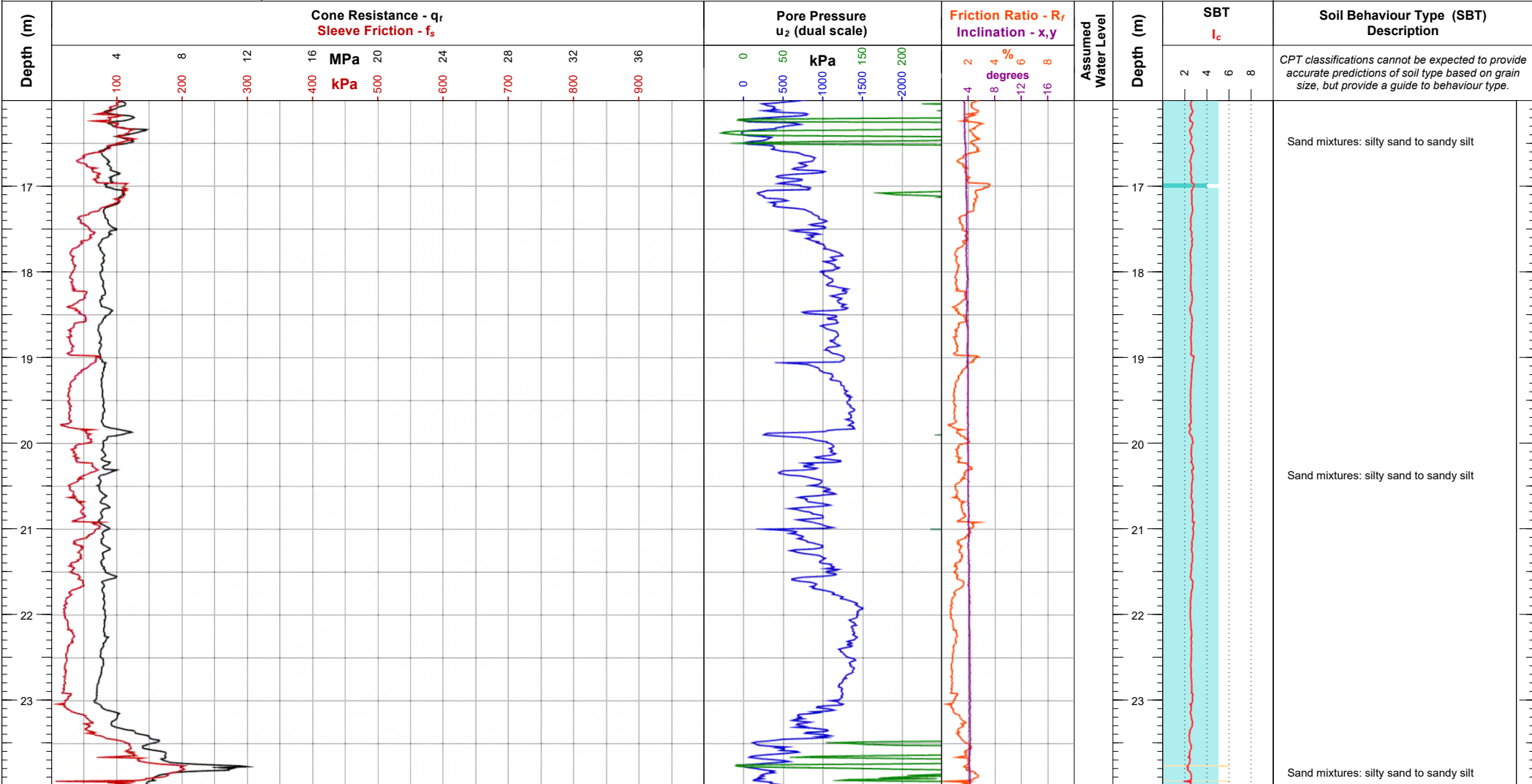
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Javan Cassidy Cone Ref: S15CFIIP.1460.cal Cone Type: 15 cm ² Subtraction Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857395.59, 1790463.39 WGS84, (deg): 175.152110, -37.410668 Location Method: Handheld GPS Surveyor: N/A Termination Reason: High pore water pressure	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 26.45 Pre-Drill (m): N/A
		Client Job Ref:	
		CPT Number: CPT-209	
		G.I. Job Ref: 17-701	

Remarks:

CONE PENETRATION TEST (CPT) LOG



Soil Behaviour Type (SBT) Description

CPT classifications cannot be expected to provide accurate predictions of soil type based on grain size, but provide a guide to behaviour type.

Sand mixtures: silty sand to sandy silt

Sand mixtures: silty sand to sandy silt

Sand mixtures: silty sand to sandy silt

Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Javan Cassidy
Cone Ref: S15CFIIP.1460.cal
Cone Type: 15 cm² Subtraction
Area Ratio: 0.79
Filter Type: u2

NZTM2000 N,E (m): 5857395.59, 1790463.39
WGS84, (deg): 175.152110, -37.410668
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: High pore water pressure

Elevation (m): -
Date of Test: 30/11/2017
Depth (m): 26.45
Pre-Drill (m): N/A

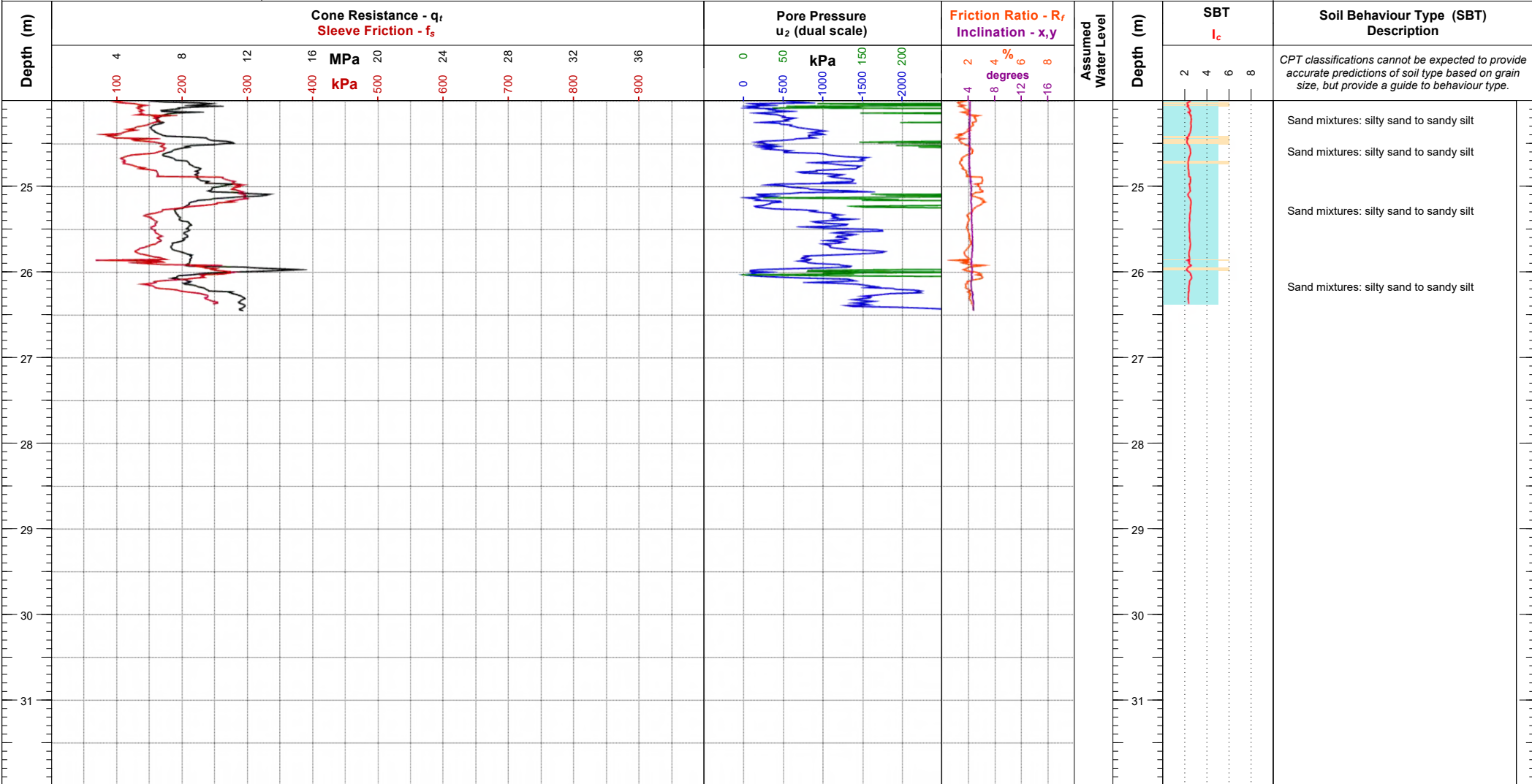
Client Job Ref:

CPT Number: **CPT-209**

G.I. Job Ref: **17-701**

Remarks:

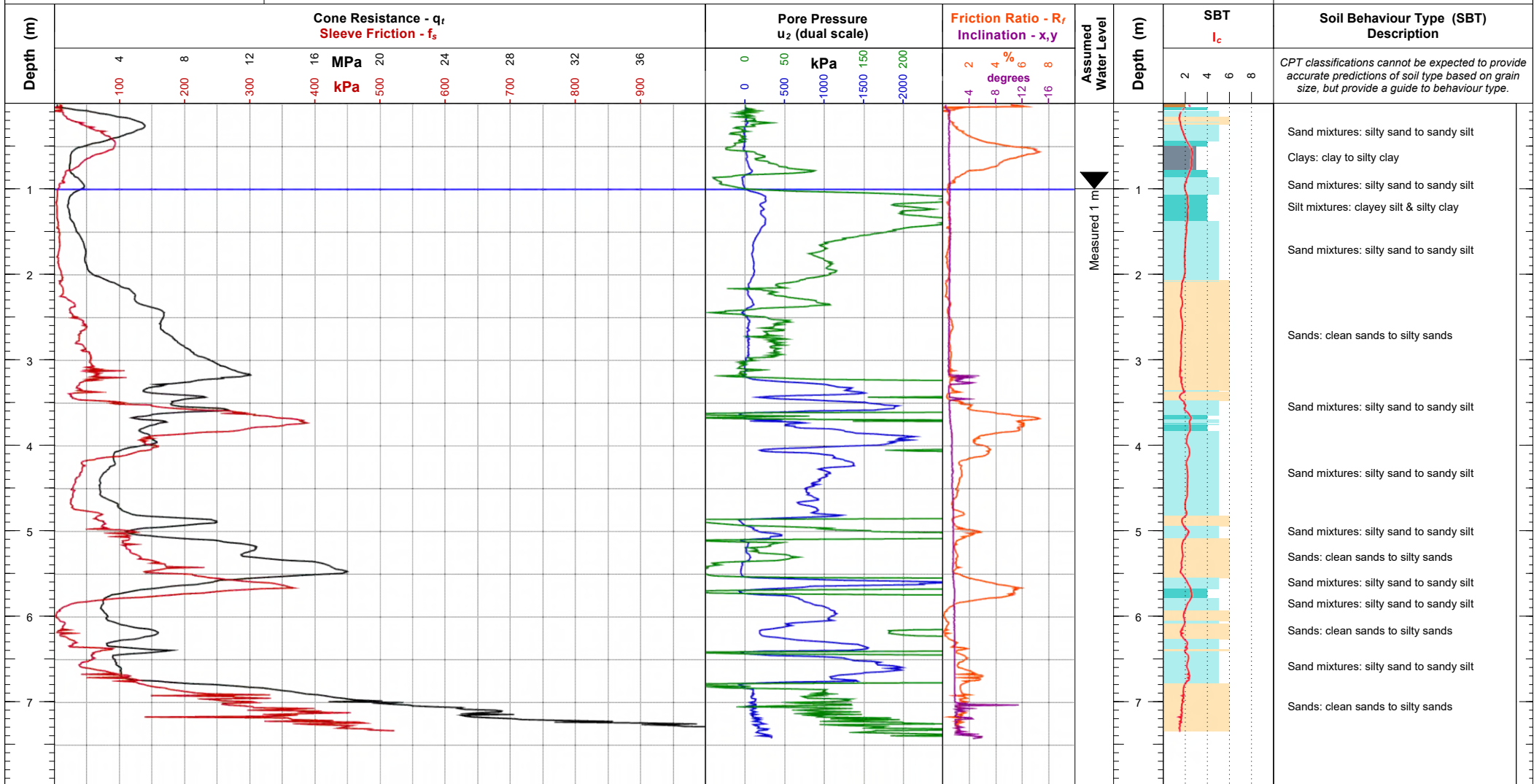
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Javan Cassidy Cone Ref: S15CFIIP.1460.cal Cone Type: 15 cm ² Subtraction Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857395.59, 1790463.39 WGS84, (deg): 175.152110, -37.410668 Location Method: Handheld GPS Surveyor: N/A Termination Reason: High pore water pressure	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 26.45 Pre-Drill (m): N/A	Client Job Ref: CPT Number: CPT-209 G.I. Job Ref: 17-701
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Remarks:

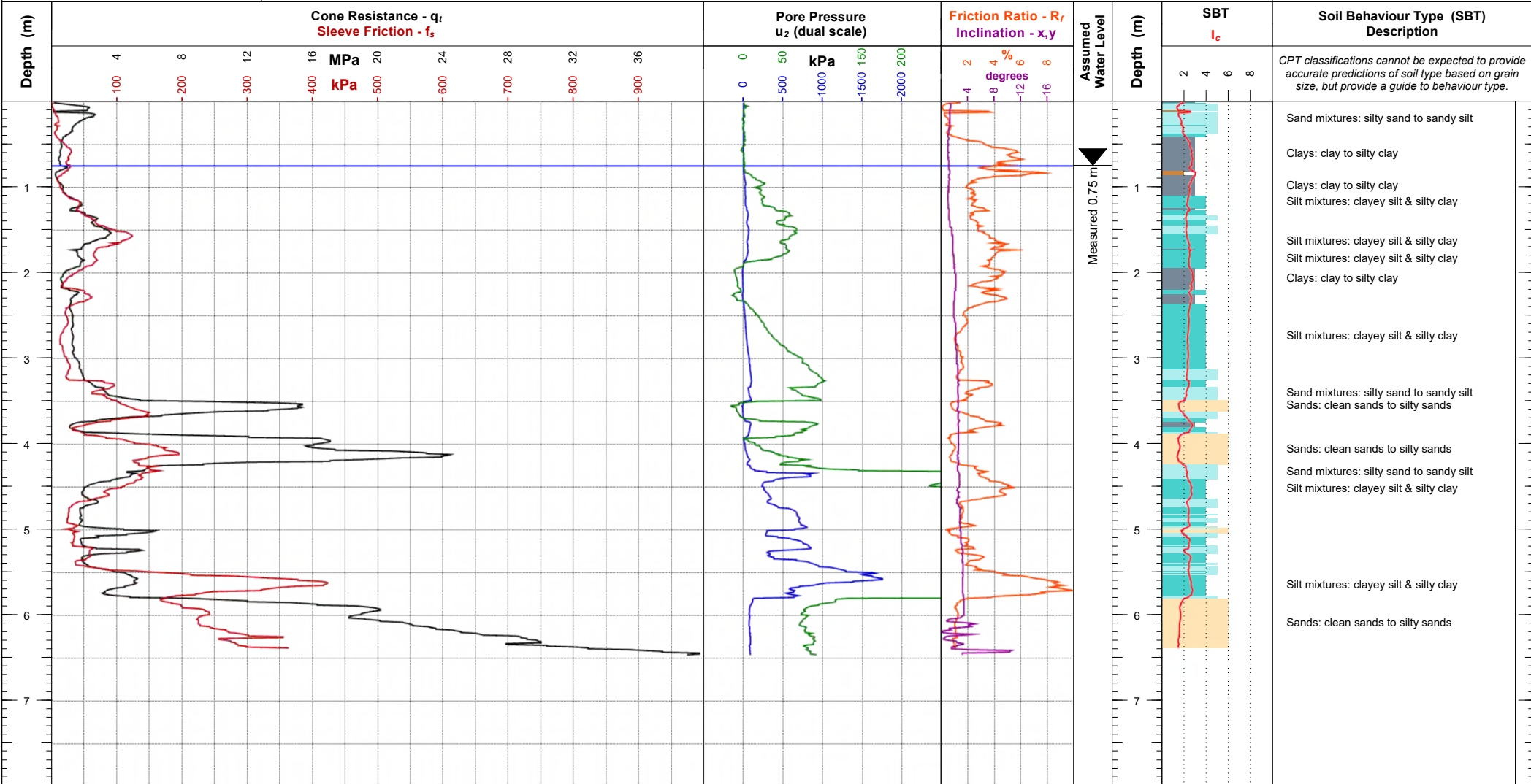
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Javan Cassidy Cone Ref: S15CFIIP.1460.cal Cone Type: 15 cm ² Subtraction Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857373.86, 1790466.96 WGS84, (deg): 175.152156, -37.410863 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Inclination high or rapid increase	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 7.42 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-210
G.I. Job Ref:			17-701

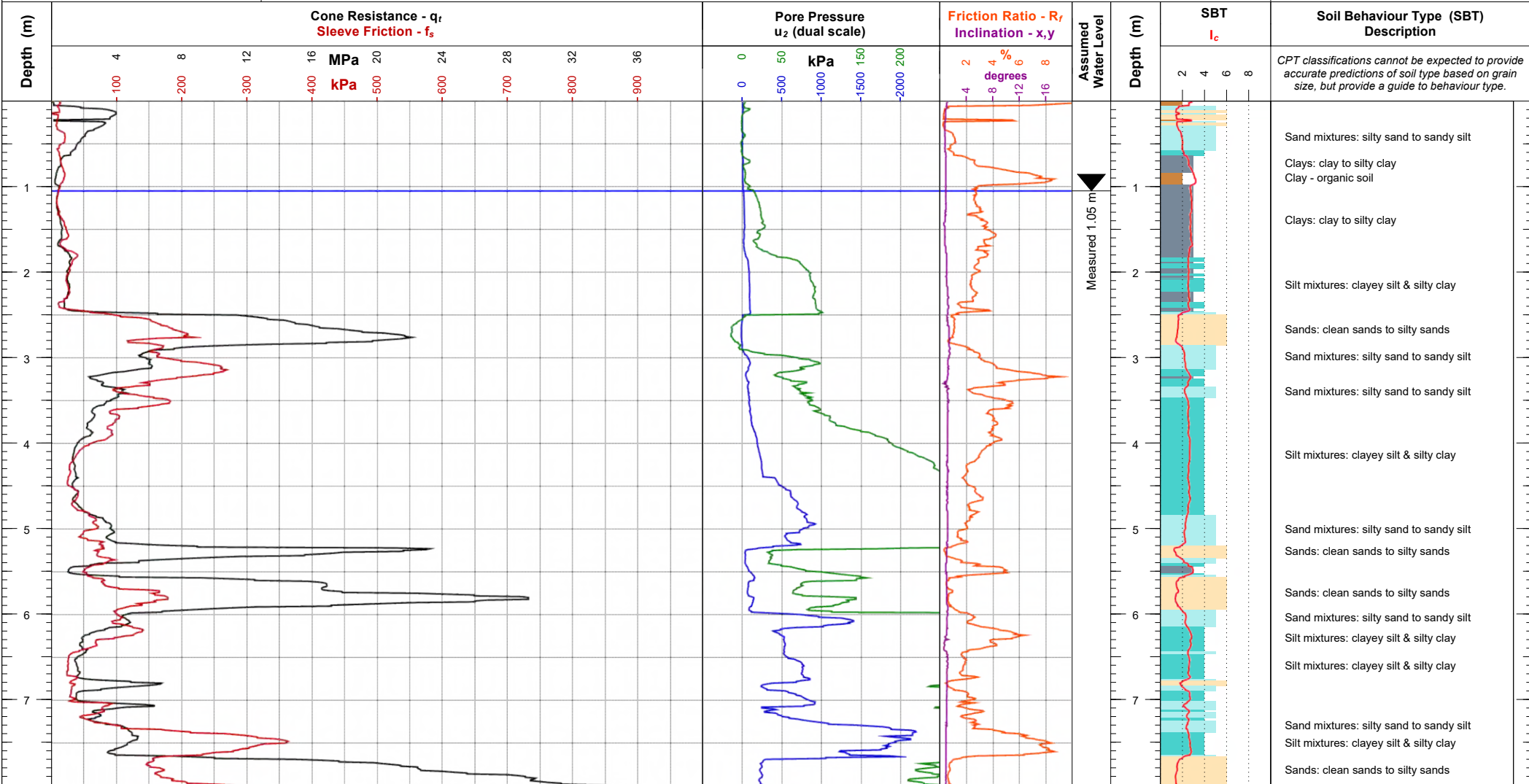
Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Tomas Cone Ref: MKJ333 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5857253.16, 1790560.47 WGS84, (deg): 175.153243, -37.411931 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 29/11/2017 Depth (m): 6.46 Pre-Drill (m): N/A
Remarks:			Client Job Ref: CPT Number: CPT-211 G.I. Job Ref: 17-701

CONE PENETRATION TEST (CPT) LOG



CPT classifications cannot be expected to provide accurate predictions of soil type based on grain size, but provide a guide to behaviour type.

Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ333
Cone Type: 10 cm² Compression
Area Ratio: 0.8
Filter Type: u2

NZTM2000 N,E (m): 5857267.09, 1790553.08
WGS84, (deg): 175.153156, -37.411807
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Danger of buckling rods

Elevation (m): -
Date of Test: 29/11/2017
Depth (m): 8.32
Pre-Drill (m): N/A

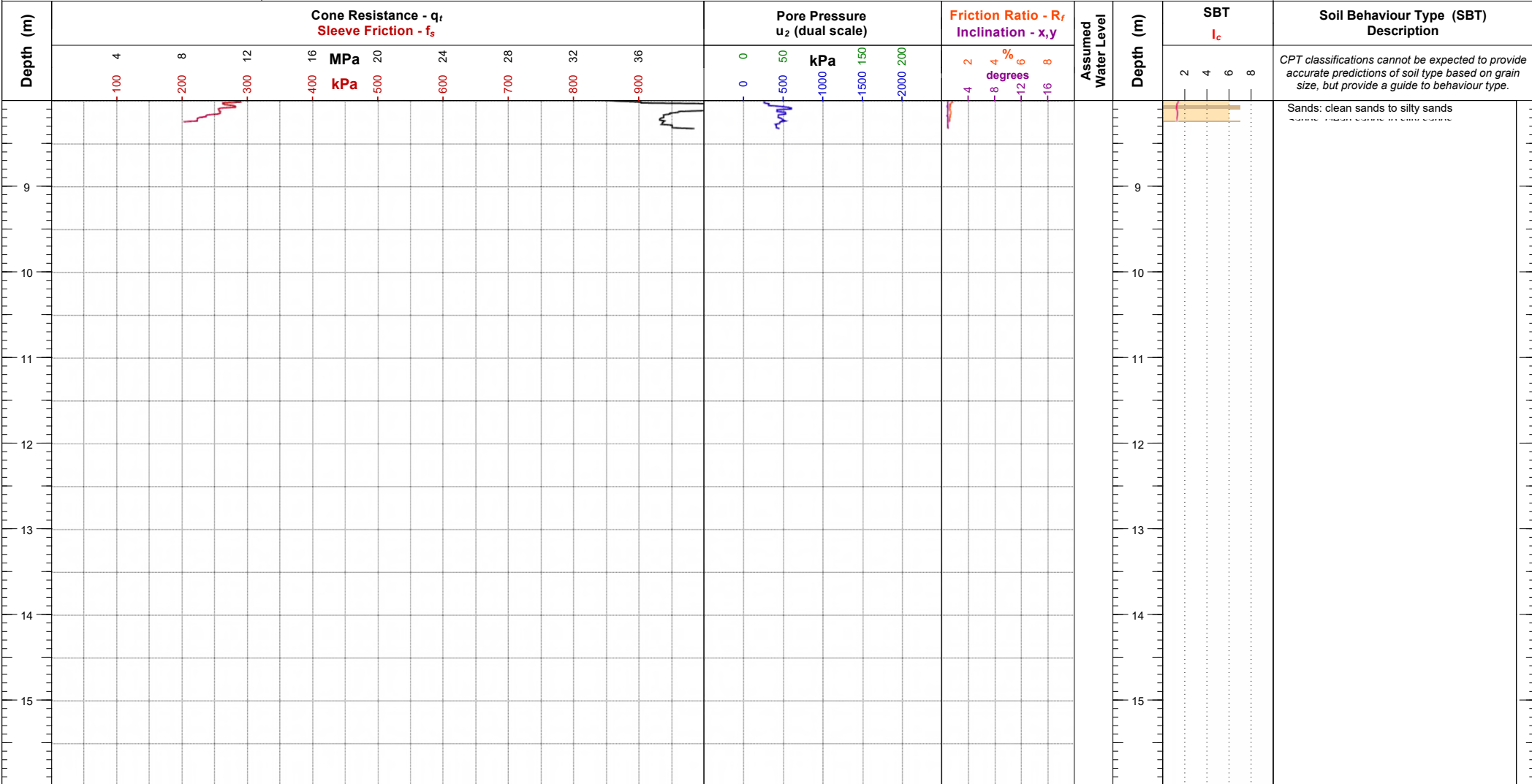
Client Job Ref:

CPT Number: **CPT-212**

G.I. Job Ref: **17-701**

Remarks:

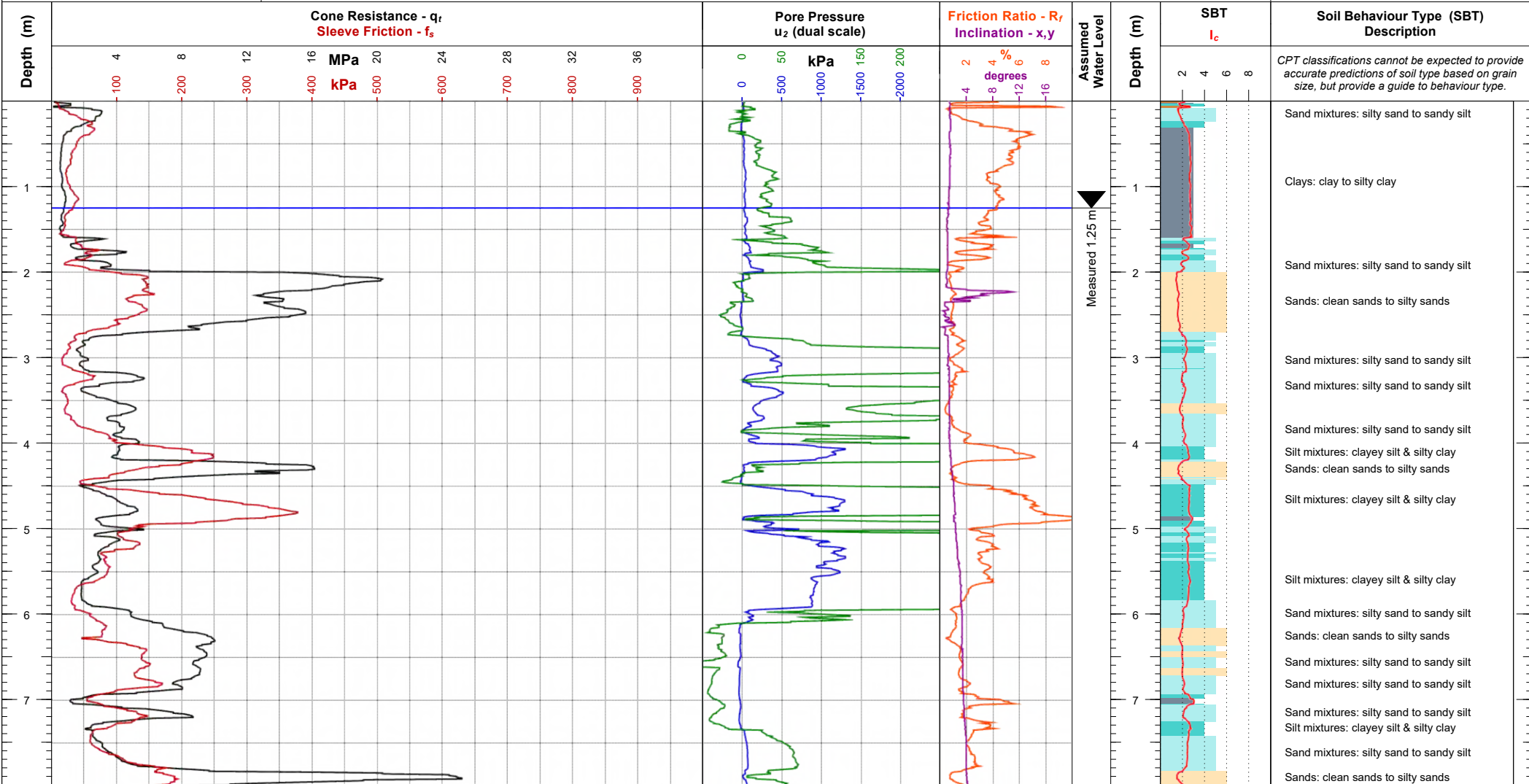
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ333 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5857267.09, 1790553.08 WGS84, (deg): 175.153156, -37.411807 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Danger of buckling rods	Elevation (m): - Date of Test: 29/11/2017 Depth (m): 8.32 Pre-Drill (m): N/A	Client Job Ref:
				CPT Number: CPT-212
				G.I. Job Ref: 17-701

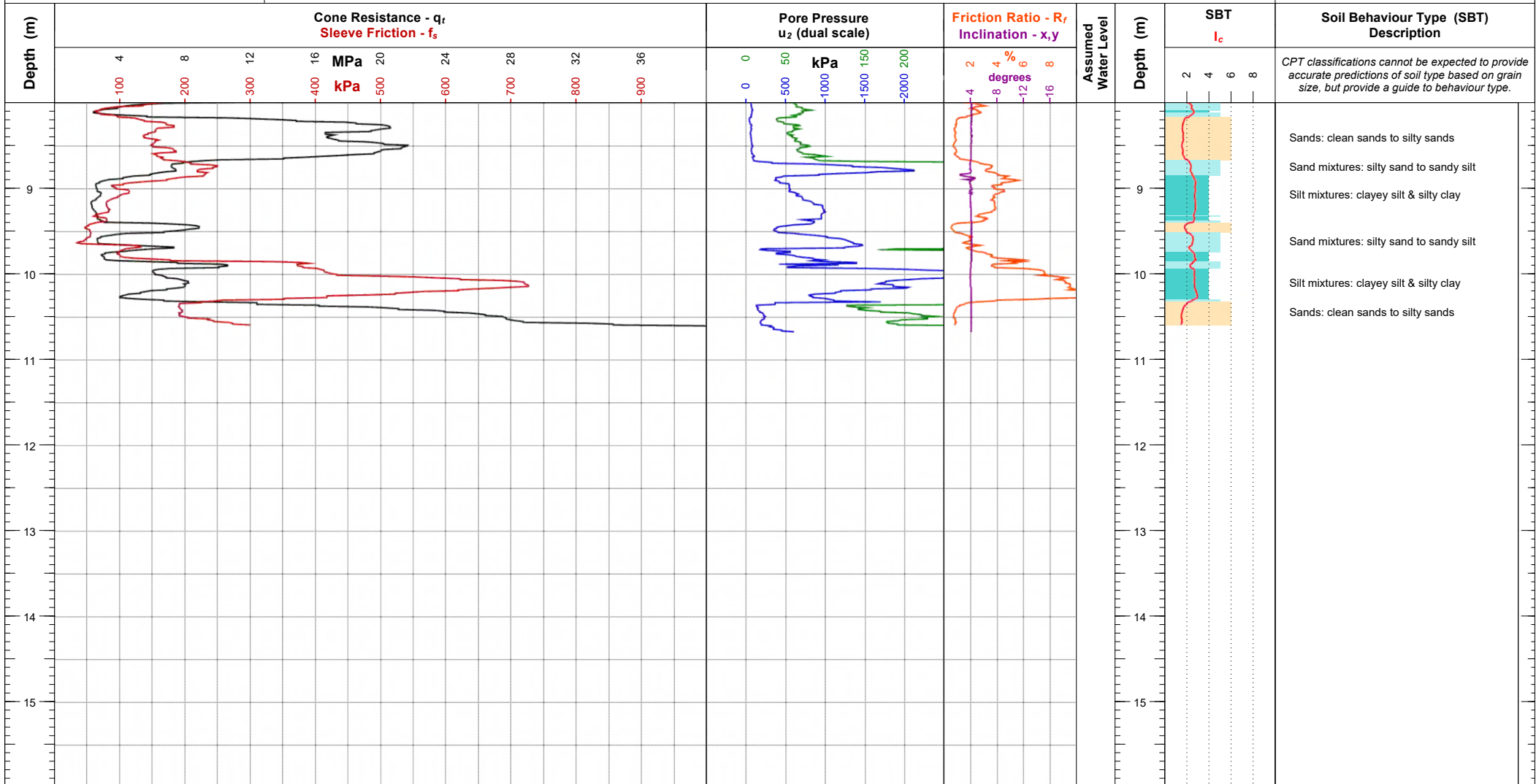
Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Tomas Cone Ref: MKJ333 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5857292.24, 1790541.08 WGS84, (deg): 175.153014, -37.411583 Location Method: Handheld GPS Surveyor: N/A Termination Reason: High cone end resistance	Elevation (m): - Date of Test: 29/11/2017 Depth (m): 10.67 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-213
Remarks:			G.I. Job Ref: 17-701

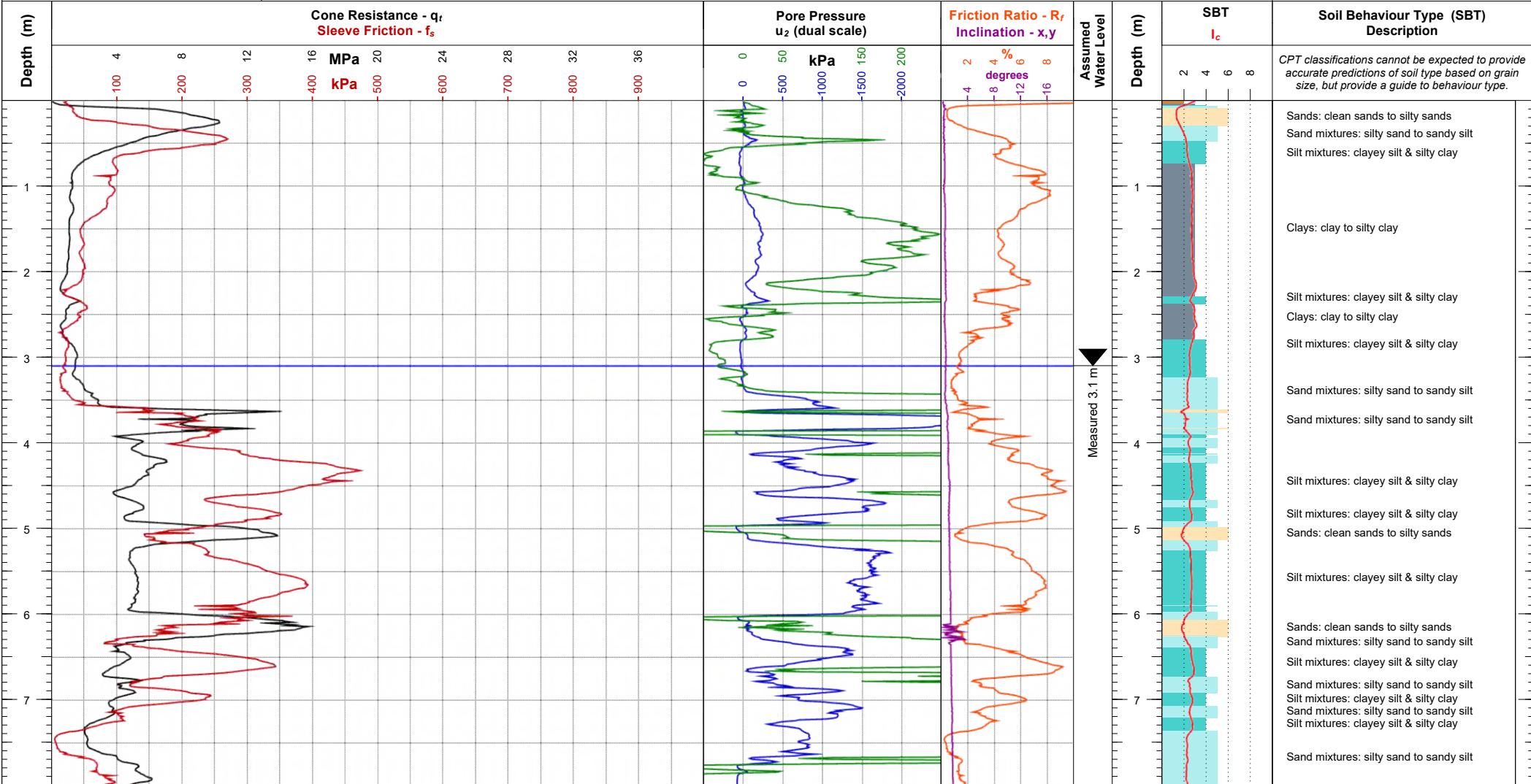
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Tomas Cone Ref: MKJ333 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5857292.24, 1790541.08 WGS84, (deg): 175.153014, -37.411583 Location Method: Handheld GPS Surveyor: N/A Termination Reason: High cone end resistance	Elevation (m): - Date of Test: 29/11/2017 Depth (m): 10.67 Pre-Drill (m): N/A	Client Job Ref:
				CPT Number: CPT-213
				G.I. Job Ref: 17-701

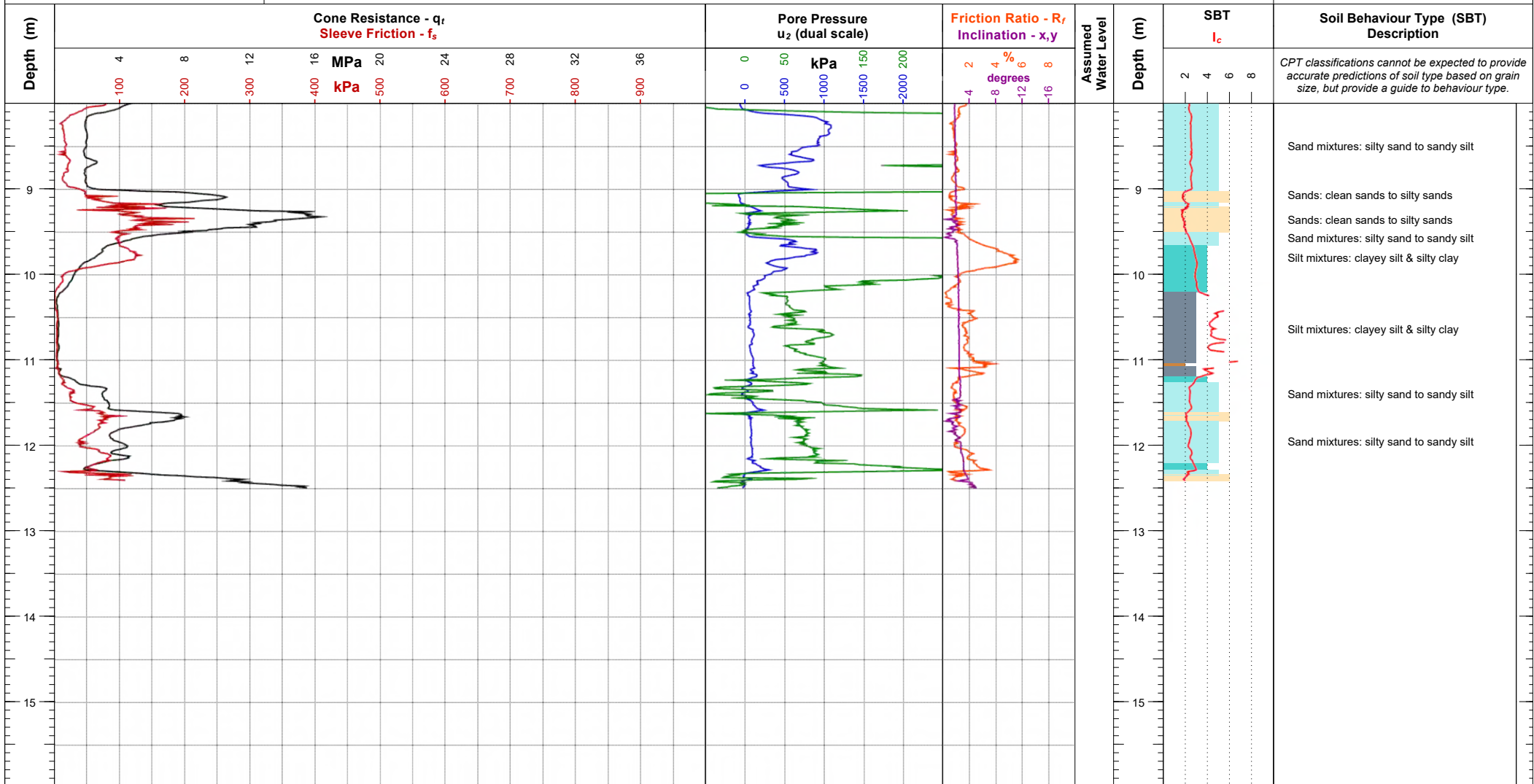
Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Javan Cassidy Cone Ref: S15CFIIP.1460.cal Cone Type: 15 cm ² Subtraction Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857306.87, 1790440.02 WGS84, (deg): 175.151869, -37.411472 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Inclination high or rapid increase	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 12.49 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-214
Remarks:			G.I. Job Ref: 17-701

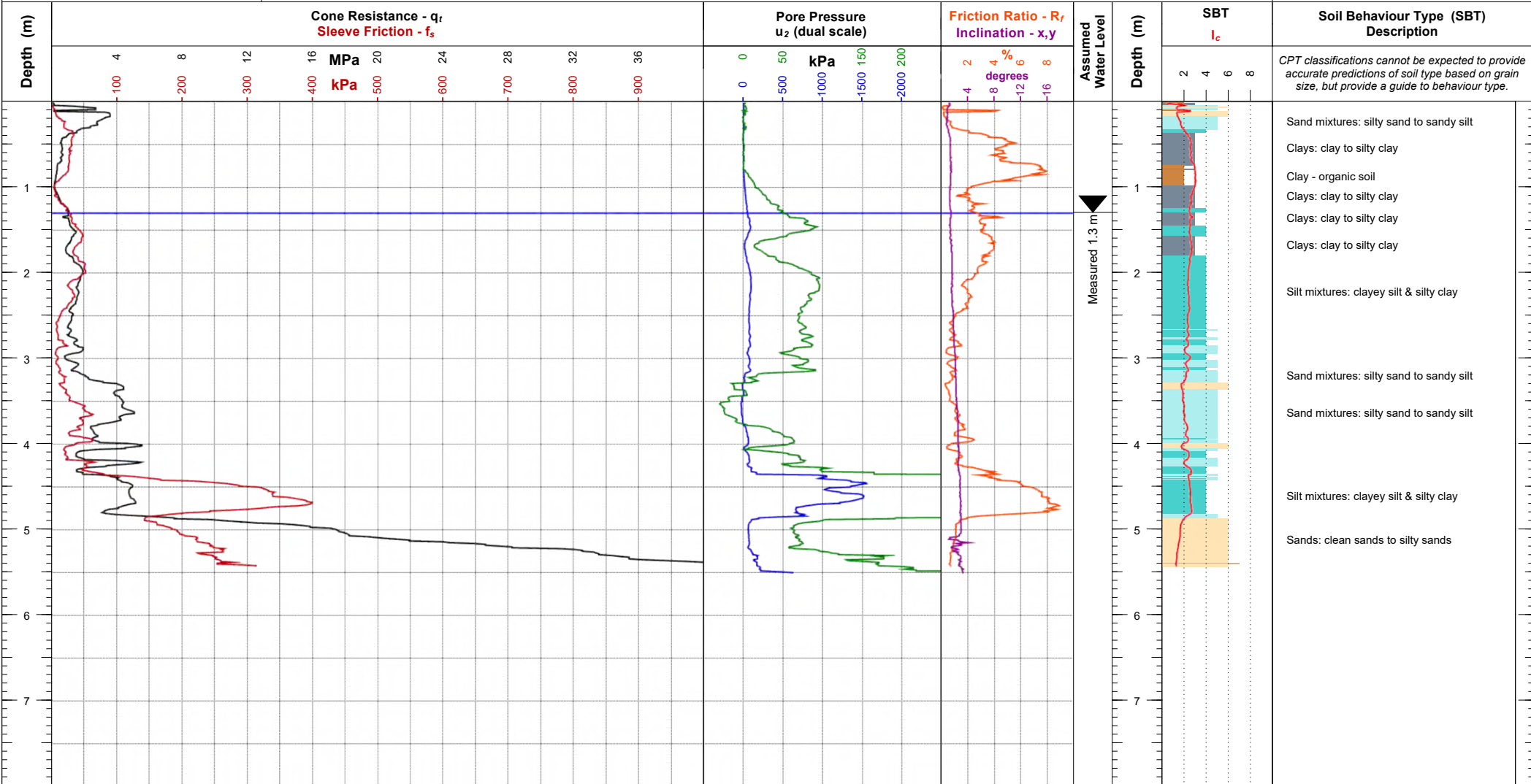
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Javan Cassidy Cone Ref: S15CFIIP.1460.cal Cone Type: 15 cm ² Subtraction Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857306.87, 1790440.02 WGS84, (deg): 175.151869, -37.411472 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Inclination high or rapid increase	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 12.49 Pre-Drill (m): N/A	Client Job Ref: CPT Number: CPT-214 G.I. Job Ref: 17-701
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Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ333
Cone Type: 10 cm² Compression
Area Ratio: 0.8
Filter Type: u2

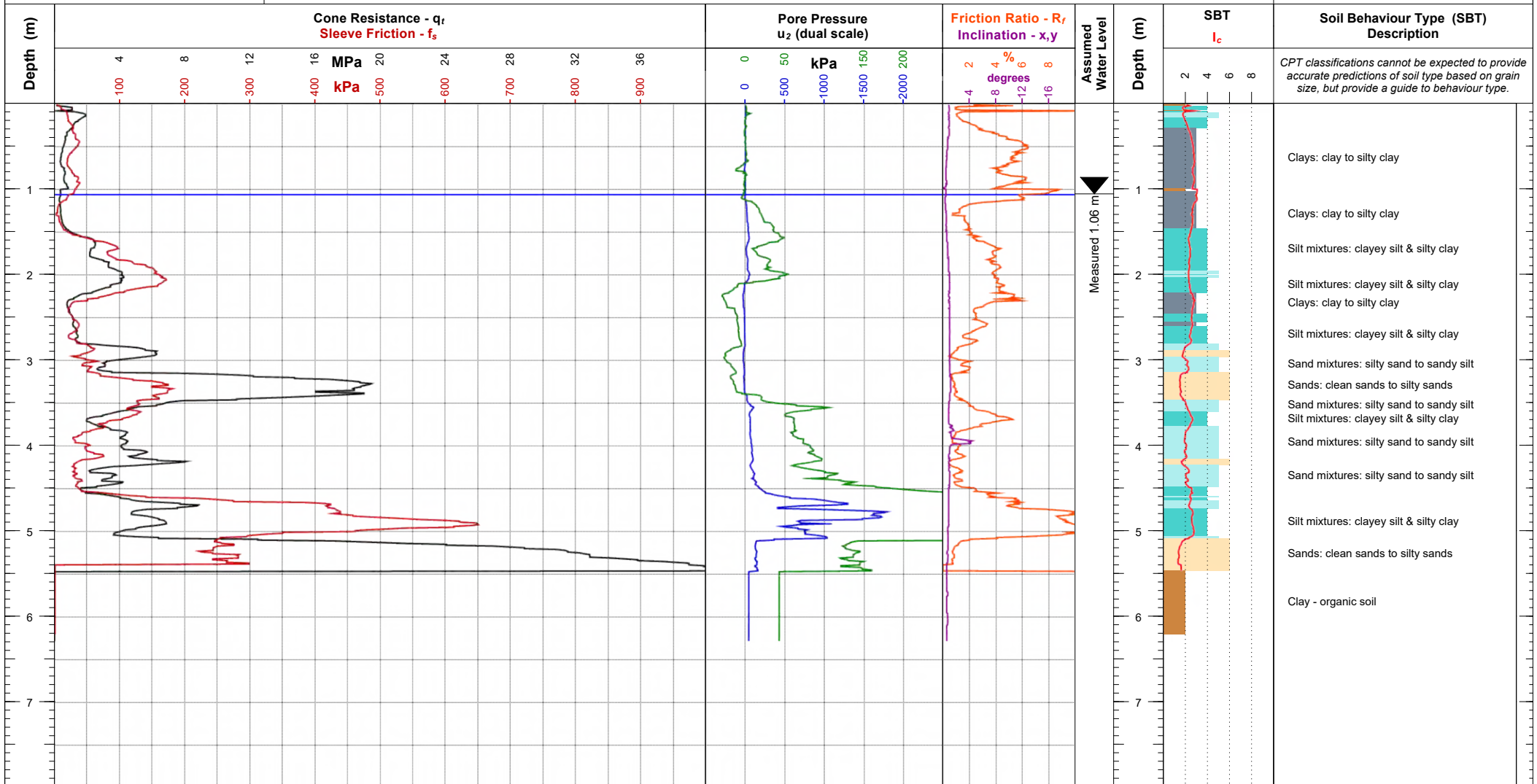
NZTM2000 N,E (m): 5857177.36, 1790539.79
WGS84, (deg): 175.153029, -37.412618
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Limit of reaction force

Elevation (m): -
Date of Test: 29/11/2017
Depth (m): 5.51
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: CPT-215
G.I. Job Ref: 17-701

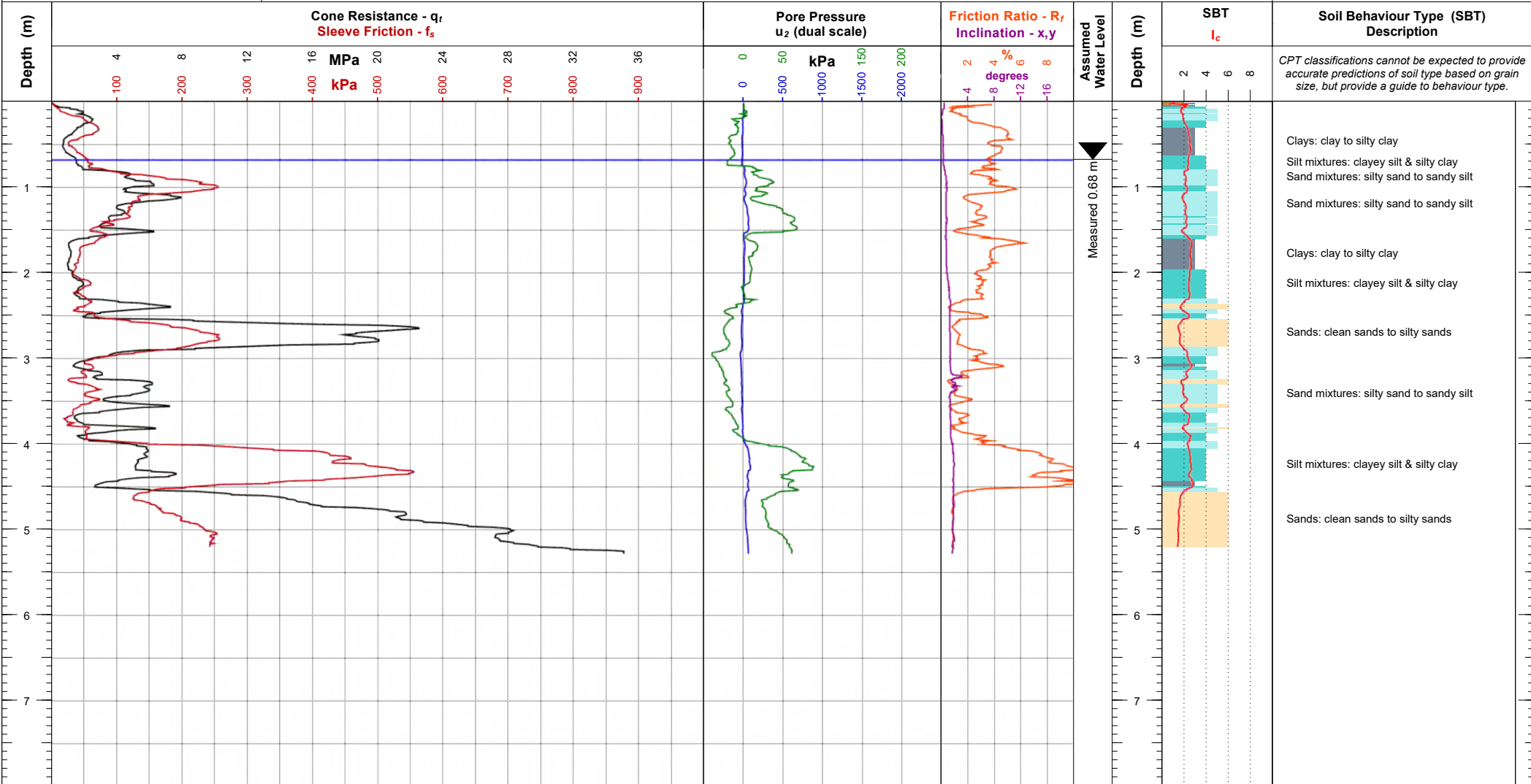
Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Tomas Cone Ref: MKJ333 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5857160.91, 1790525.95 WGS84, (deg): 175.152877, -37.412769 Location Method: Handheld GPS Surveyor: N/A Termination Reason: High cone end resistance	Elevation (m): - Date of Test: 29/11/2017 Depth (m): 6.28 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-216
Remarks:			G.I. Job Ref: 17-701

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ333
Cone Type: 10 cm² Compression
Area Ratio: 0.8
Filter Type: u2

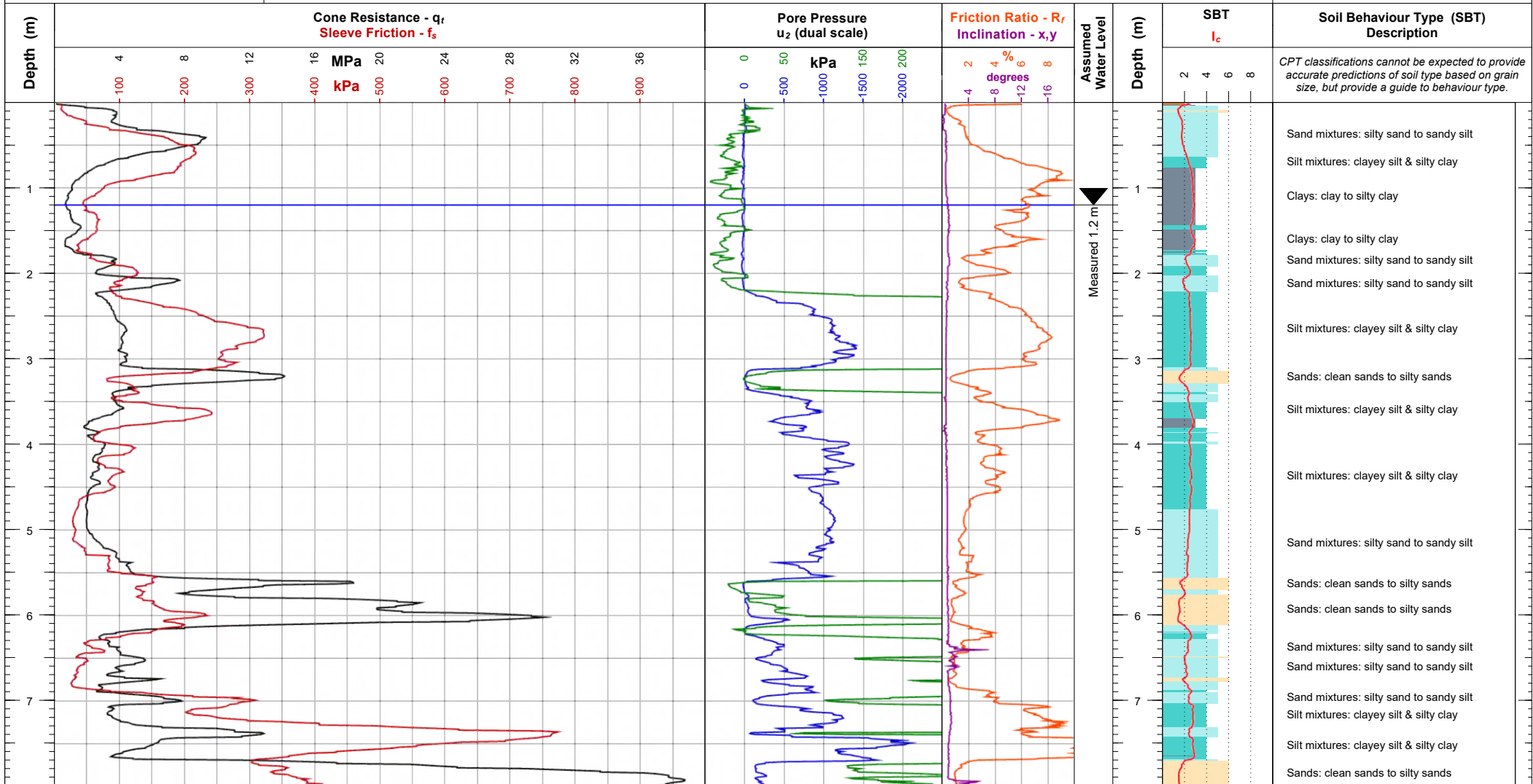
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WGS84, (deg): 175.152131, -37.413117
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Limit of reaction force

Elevation (m): -
Date of Test: 29/11/2017
Depth (m): 5.28
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: CPT-217
G.I. Job Ref: 17-701

Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ335
Cone Type: 10 cm² Compression
Area Ratio: 0.8
Filter Type: u2

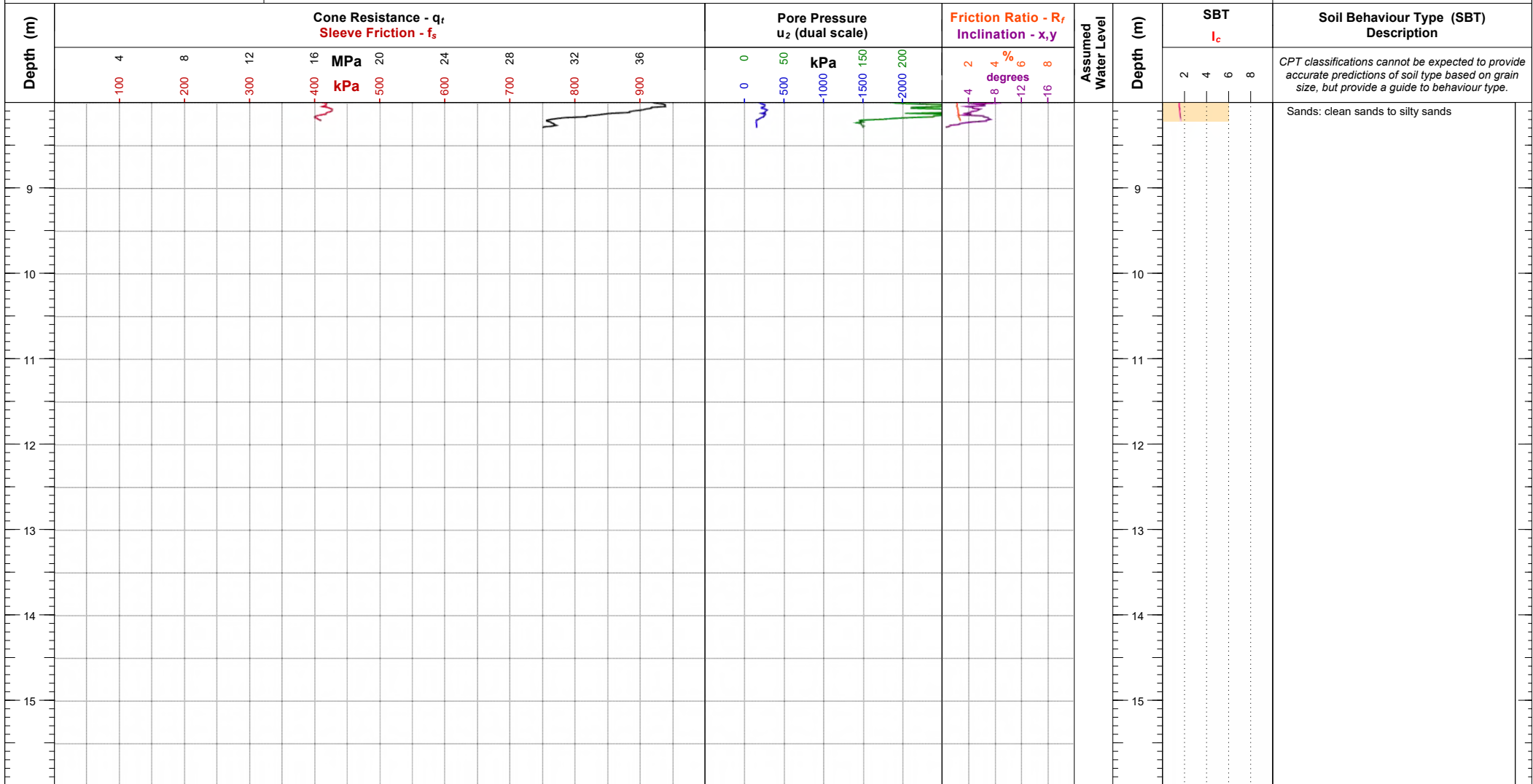
NZTM2000 N,E (m): 5857065.22, 1790380.04
WGS84, (deg): 175.151254, -37.413661
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Limit of reaction force

Elevation (m): -
Date of Test: 27/11/2017
Depth (m): 8.29
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-218**
G.I. Job Ref: **17-701**

Remarks:

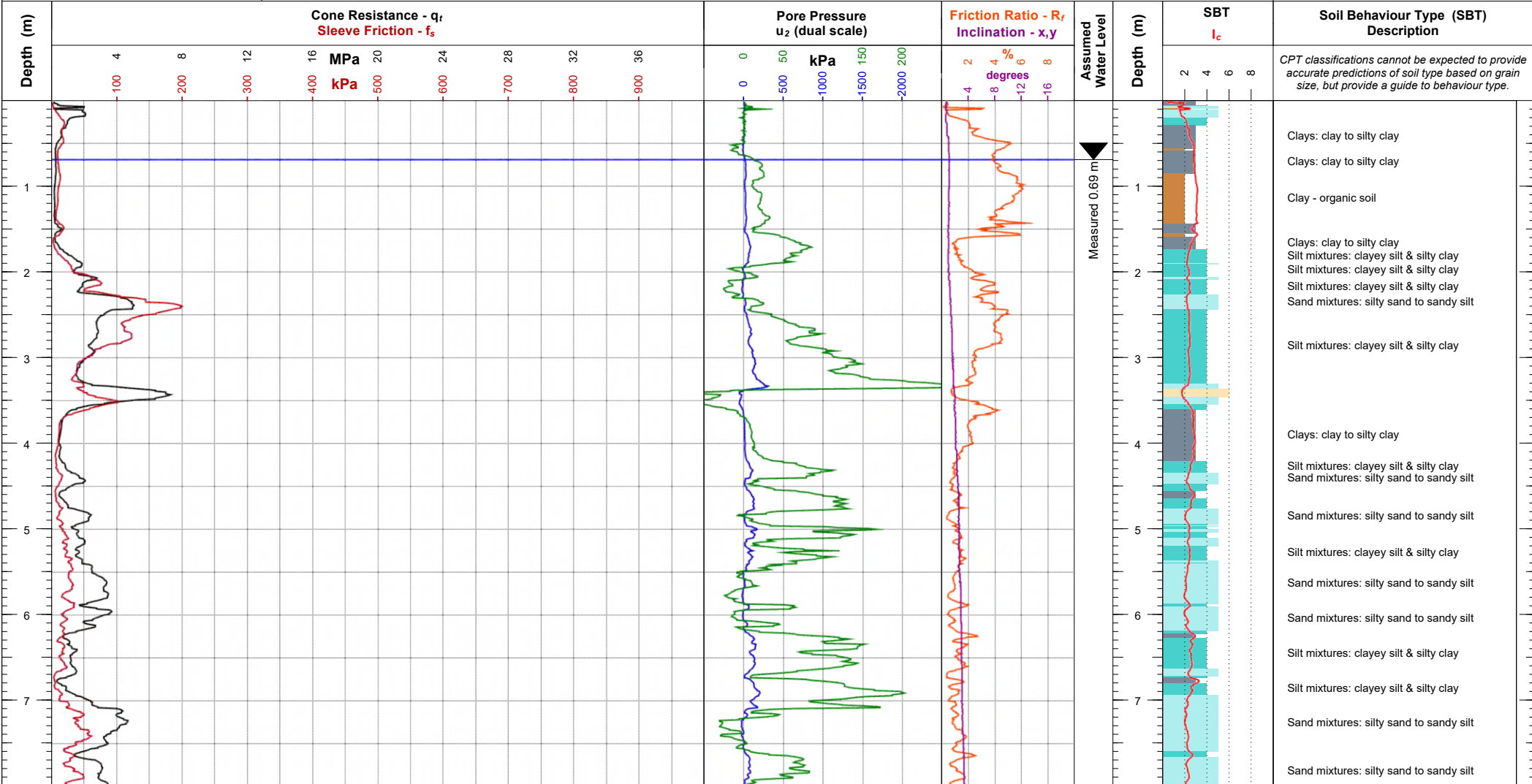
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ335 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5857065.22, 1790380.04 WGS84, (deg): 175.151254, -37.413661 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 27/11/2017 Depth (m): 8.29 Pre-Drill (m): N/A	Client Job Ref: CPT Number: CPT-218 G.I. Job Ref: 17-701
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Remarks:

CONE PENETRATION TEST (CPT) LOG

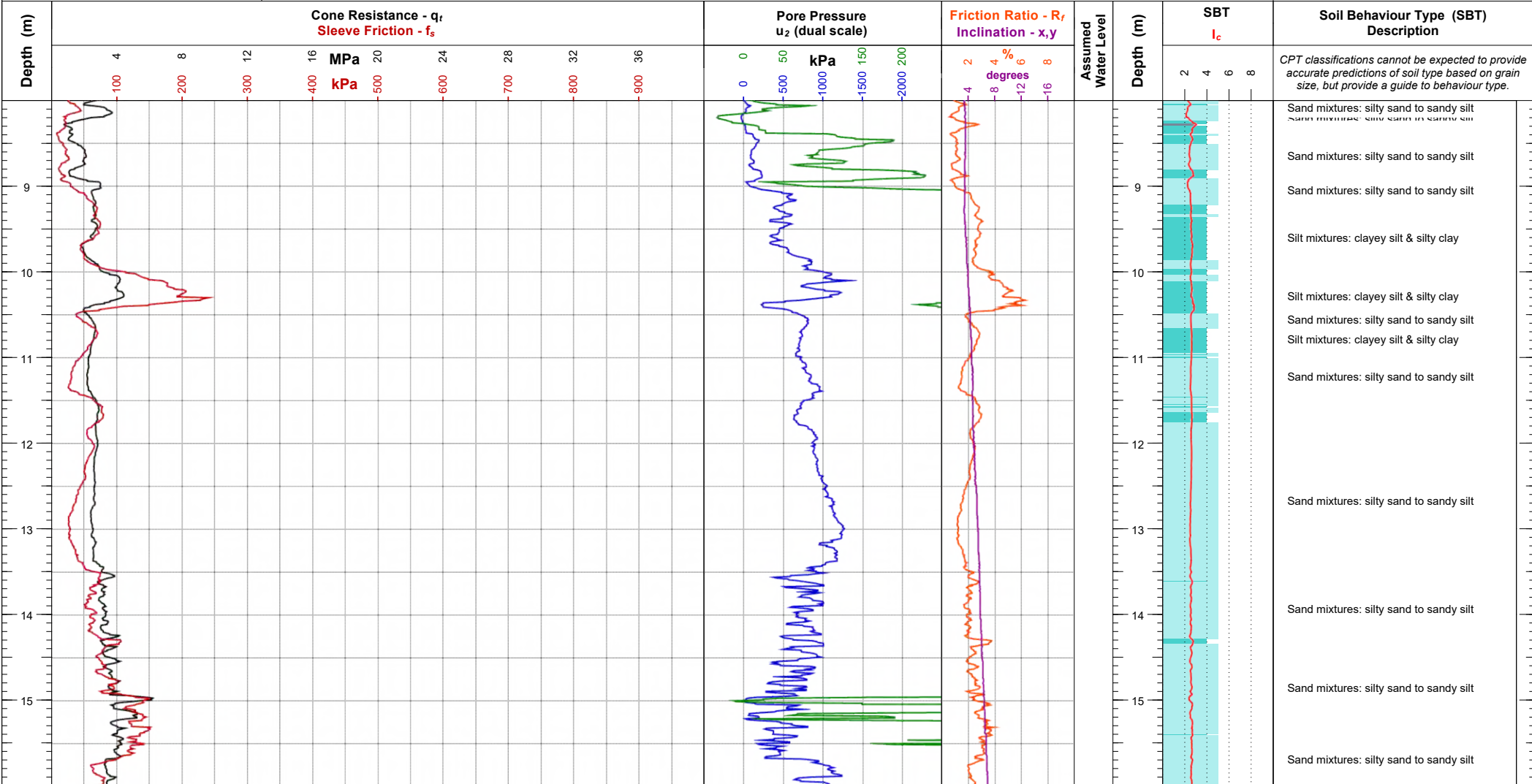


CPT classifications cannot be expected to provide accurate predictions of soil type based on grain size, but provide a guide to behaviour type.

- Clays: clay to silty clay
- Clays: clay to silty clay
- Clay - organic soil
- Clays: clay to silty clay
- Silt mixtures: clayey silt & silty clay
- Silt mixtures: clayey silt & silty clay
- Silt mixtures: clayey silt & silty clay
- Sand mixtures: silty sand to sandy silt
- Silt mixtures: clayey silt & silty clay
- Clays: clay to silty clay
- Silt mixtures: clayey silt & silty clay
- Sand mixtures: silty sand to sandy silt
- Sand mixtures: silty sand to sandy silt
- Silt mixtures: clayey silt & silty clay
- Sand mixtures: silty sand to sandy silt
- Silt mixtures: clayey silt & silty clay
- Sand mixtures: silty sand to sandy silt
- Silt mixtures: clayey silt & silty clay
- Sand mixtures: silty sand to sandy silt

Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ333 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5857062.55, 1790555.32 WGS84, (deg): 175.153234, -37.413649 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 29/11/2017 Depth (m): 25.22 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-220
Remarks:			G.I. Job Ref: 17-701

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ333
Cone Type: 10 cm² Compression
Area Ratio: 0.8
Filter Type: u2

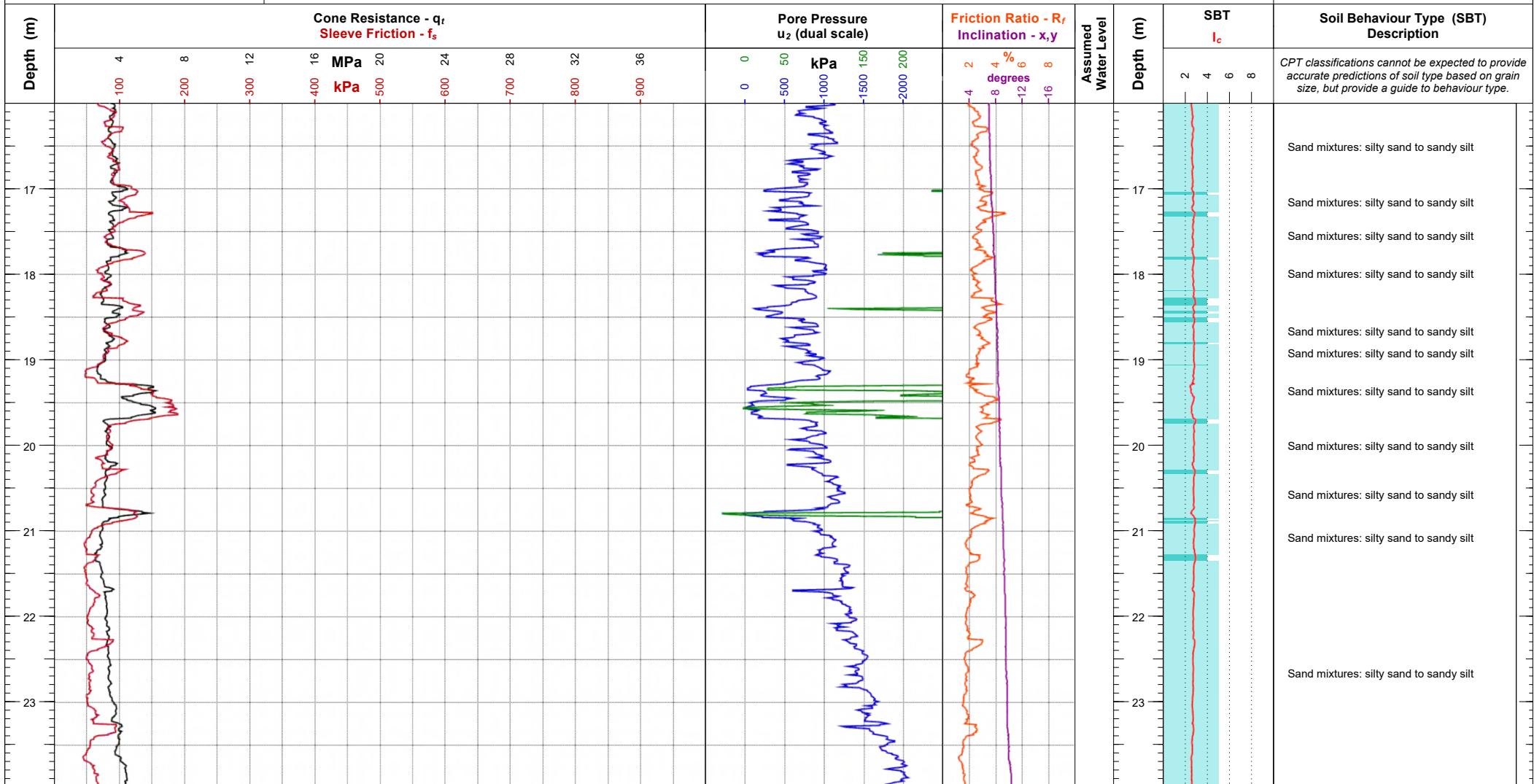
NZTM2000 N,E (m): 5857062.55, 1790555.32
WGS84, (deg): 175.153234, -37.413649
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Limit of reaction force

Elevation (m): -
Date of Test: 29/11/2017
Depth (m): 25.22
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-220**
G.I. Job Ref: **17-701**

Remarks:

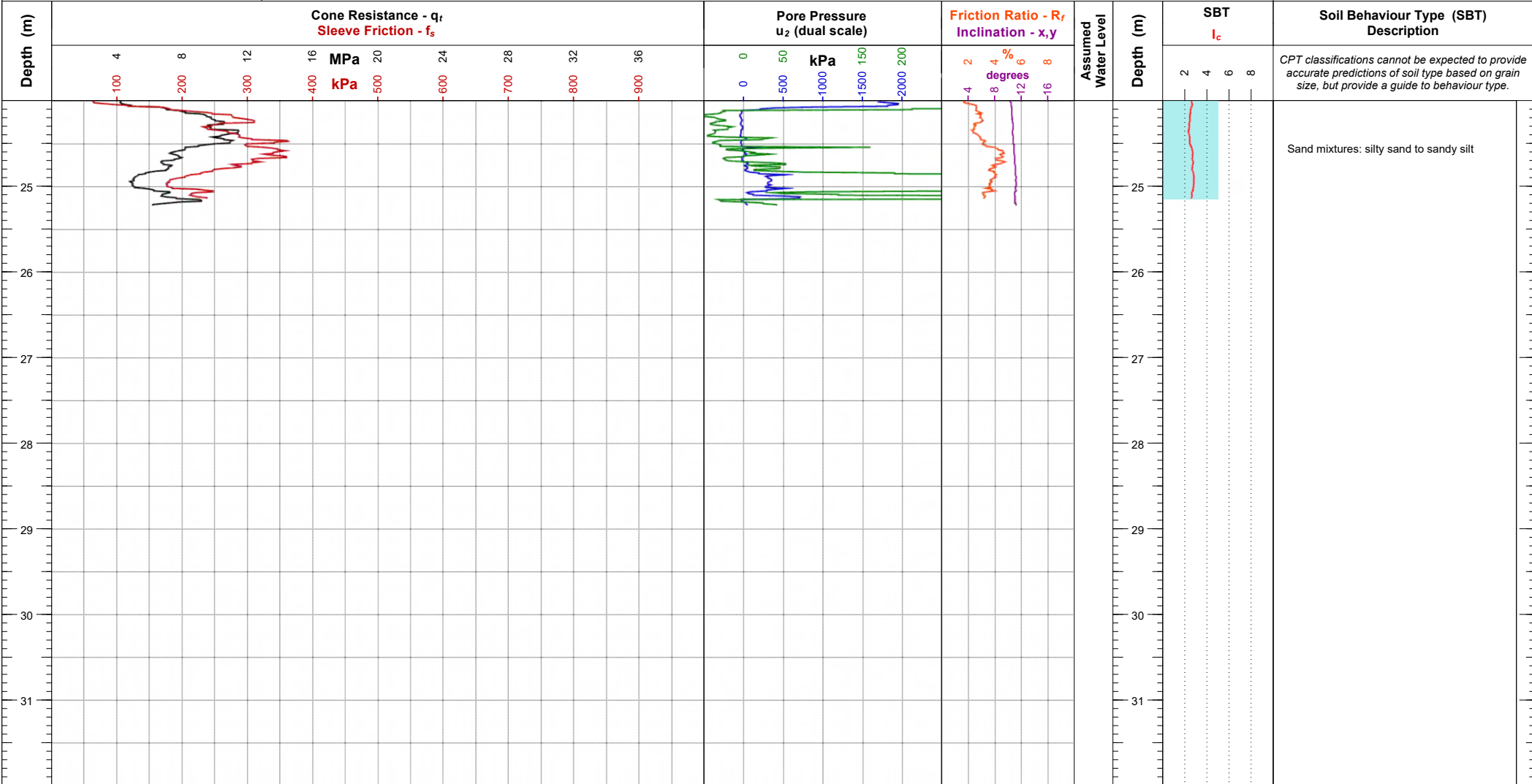
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ333 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5857062.55, 1790555.32 WGS84, (deg): 175.153234, -37.413649 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 29/11/2017 Depth (m): 25.22 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-220
G.I. Job Ref:			17-701

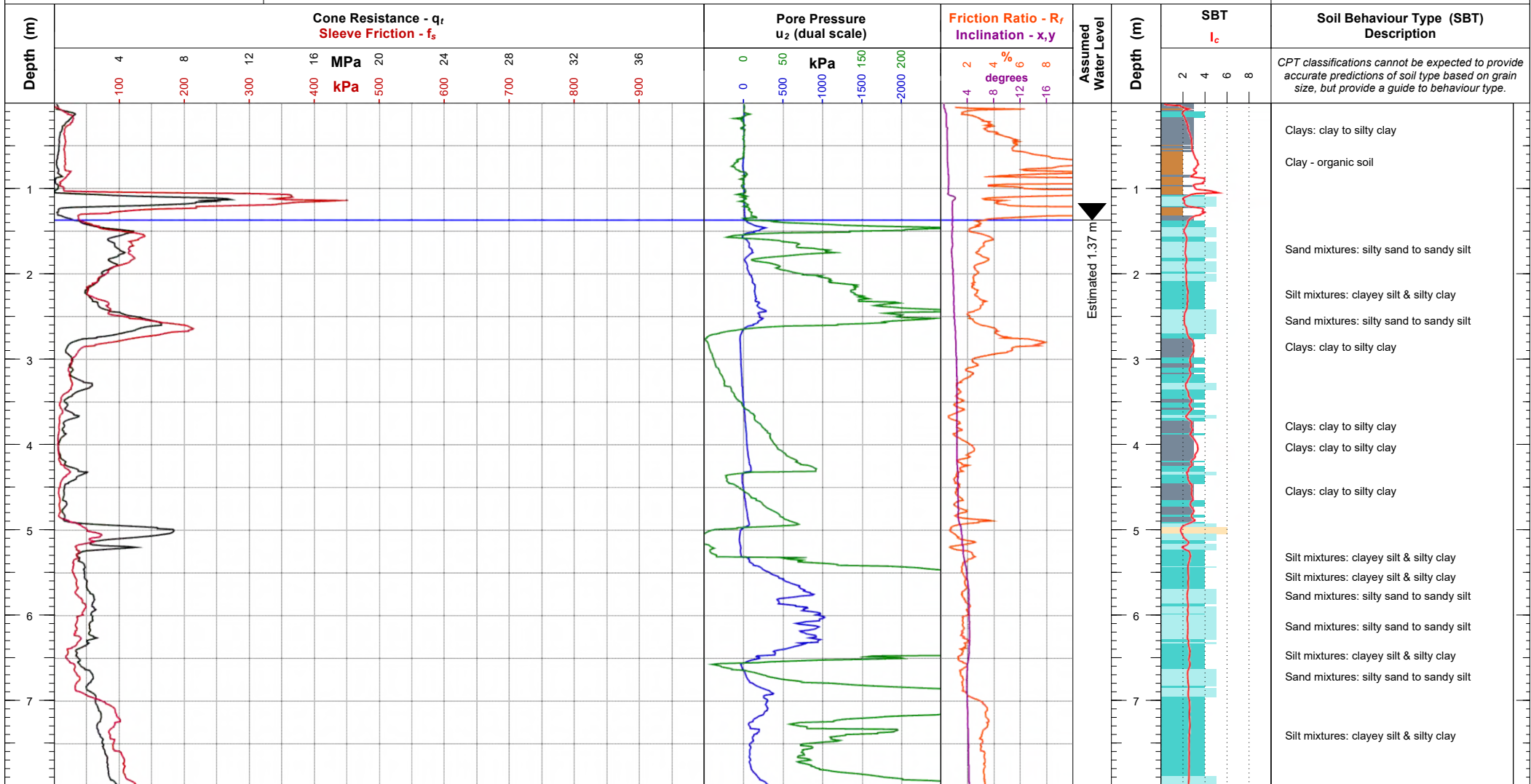
Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ333 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5857062.55, 1790555.32 WGS84, (deg): 175.153234, -37.413649 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 29/11/2017 Depth (m): 25.22 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-220
Remarks:			G.I. Job Ref: 17-701

CONE PENETRATION TEST (CPT) LOG

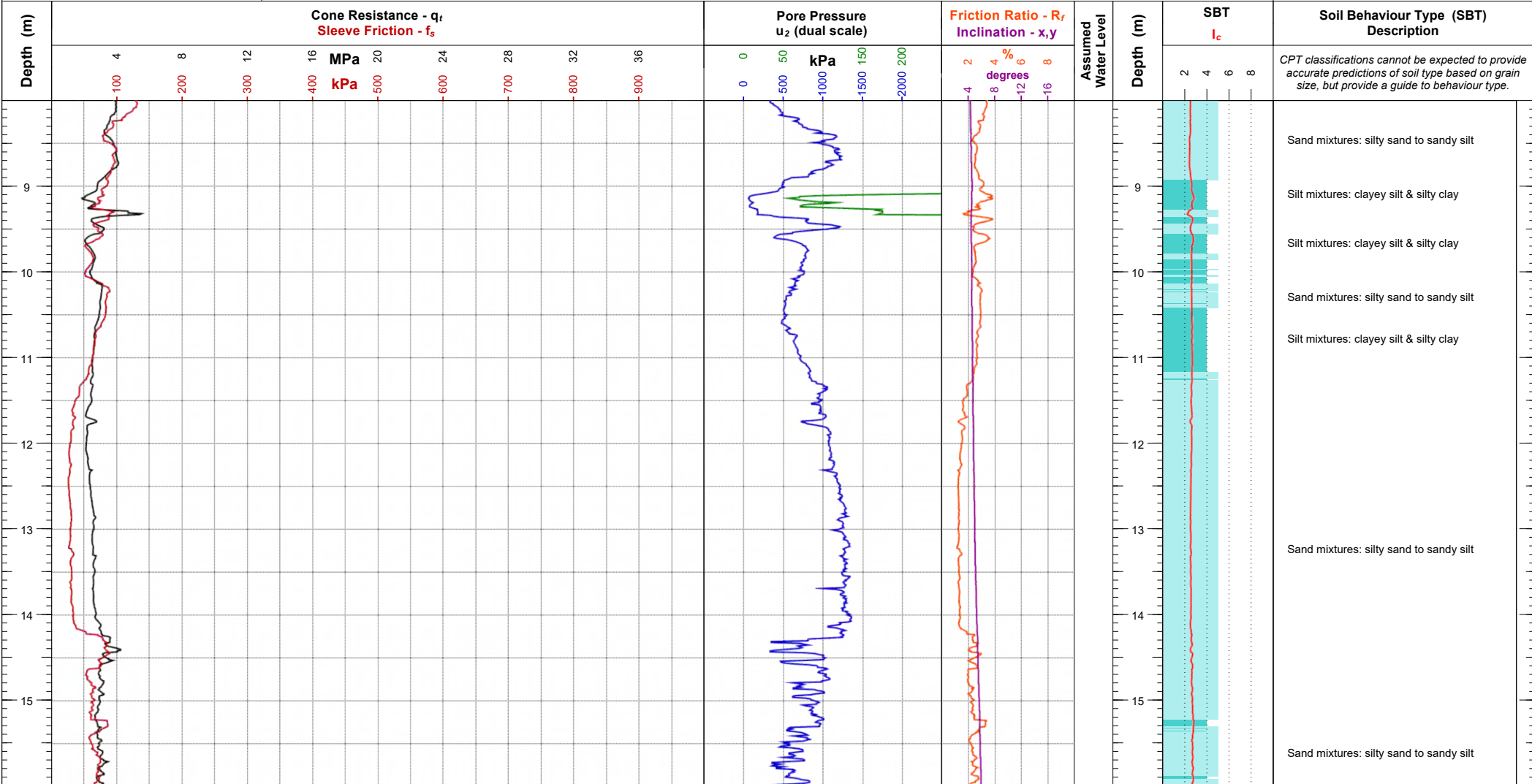


CPT classifications cannot be expected to provide accurate predictions of soil type based on grain size, but provide a guide to behaviour type.

- Clays: clay to silty clay
- Clay - organic soil
- Sand mixtures: silty sand to sandy silt
- Silt mixtures: clayey silt & silty clay
- Sand mixtures: silty sand to sandy silt
- Clays: clay to silty clay
- Clays: clay to silty clay
- Clays: clay to silty clay
- Silt mixtures: clayey silt & silty clay
- Silt mixtures: clayey silt & silty clay
- Sand mixtures: silty sand to sandy silt
- Sand mixtures: silty sand to sandy silt
- Silt mixtures: clayey silt & silty clay
- Sand mixtures: silty sand to sandy silt
- Silt mixtures: clayey silt & silty clay

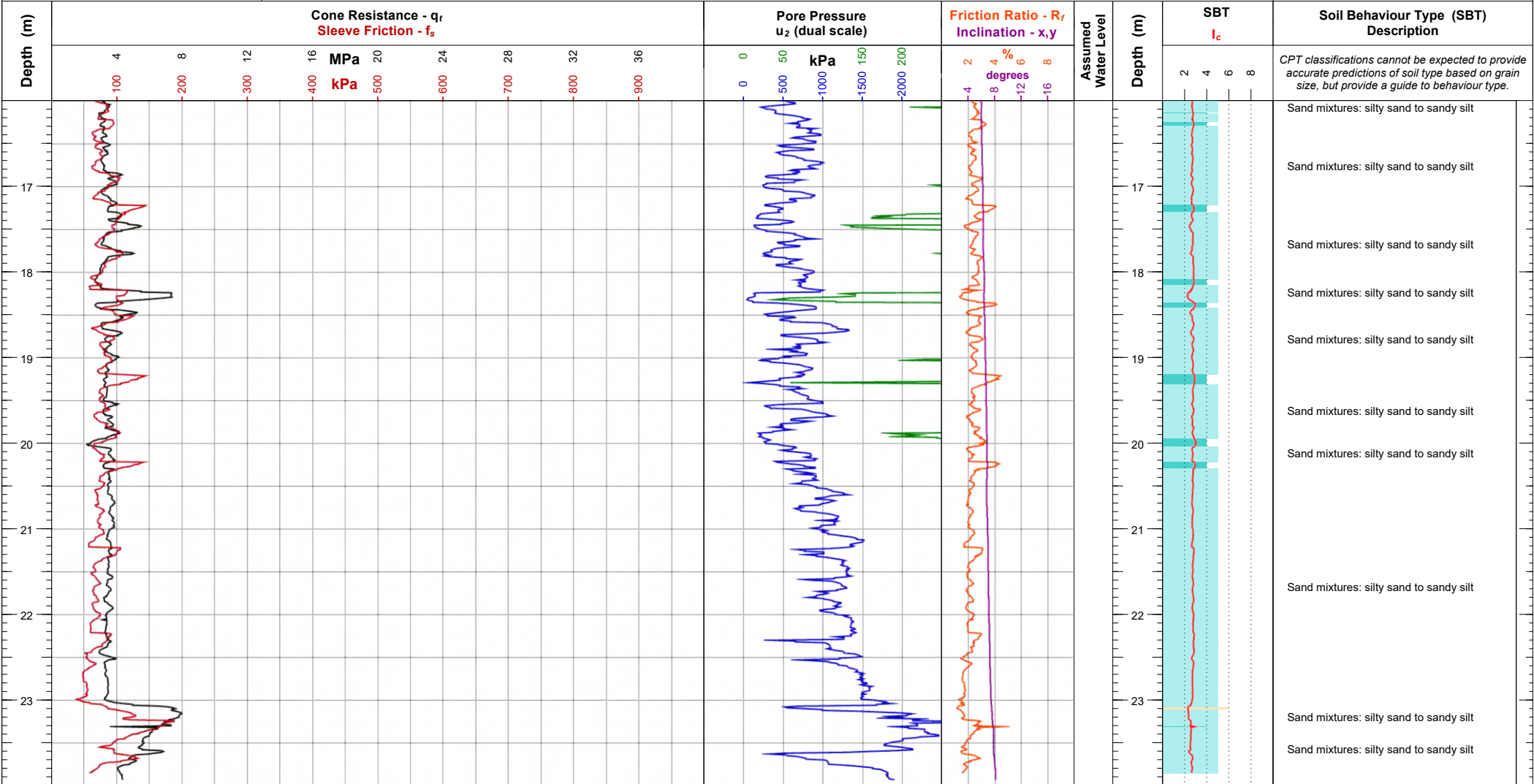
Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ208 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856906.75, 1790663.6 WGS84, (deg): 175.154497, -37.415030 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 28/11/2017 Depth (m): 23.93 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-221
Remarks:			G.I. Job Ref: 17-701

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ208 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856906.75, 1790663.6 WGS84, (deg): 175.154497, -37.415030 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 28/11/2017 Depth (m): 23.93 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-221
Remarks:			G.I. Job Ref: 17-701

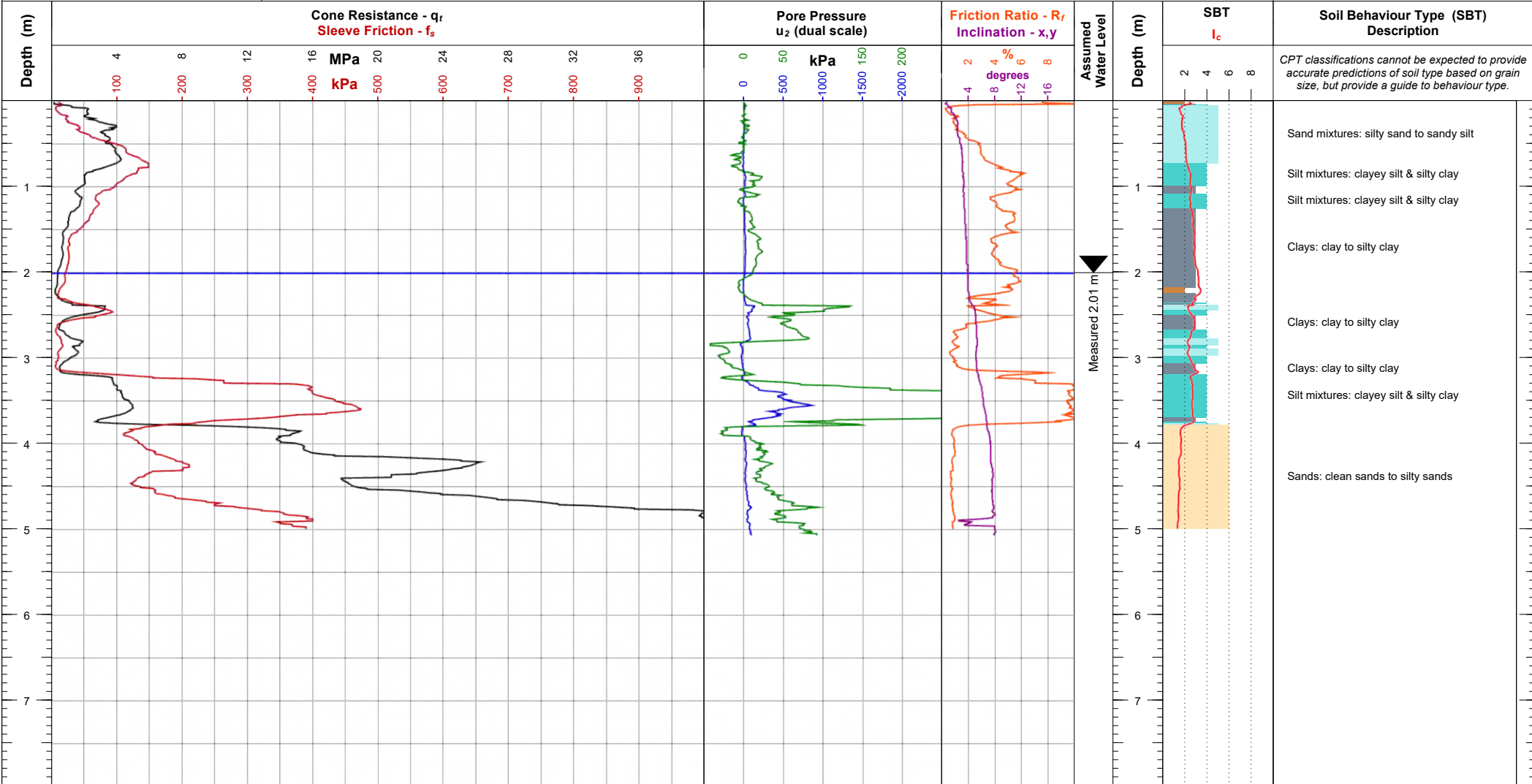
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ208 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856906.75, 1790663.6 WGS84, (deg): 175.154497, -37.415030 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 28/11/2017 Depth (m): 23.93 Pre-Drill (m): N/A	Client Job Ref: CPT Number: CPT-221 G.I. Job Ref: 17-701
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Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ208
Cone Type: 10 cm² Compression
Area Ratio: 0.8
Filter Type: u2

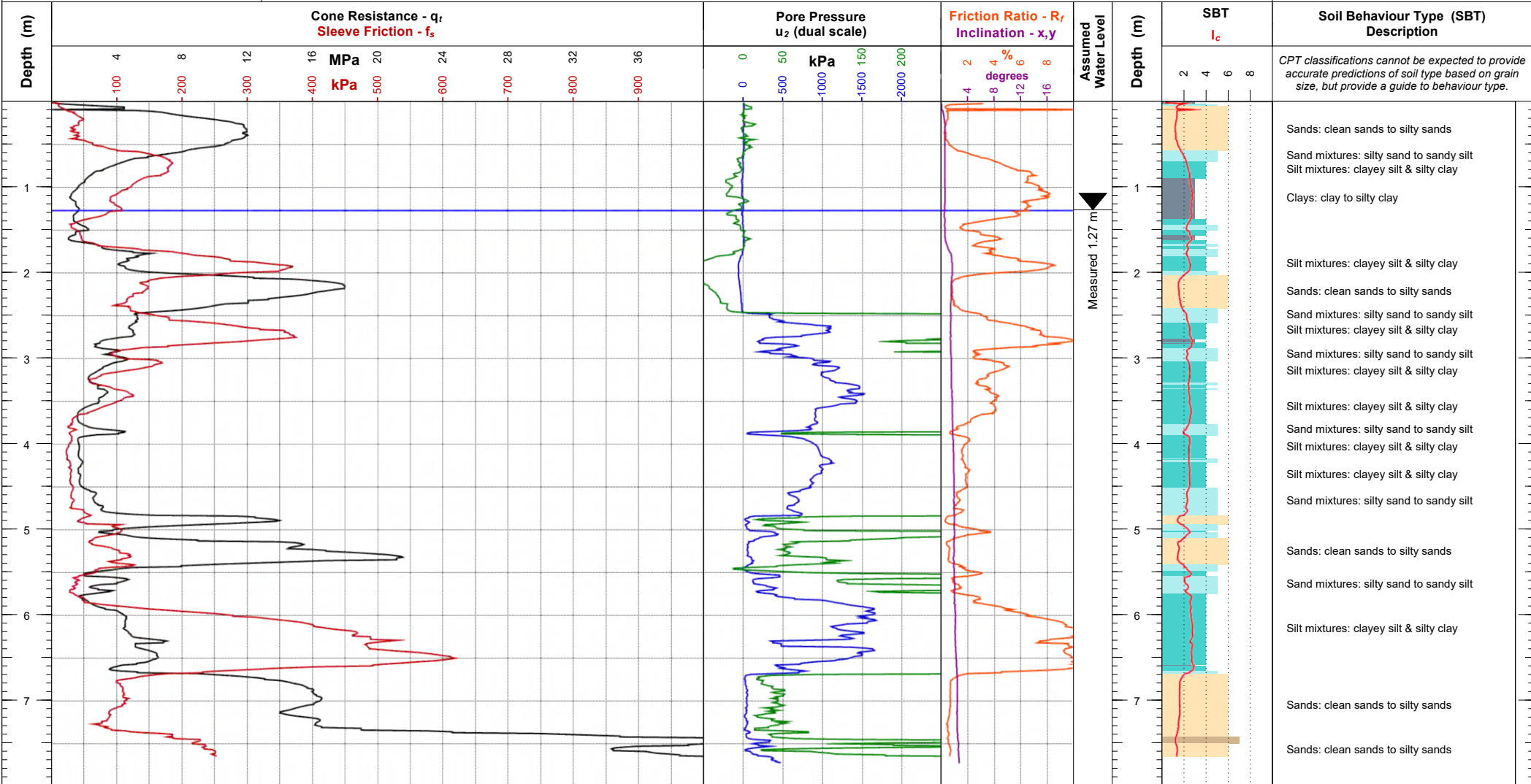
NZTM2000 N,E (m): 5856996.43, 1790654.94
WGS84, (deg): 175.154376, -37.414224
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: High cone end resistance

Elevation (m): -
Date of Test: 28/11/2017
Depth (m): 5.07
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-222**
G.I. Job Ref: **17-701**

Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ208
Cone Type: 10 cm² Compression
Area Ratio: 0.8
Filter Type: u2

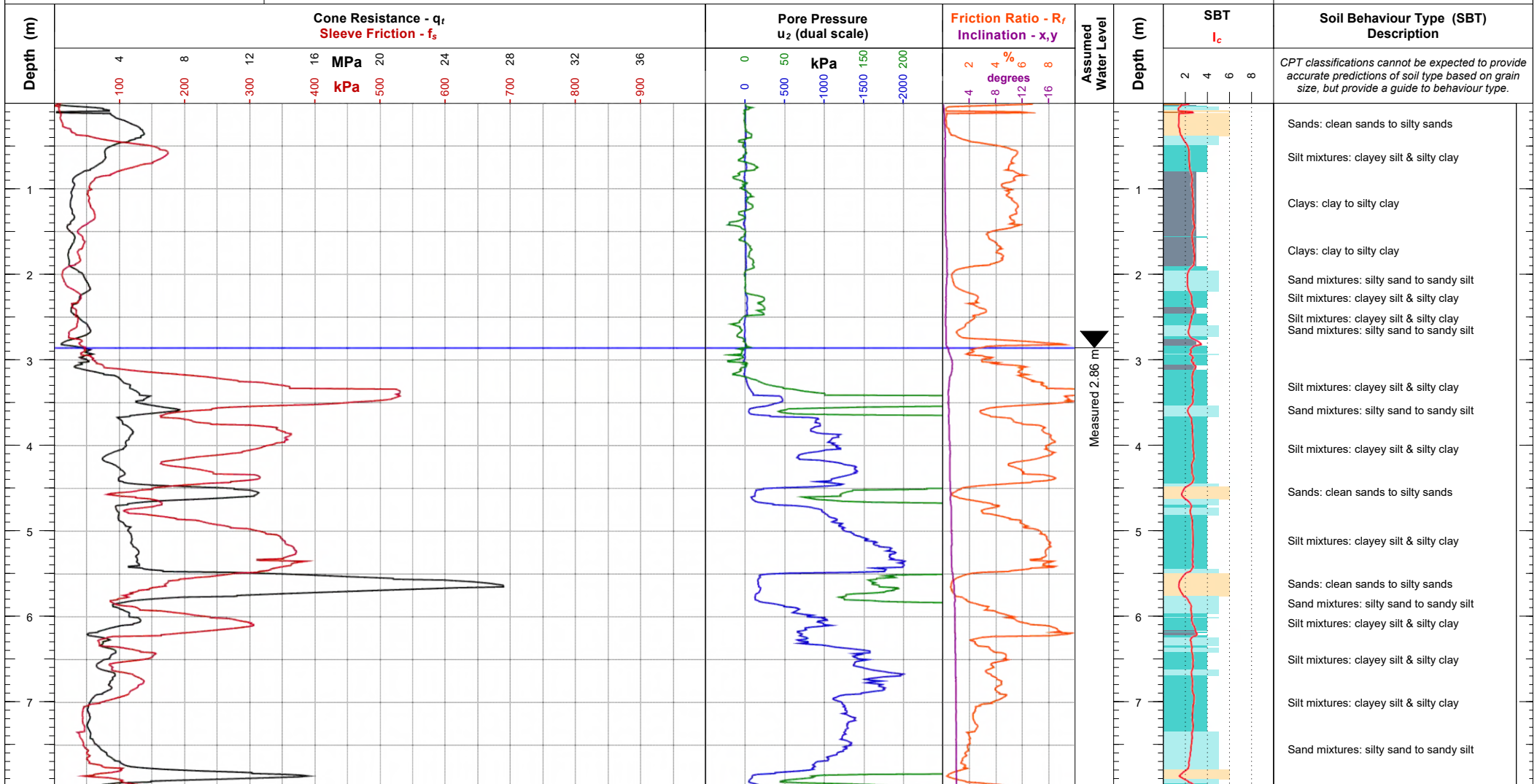
NZTM2000 N,E (m): 5856970.91, 1790581.56
WGS84, (deg): 175.153554, -37.414469
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Limit of reaction force

Elevation (m): -
Date of Test: 28/11/2017
Depth (m): 7.73
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-223**
G.I. Job Ref: **17-701**

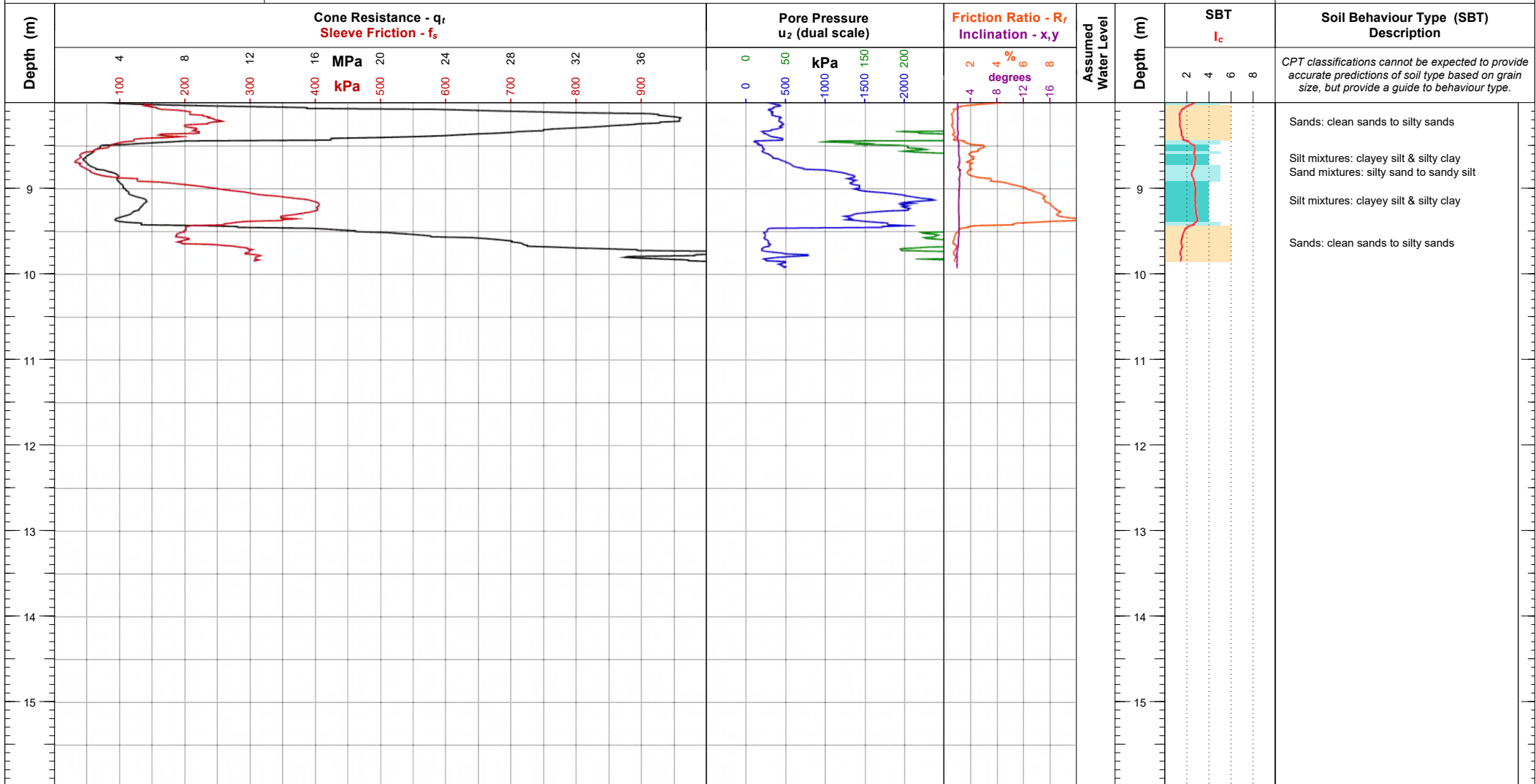
Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ208 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856972.92, 1790493.5 WGS84, (deg): 175.152559, -37.414469 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 28/11/2017 Depth (m): 9.93 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-224
Remarks:			G.I. Job Ref: 17-701

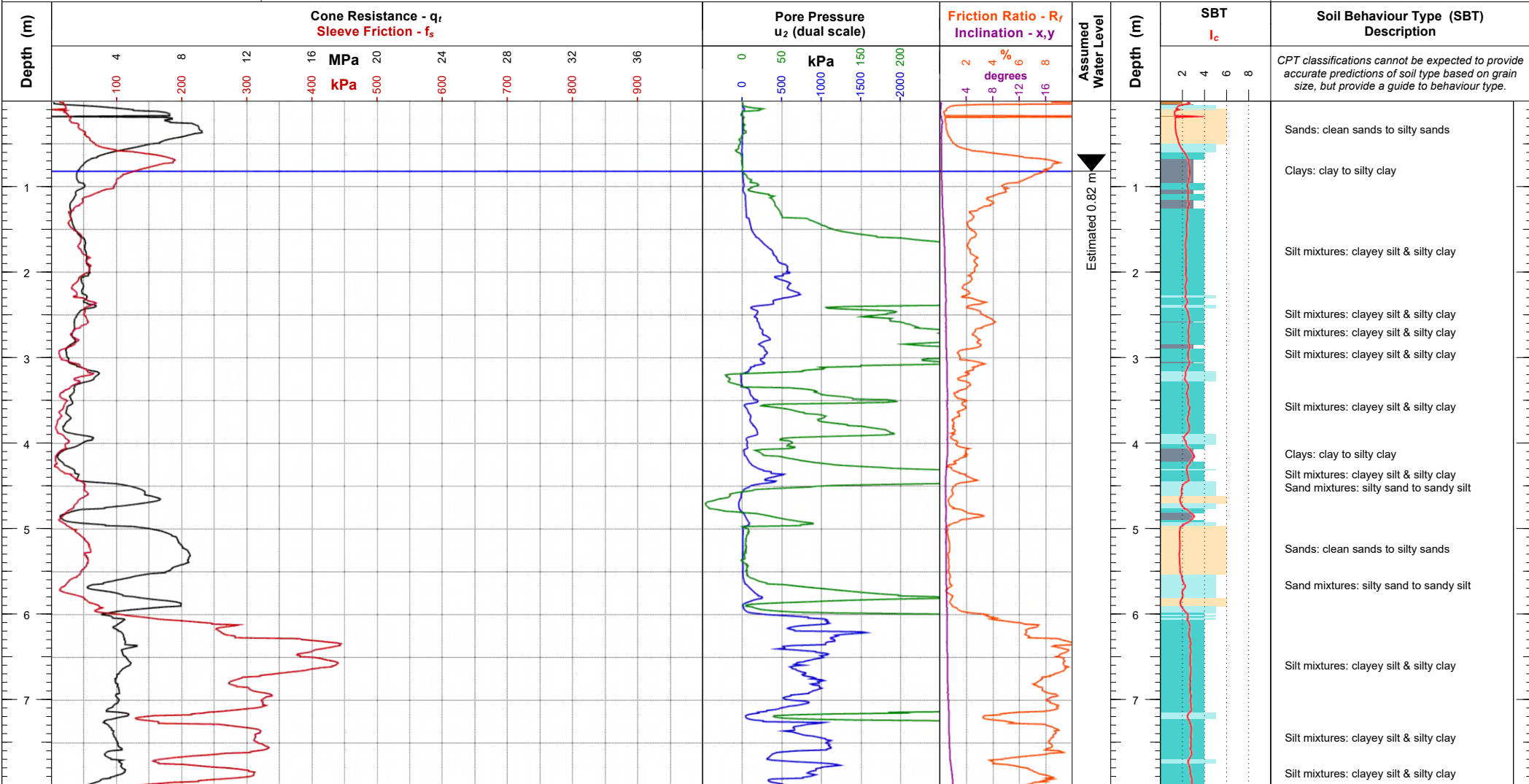
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ208 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856972.92, 1790493.5 WGS84, (deg): 175.152559, -37.414469 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 28/11/2017 Depth (m): 9.93 Pre-Drill (m): N/A	Client Job Ref: CPT Number: CPT-224 G.I. Job Ref: 17-701
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Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ208
Cone Type: 10 cm² Compression
Area Ratio: 0.8
Filter Type: u2

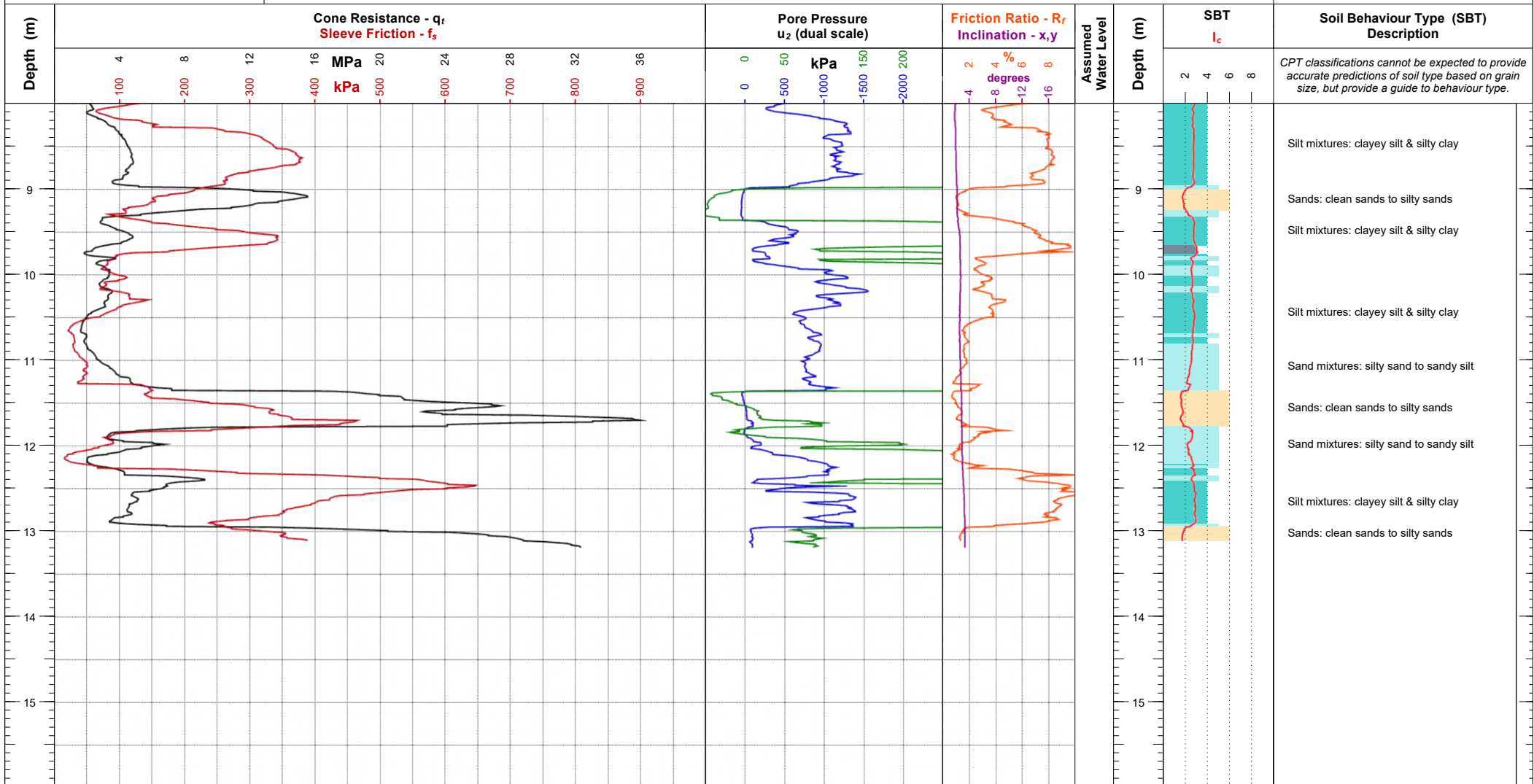
NZTM2000 N,E (m): 5856970.83, 1790449.08
WGS84, (deg): 175.152058, -37.414497
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Limit of reaction force

Elevation (m): -
Date of Test: 28/11/2017
Depth (m): 13.19
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-225**
G.I. Job Ref: **17-701**

Remarks:

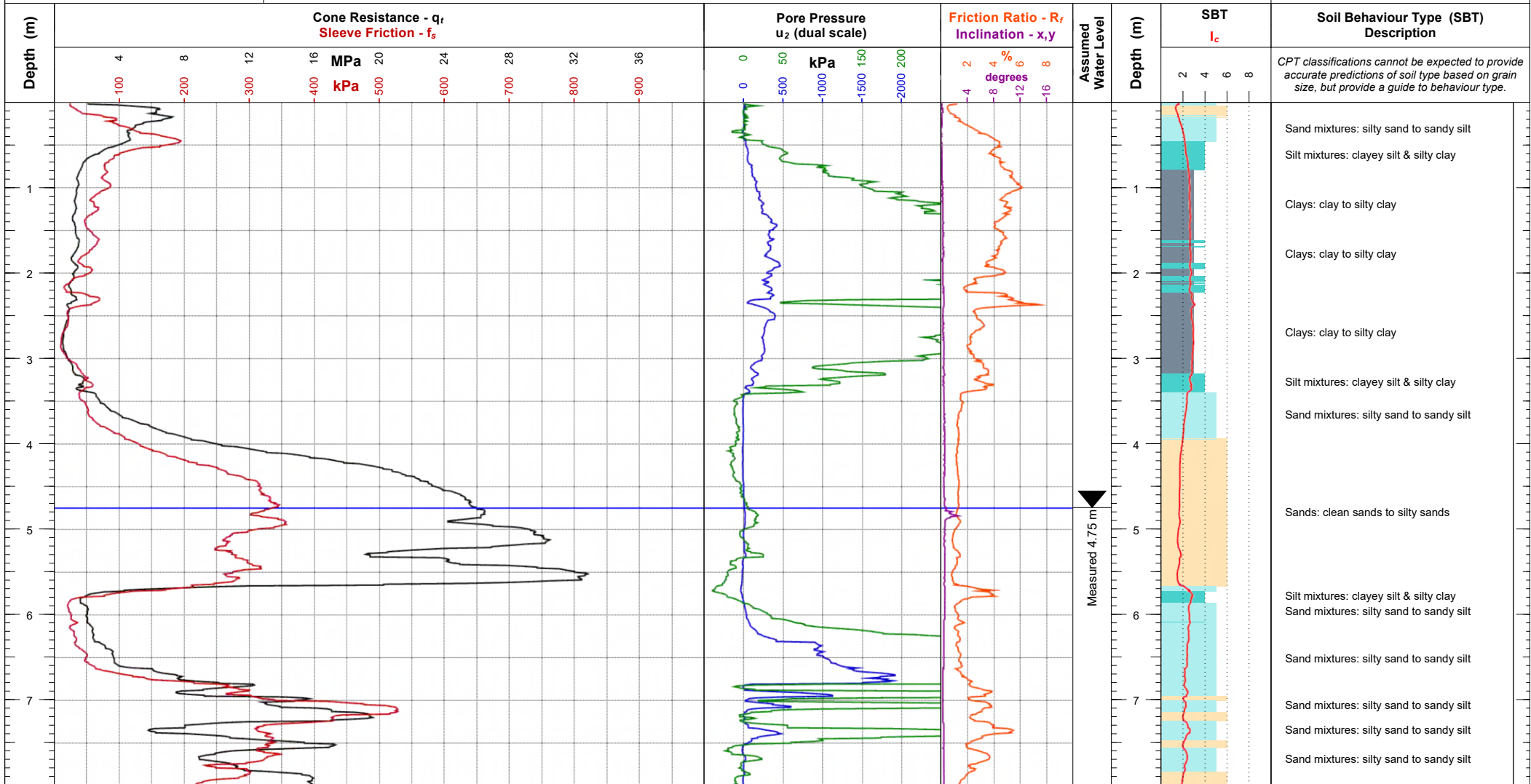
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ208 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856970.83, 1790449.08 WGS84, (deg): 175.152058, -37.414497 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 28/11/2017 Depth (m): 13.19 Pre-Drill (m): N/A
			Client Job Ref: CPT Number: CPT-225 G.I. Job Ref: 17-701

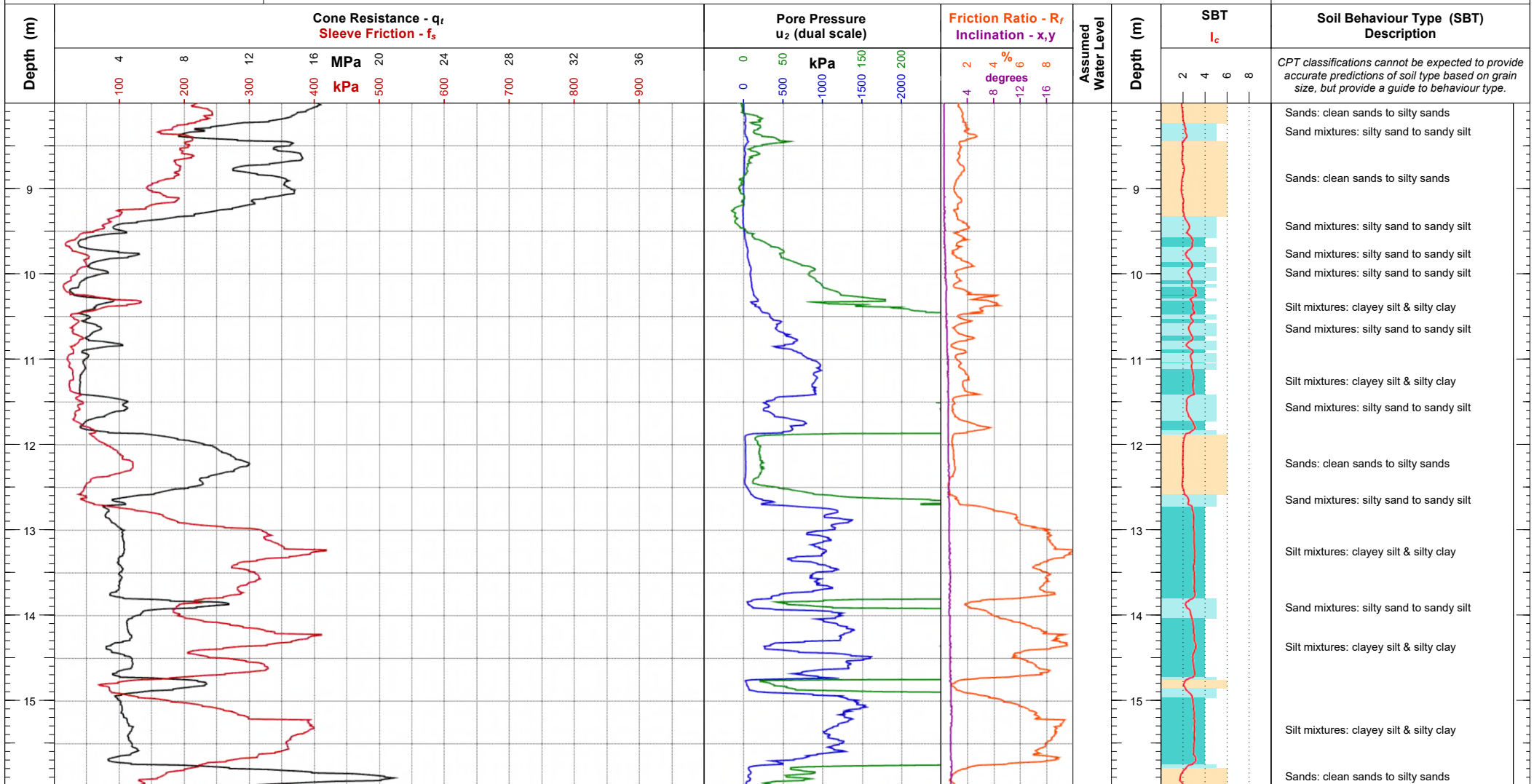
Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ335 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856988.81, 1790332.43 WGS84, (deg): 175.150736, -37.414359 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 27/11/2017 Depth (m): 18.53 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-226
Remarks:			G.I. Job Ref: 17-701

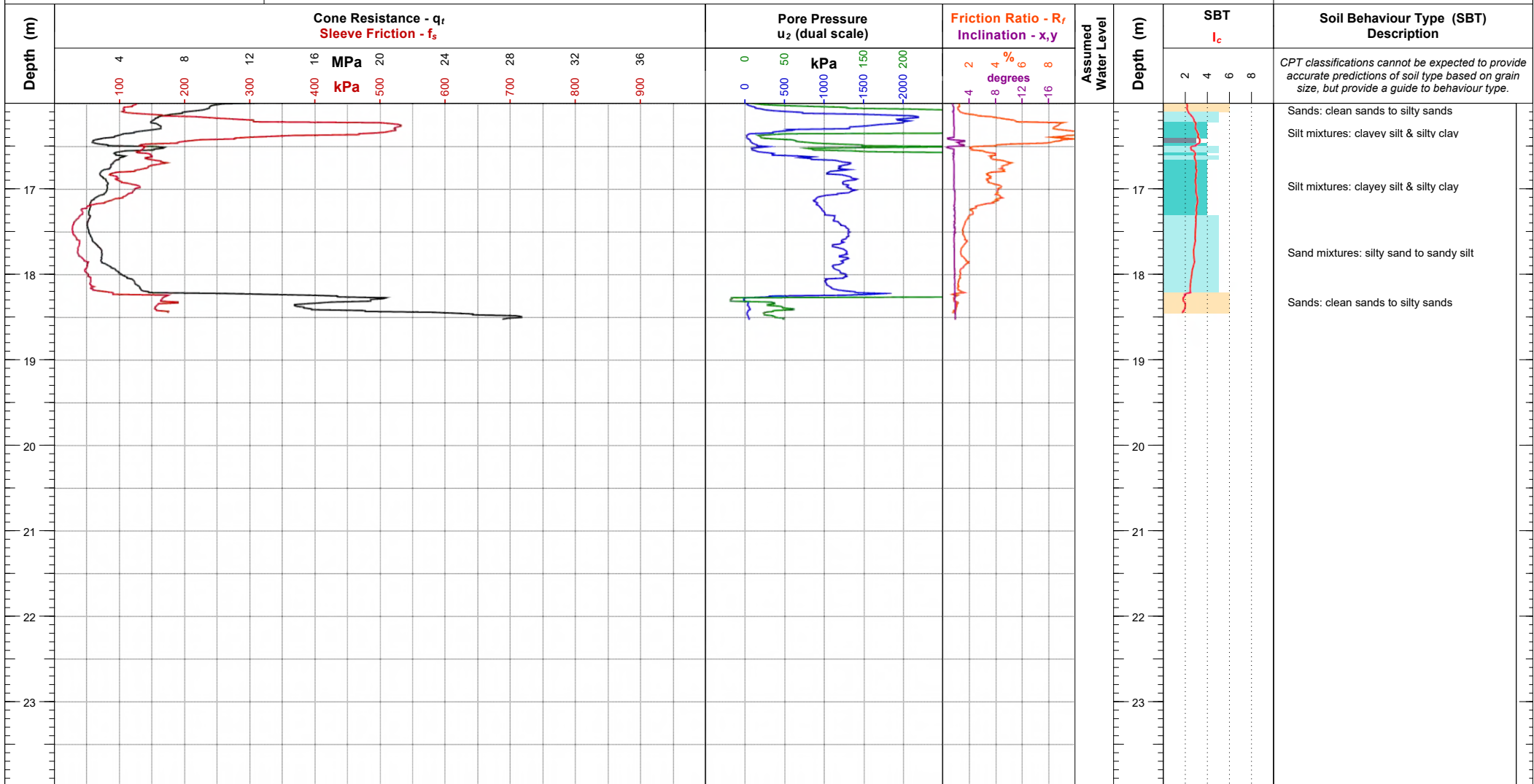
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ335 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856988.81, 1790332.43 WGS84, (deg): 175.150736, -37.414359 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 27/11/2017 Depth (m): 18.53 Pre-Drill (m): N/A
			Client Job Ref: <div style="text-align: center;">CPT Number: CPT-226</div> G.I. Job Ref: 17-701

Remarks:

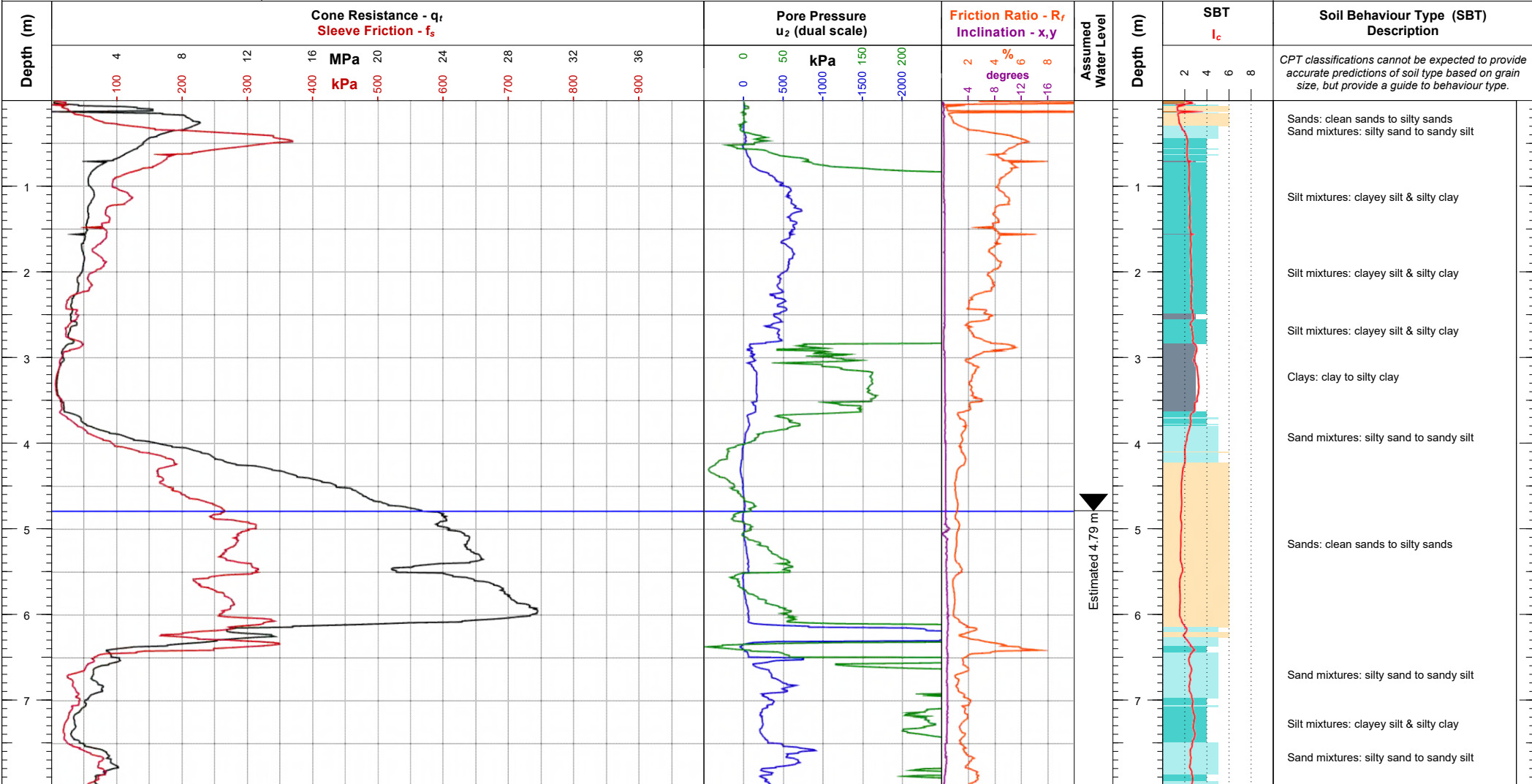
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ335 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856988.81, 1790332.43 WGS84, (deg): 175.150736, -37.414359 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 27/11/2017 Depth (m): 18.53 Pre-Drill (m): N/A	Client Job Ref: CPT Number: CPT-226 G.I. Job Ref: 17-701
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Remarks:

CONE PENETRATION TEST (CPT) LOG



CPT classifications cannot be expected to provide accurate predictions of soil type based on grain size, but provide a guide to behaviour type.

- Sands: clean sands to silty sands
Sand mixtures: silty sand to sandy silt
- Silt mixtures: clayey silt & silty clay
- Silt mixtures: clayey silt & silty clay
- Silt mixtures: clayey silt & silty clay
- Clays: clay to silty clay
- Sand mixtures: silty sand to sandy silt
- Sands: clean sands to silty sands
- Sand mixtures: silty sand to sandy silt
- Silt mixtures: clayey silt & silty clay
- Sand mixtures: silty sand to sandy silt

Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ335
Cone Type: 10 cm² Compression
Area Ratio: 0.8
Filter Type: u2

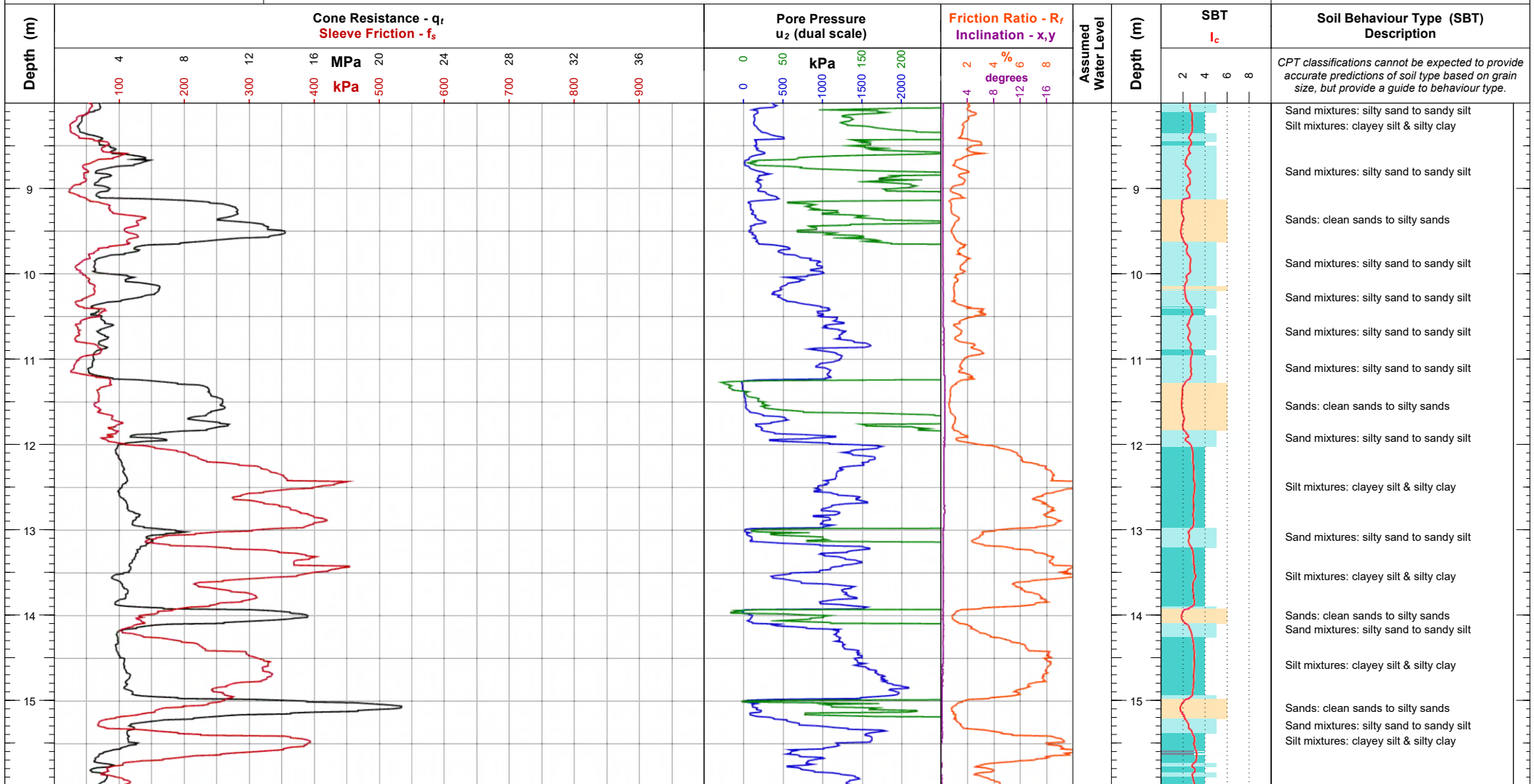
NZTM2000 N,E (m): 5857009.04, 1790272.94
WGS84, (deg): 175.150059, -37.414189
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Limit of reaction force

Elevation (m): -
Date of Test: 27/11/2017
Depth (m): 19.25
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-227**
G.I. Job Ref: **17-701**

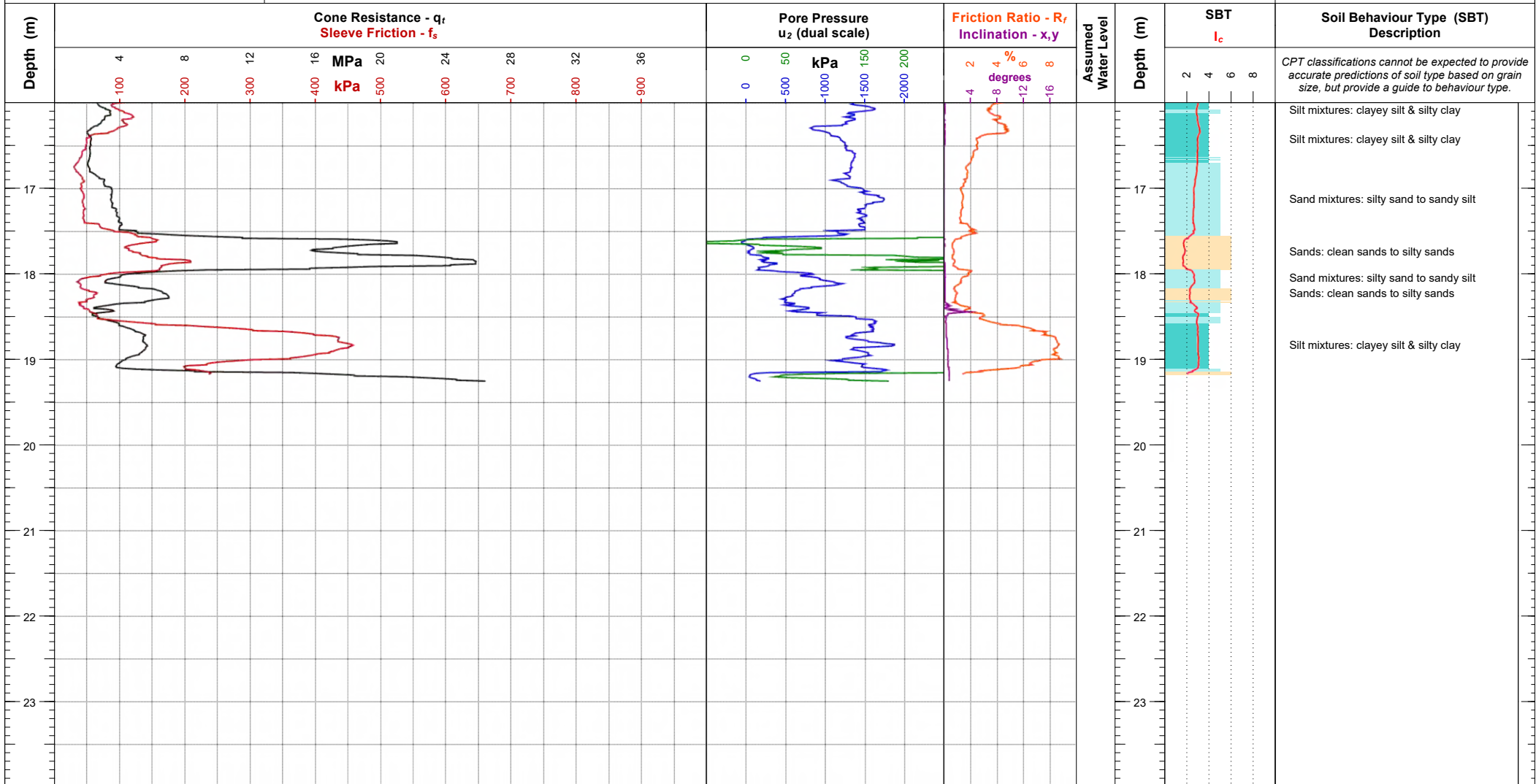
Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ335 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5857009.04, 1790272.94 WGS84, (deg): 175.150059, -37.414189 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 27/11/2017 Depth (m): 19.25 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-227
Remarks:			G.I. Job Ref: 17-701

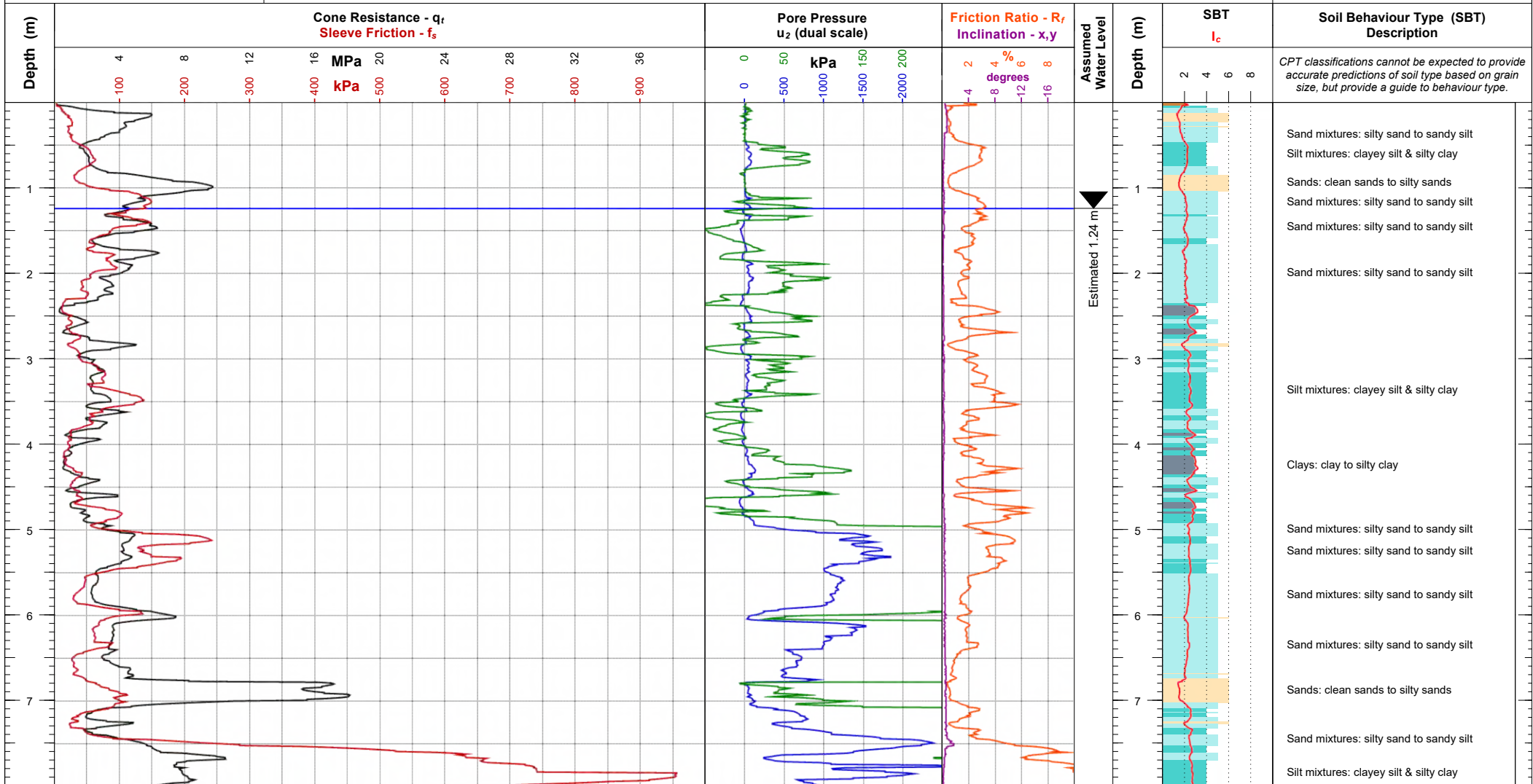
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ335 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5857009.04, 1790272.94 WGS84, (deg): 175.150059, -37.414189 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 27/11/2017 Depth (m): 19.25 Pre-Drill (m): N/A	Client Job Ref:
				CPT Number: CPT-227
				G.I. Job Ref: 17-701

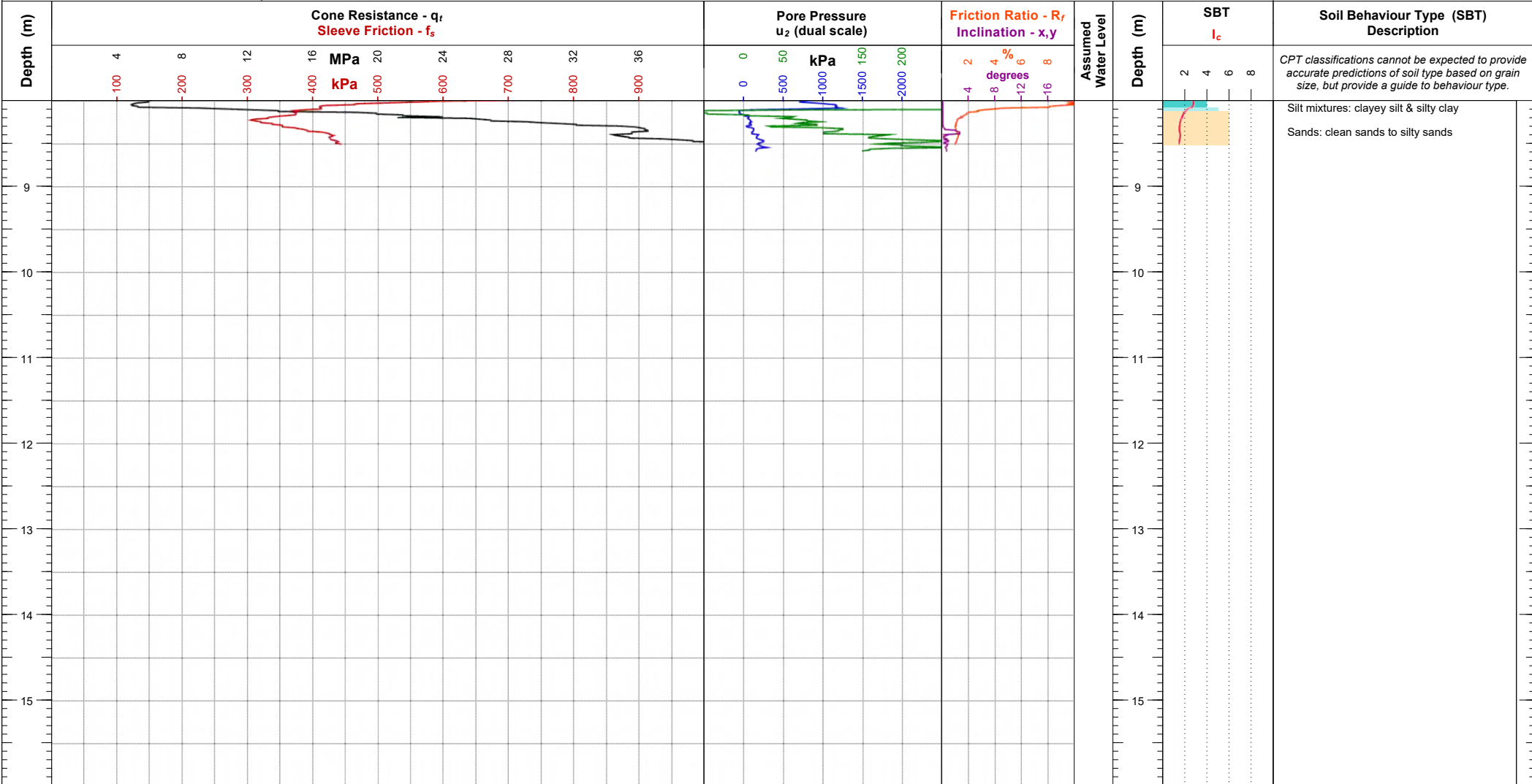
Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ335 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856889.89, 1790176.8 WGS84, (deg): 175.149004, -37.415282 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 27/11/2017 Depth (m): 8.59 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-228
Remarks:			G.I. Job Ref: 17-701

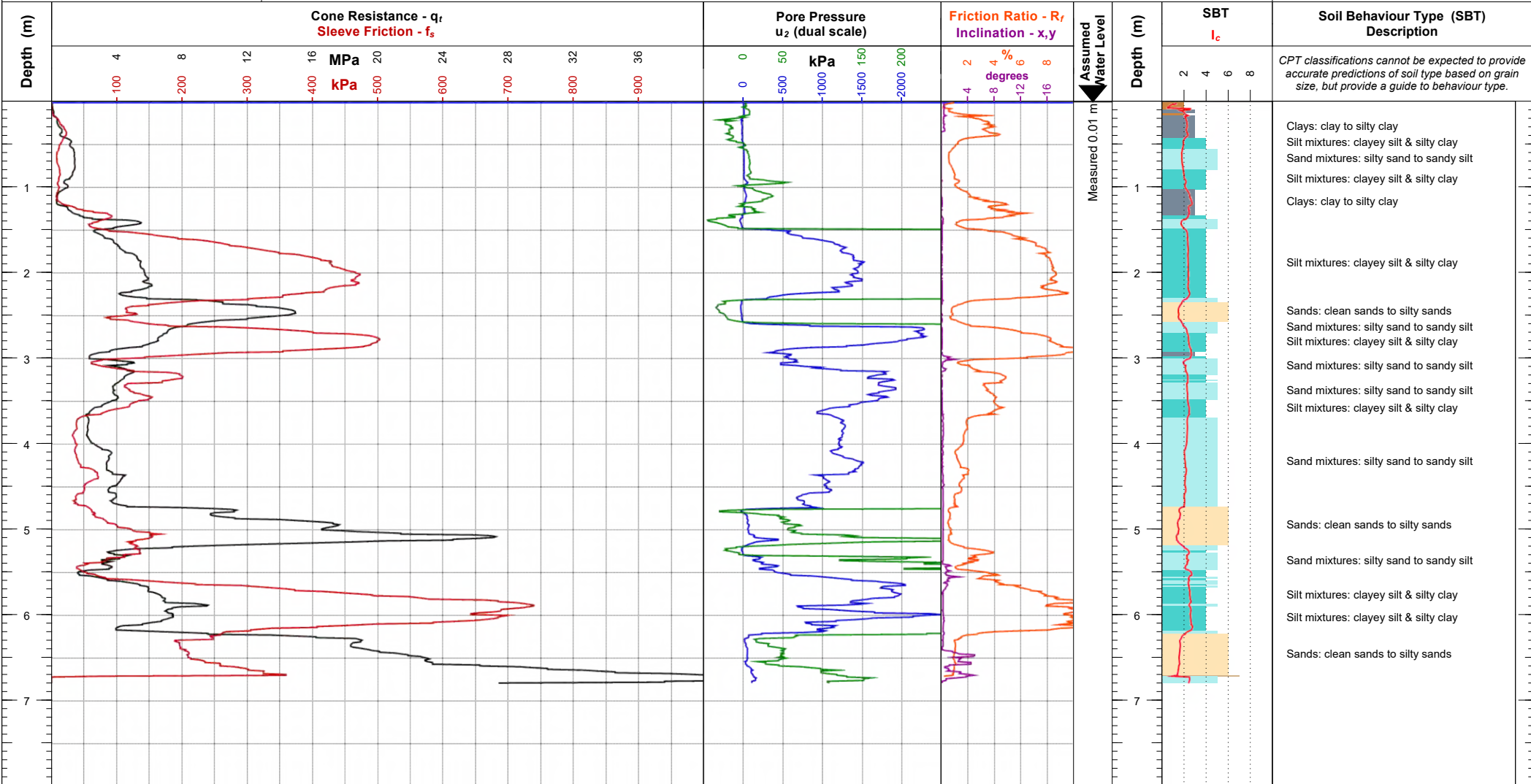
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ335 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856889.89, 1790176.8 WGS84, (deg): 175.149004, -37.415282 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 27/11/2017 Depth (m): 8.59 Pre-Drill (m): N/A	Client Job Ref:
				CPT Number: CPT-228
				G.I. Job Ref: 17-701

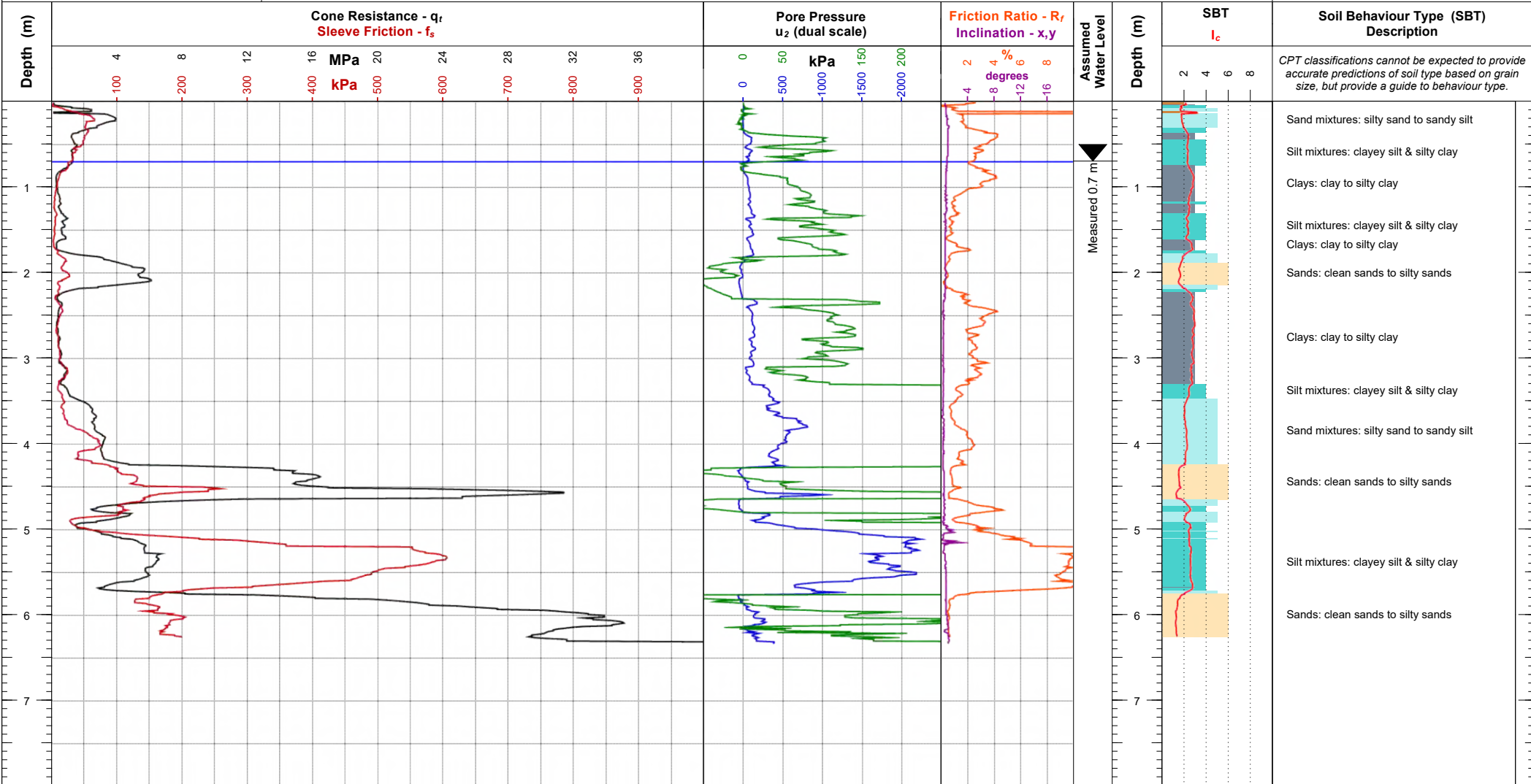
Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ335 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856862.5, 1790243.38 WGS84, (deg): 175.149763, -37.415515 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 27/11/2017 Depth (m): 6.79 Pre-Drill (m): N/A
Client Job Ref:			CPT Number: CPT-230
Remarks:			G.I. Job Ref: 17-701

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force
Project: Lakeside Development
Location: 94a Scott Road, Te Kauwhata, Waikato
Engineer: Philip Kelsey
Contractor: Ground Investigation Ltd. www.g-i.co.nz

Operator: Marcelo
Cone Ref: MKJ335
Cone Type: 10 cm² Compression
Area Ratio: 0.8
Filter Type: u2

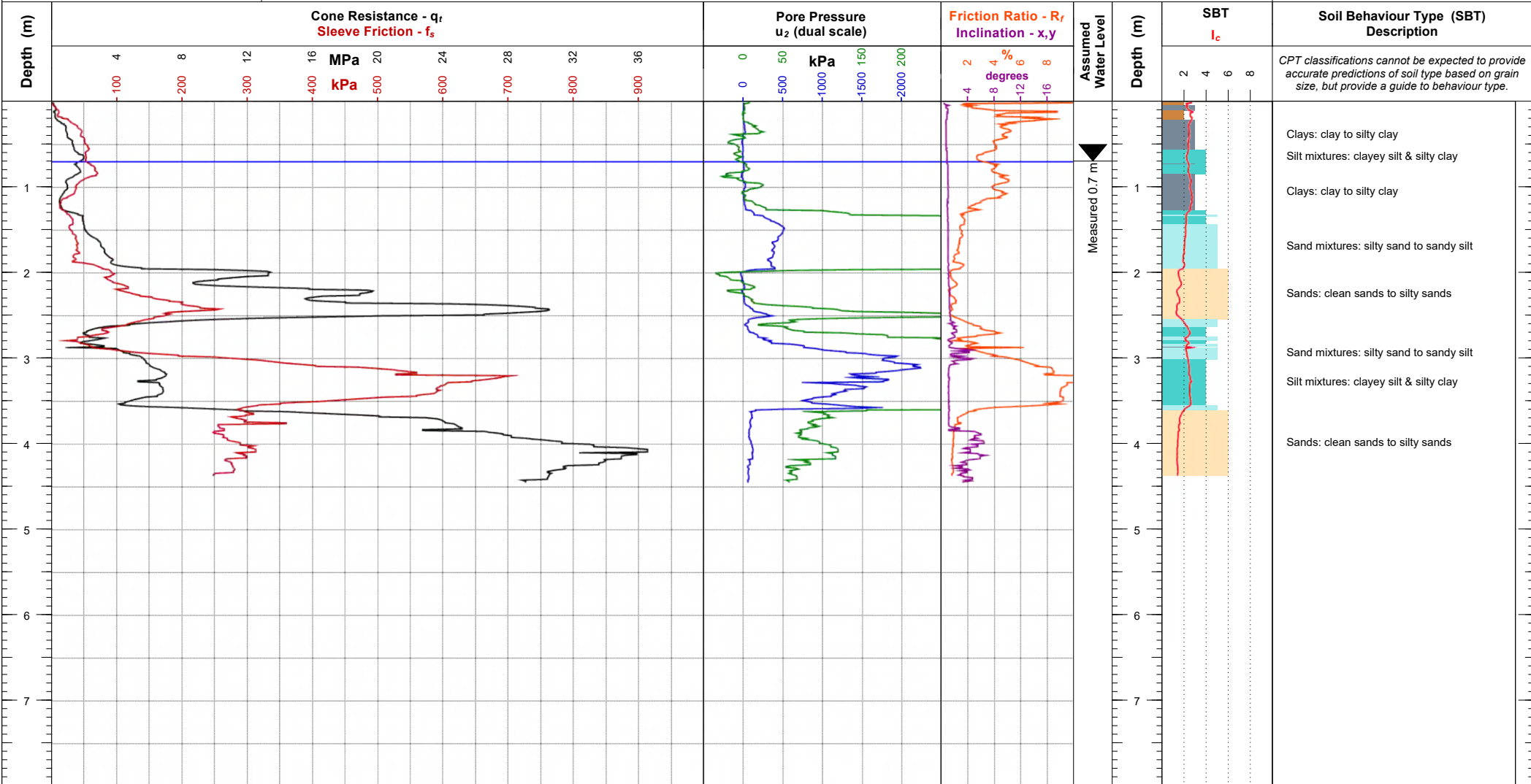
NZTM2000 N,E (m): 5856836.73, 1790292.83
WGS84, (deg): 175.150328, -37.415737
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Limit of reaction force

Elevation (m): -
Date of Test: 27/11/2017
Depth (m): 6.33
Pre-Drill (m): N/A

Client Job Ref:
CPT Number: **CPT-231**
G.I. Job Ref: **17-701**

Remarks:

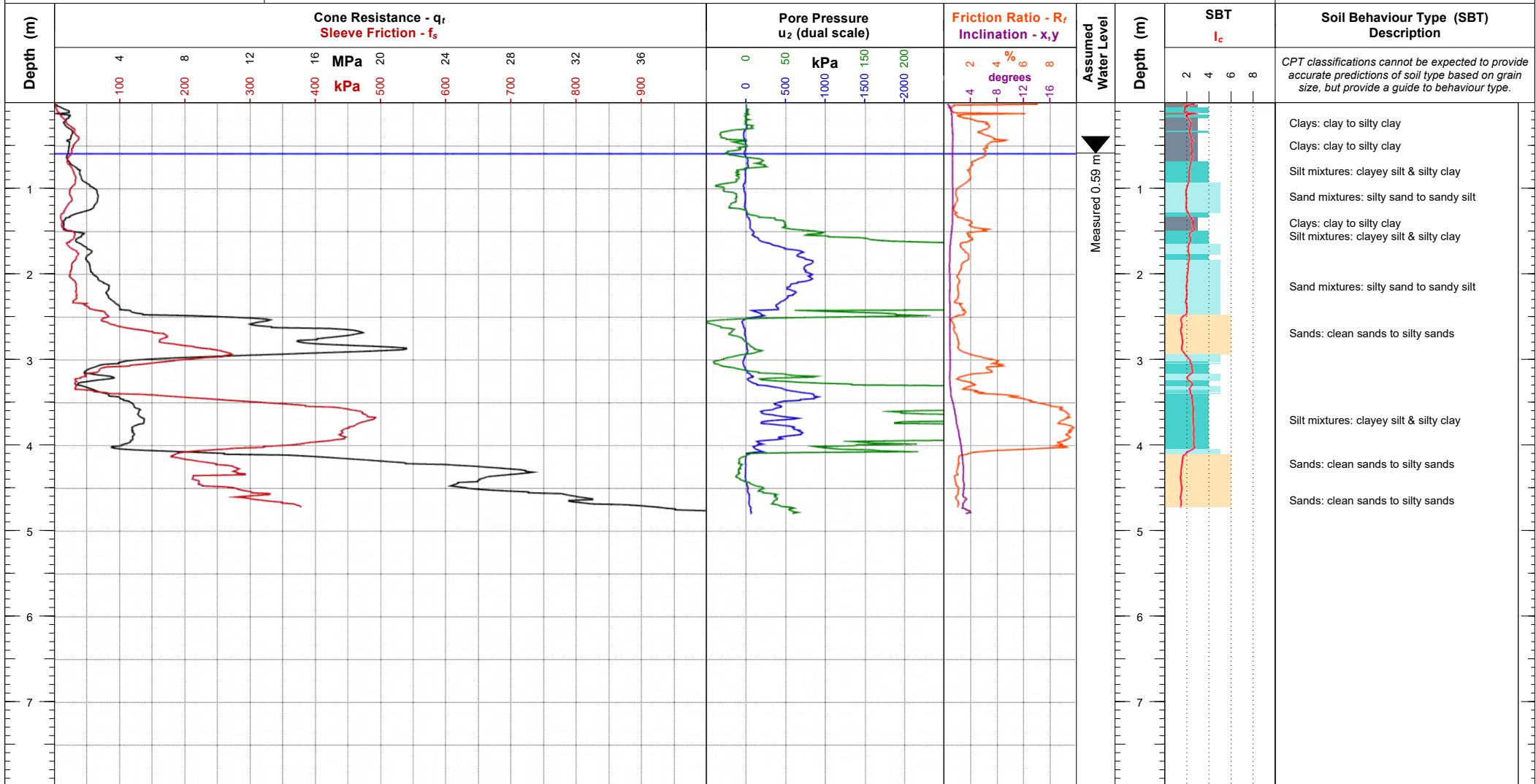
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ335 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856839.49, 1790444.05 WGS84, (deg): 175.152035, -37.415681 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 28/11/2017 Depth (m): 4.45 Pre-Drill (m): N/A	Client Job Ref:
				CPT Number: CPT-232
				G.I. Job Ref: 17-701

Remarks:

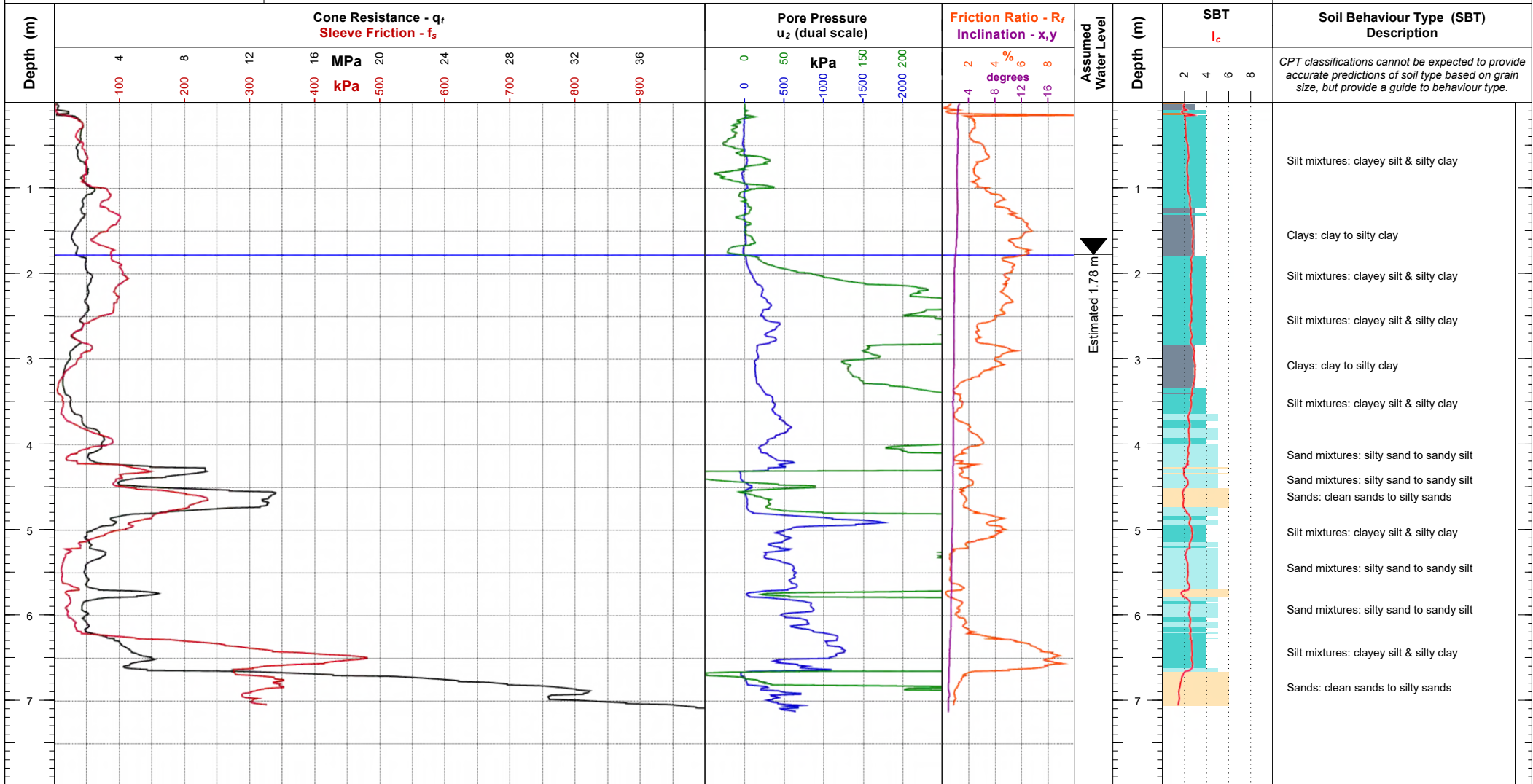
CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ208 Cone Type: 10 cm ² Compression Area Ratio: 0.8 Filter Type: u2	NZTM2000 N,E (m): 5856861.69, 1790473.6 WGS84, (deg): 175.152363, -37.415475 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 28/11/2017 Depth (m): 4.80 Pre-Drill (m): N/A
			Client Job Ref: <div style="text-align: center; font-size: 1.2em; font-weight: bold;"> CPT Number: CPT-233 </div> G.I. Job Ref: 17-701

Remarks:

CONE PENETRATION TEST (CPT) LOG



Client: Drill Force Project: Lakeside Development Location: 94a Scott Road, Te Kauwhata, Waikato Engineer: Philip Kelsey Contractor: Ground Investigation Ltd. www.g-i.co.nz	Operator: Marcelo Cone Ref: MKJ540 Cone Type: 10 cm ² Compression Area Ratio: 0.79 Filter Type: u2	NZTM2000 N,E (m): 5857216.9, 1790378.54 WGS84, (deg): 175.151198, -37.412295 Location Method: Handheld GPS Surveyor: N/A Termination Reason: Limit of reaction force	Elevation (m): - Date of Test: 30/11/2017 Depth (m): 7.13 Pre-Drill (m): N/A
Client Job Ref:		CPT Number: CPT-234	
Remarks:		G.I. Job Ref: 17-701	

Appendix C: Laboratory Solid Density and Compaction Test Results

Test Number: 172767

Report Number: 28802T

Date of Issue: 23rd November 2017

Page 1 of 2 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTDClients Address: PO Box 721
PUKEKOHE 2340

Attention: Philip Kelsey

Reference: No. 4036

Subject: **SOIL TESTING**

Clients Instructions: Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test
 - 2.1: Determination of the Water Content
 - 2.7.2: Determination of the Solid Density of Soil Particles
 - 4.1.1: Dry Density/Water Content Relationship
- NZ Standard Compaction
2. NZ Geotechnical Society, Guideline
Determining the Shear Strength of a Cohesive Soil using a Hand Held Shear Vane

Date Sampled: 9th November 2017Date Received: 10th November 2017

Date of Test: November 2017

Description of Sample: **TP202 (0.6 – 1.6 & 1.6 – 2.6m), Puketoka Silt/Clay**

Source: Lakeside Developments Te Kauwhata

- Notes:
- i. Field sample received in its natural state.
 - ii. Sample taken by P.Kelsley of Earthtech Consulting Ltd by an unknown method.
 - iii. Sampling of soil is not covered by this report.

for STEVENSON CONSTRUCTION MATERIALS LTD

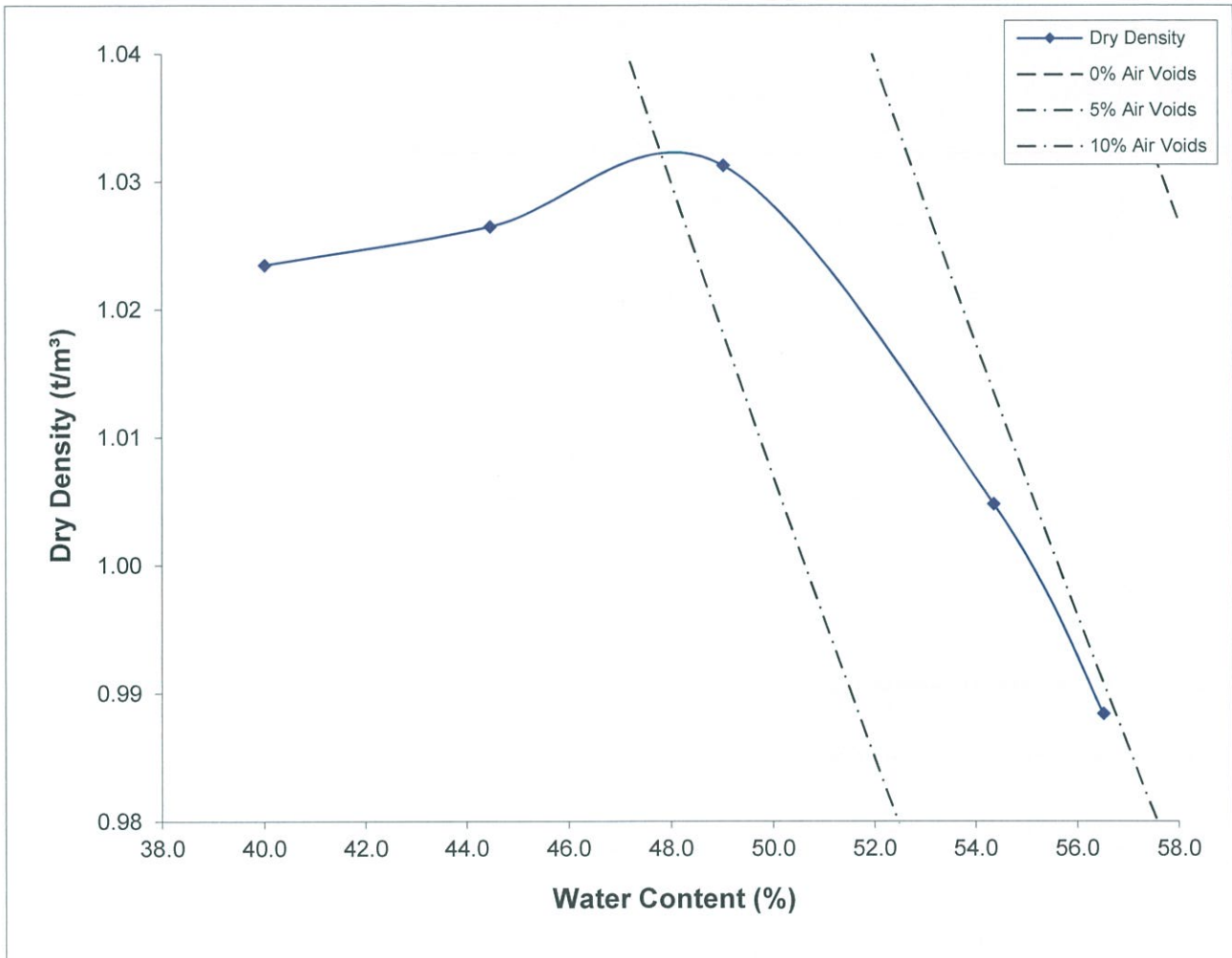

T A WHITMORE
IANZ APPROVED SIGNATORY

All tests reported
herein have been
performed in accordance
with the laboratory's
scope of accreditation

TEST RESULTS

Material:	TP202 (0.6 – 1.6 & 1.6 – 2.6m), Puketoka Silt/Clay	Test No.:	172767
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	9 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

NZ STANDARD COMPACTION



Maximum Dry Density (t/m³)	Optimum Water Content (%)	Solid Density Measured t/m³	Natural Water Content %
1.03	49.0	2.54	63.6

Water Content (%)	40.0	44.5	49.0	54.4	56.5
Dry Density (t/m³)	1.02	1.03	1.03	1.00	0.99
Shear Strength (kPa)	UTP	UTP	162	112	59
Remoulded Shear Strength (kPa)	UTP	UTP	18	9	3

- Notes:
- i. Test performed on material passing 19.0mm sieve (100%).
 - ii. UTP = Unable to Penetrate.
 - iii. Natural water content performed on whole sample.

Test Number: 172768

Report Number: 28876T

Date of Issue: 30th November 2017

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address: PO Box 721
PUKEKOHE 2340

Attention: Philip Kelsey

Reference: No. 4036

Subject: **SOIL TESTING**

Clients Instructions: Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test
 - 2.1: Determination of the Water Content
 - 2.2: Determination of Liquid Limit
 - 2.3: Determination of Plastic Limit
 - 2.4: Determination of Plasticity Index
 - 2.6: Determination of Linear Shrinkage
 - 2.7.2: Determination of Solid Density of Soil Particles
 - 4.1.1: Dry Density/Water Content Relationship
- NZ Standard Compaction
 - 6.1.1: Determination of the California Bearing Ratio
2. NZ Geotechnical Society, Guideline
Determining the Shear Strength of a Cohesive Soil using a Hand Held Shear Vane

Date Sampled: 8th November 2017

Date Received: 10th November 2017

Date of Test: November 2017

Description of Sample: **TP203 (0.3 – 1.0 & 1.0 to 1.7m) Brown Ash**

Source: Lakeside Developments Te Kauwhata

- Notes:
- i. Field sample received in its natural state.
 - ii. Sample taken by P.Kelsley of Earthtech Consulting Ltd by an unknown method.
 - iii. Sampling of soil is not covered by this report.

for STEVENSON CONSTRUCTION MATERIALS LTD



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herein have been
performed in accordance
with the laboratory's
scope of accreditation

TEST RESULTS

Material:	TP203 (0.3 – 1.0 & 1.0 to 1.7m) Brown Ash	Test No.:	172768
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	8 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

TEST METHOD	RESULT	SPECIFICATION
Liquid Limit	85	-
Plastic Limit	39	-
Plasticity Index	46	-
Linear Shrinkage	13%	-

Notes: i. Plasticity Index Tests performed on material passing 0.425mm sieve.

CALIFORNIAN BEARING RATIO

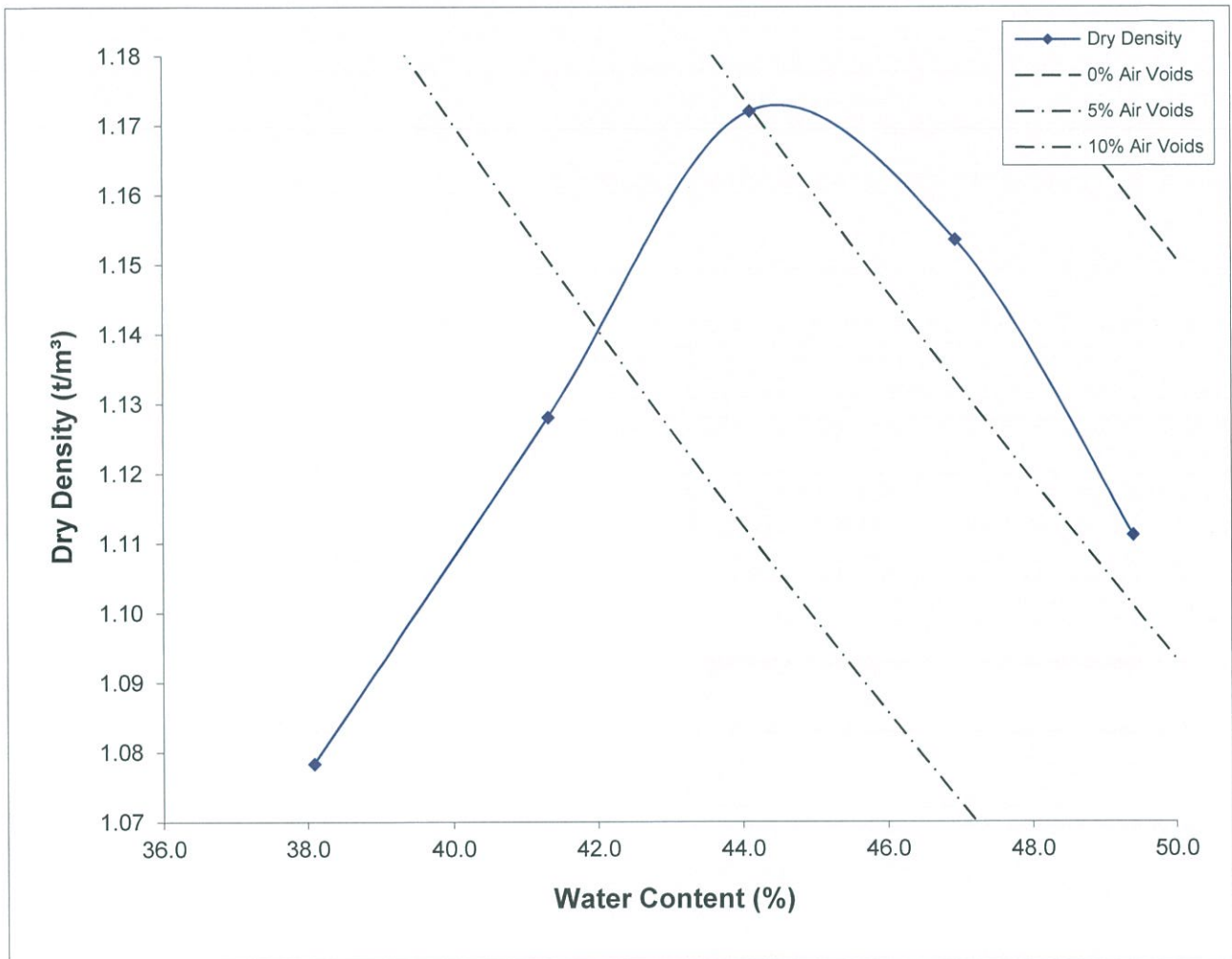
		Result
Compaction effort		NZ Standard Compaction
Sample condition		Soaked
Surcharge mass	(kg)	6.7
Period of Soaking	(Days)	4
Compacted dry density	(t/m ³)	1.18
Compacted water content	(%)	44.1
Soaked water content	(%)	46.6
Swell	(%)	0.0
Rate of penetration	(mm/min)	1
Depth CBR recorded	(mm)	2.5 & 5.0
California Bearing Ratio	CBR	5%

Notes: i. Negative Swell implies shrinkage.
ii. Test performed on material passing the 19.0mm Test Sieve (100%).

TEST RESULTS

Material:	TP203 (0.3 – 1.0 & 1.0 to 1.7m) Brown Ash	Test No.:	172768
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	8 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

NZ STANDARD COMPACTION



Maximum Dry Density (t/m³)	Optimum Water Content (%)	Solid Density Measured t/m³	Natural Water Content %
1.17	44.0	2.71	41.6

Water Content (%)	38.1	41.3	44.1	46.9	49.4
Dry Density (t/m³)	1.08	1.13	1.17	1.15	1.11
Shear Strength (kPa)	UTP	UTP	162	65	38
Remoulded Shear Strength (kPa)	UTP	UTP	80	32	15

- Notes:
- i. Test performed on material passing 19.0mm sieve (100%).
 - ii. UTP = Unable to Penetrate.
 - iii. Natural water content performed on whole sample.

Test Number: 172769

Report Number: 28803T – Amendment One

Date of Issue: 5th December 2017

Page 1 of 2 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTDClients Address: PO Box 721
PUKEKOHE 2340

Attention: Philip Kelsey

Reference: No. 4036

Subject: **SOIL TESTING**

Clients Instructions: Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test
 - 2.1: Determination of the Water Content
 - 4.1.1: Dry Density/Water Content Relationship
- NZ Standard Compaction
2. NZ Geotechnical Society, Guideline
Determining the Shear Strength of a Cohesive Soil using a Hand Held Shear Vane

Date Sampled: 8th November 2017Date Received: 10th November 2017

Date of Test: November 2017

Description of Sample: **TP203 (1.7 – 2.7 & 2.7 – 3.4m), Puketoka Silt/Clay**

Source: Lakeside Developments Te Kauwhata

- Notes:
- i. Field sample received in its natural state.
 - ii. Sample taken by P.Kelsey of Earthtech Consulting Ltd by an unknown method.
 - iii. Sampling of soil is not covered by this report.

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Test Number: 172770

Report Number: 28877T

Date of Issue: 30th November 2017

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTDClients Address: PO Box 721
PUKEKOHE 2340

Attention: Philip Kelsey

Reference: No. 4036

Subject: **SOIL TESTING**

Clients Instructions: Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test
 - 2.1: Determination of the Water Content
 - 2.2: Determination of Liquid Limit
 - 2.3: Determination of Plastic Limit
 - 2.4: Determination of Plasticity Index
 - 2.6: Determination of Linear Shrinkage
 - 2.7.2: Determination of Solid Density of Soil Particles
 - 4.1.1: Dry Density/Water Content Relationship
- NZ Standard Compaction
 - 6.1.1: Determination of the California Bearing Ratio
2. NZ Geotechnical Society, Guideline
Determining the Shear Strength of a Cohesive Soil using a Hand Held Shear Vane

Date Sampled: 7th November 2017Date Received: 10th November 2017

Date of Test: November 2017

Description of Sample: **TP204 (1.0 – 2.0 & 2.0 to 3.0m) Puketoka Silt/Clay**

Source: Lakeside Developments Te Kauwhata

- Notes:
- i. Field sample received in its natural state.
 - ii. Sample taken by P.Kelsley of Earthtech Consulting Ltd by an unknown method.
 - iii. Sampling of soil is not covered by this report.

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herein have been
performed in accordance
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scope of accreditation

TEST RESULTS

Material:	TP204 (1.0 – 2.0 & 2.0 to 3.0m) Puketoka Silt/Clay	Test No.:	172770
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	7 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

TEST METHOD	RESULT	SPECIFICATION
Liquid Limit	70	-
Plastic Limit	29	-
Plasticity Index	41	-
Linear Shrinkage	12%	-

Notes: i. Plasticity Index Tests performed on material passing 0.425mm sieve.

CALIFORNIA BEARING RATIO

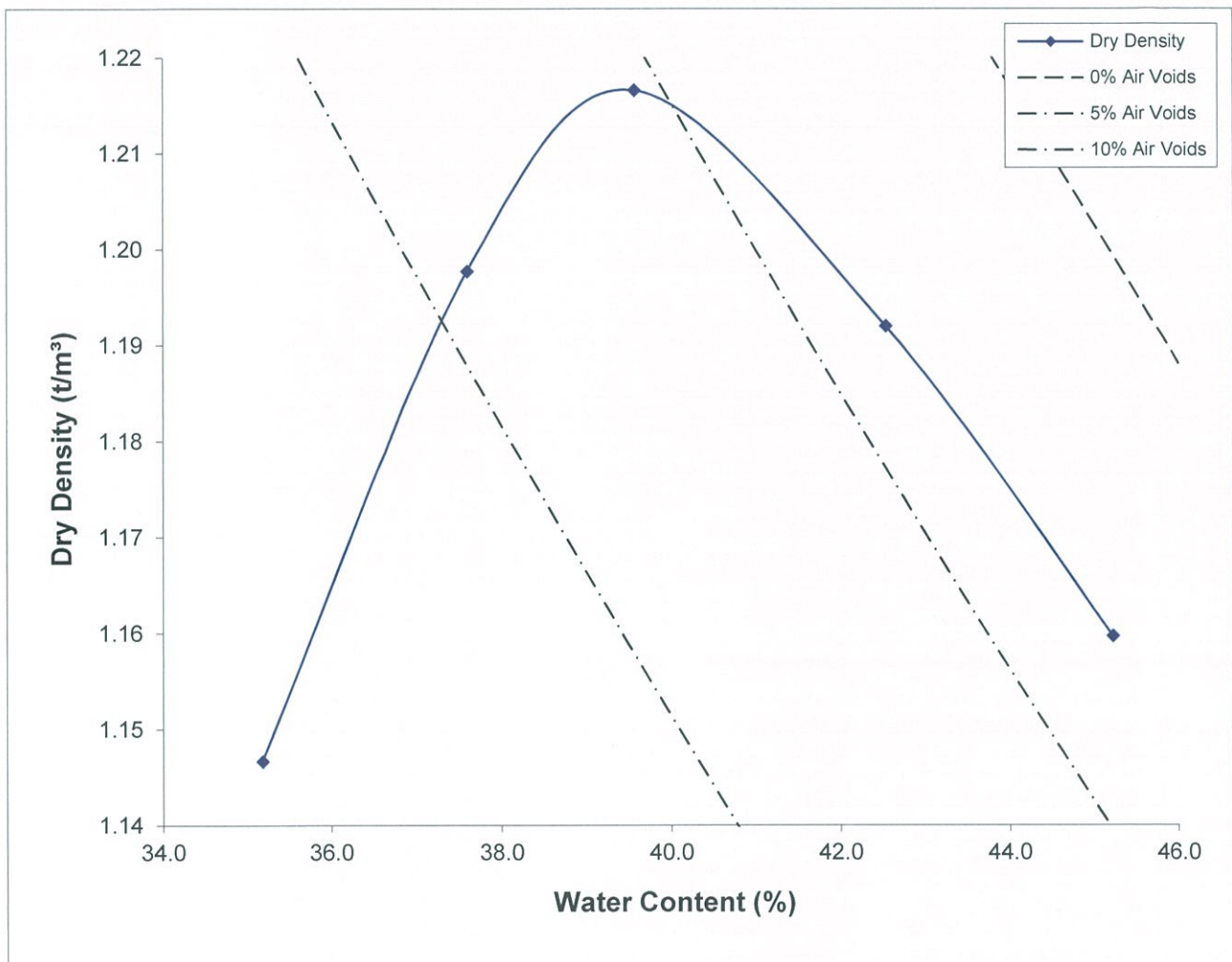
		Result
Compaction effort		NZ Standard Compaction
Sample condition		Soaked
Surcharge mass	(kg)	6.7
Period of Soaking	(Days)	4
Compacted dry density	(t/m ³)	1.22
Compacted water content	(%)	38.7
Soaked water content	(%)	41.5
Swell	(%)	1.2
Rate of penetration	(mm/min)	1
Depth CBR recorded	(mm)	2.5 & 5.0
California Bearing Ratio	CBR	6%

Notes: i. Negative Swell implies shrinkage.
ii. Test performed on material passing the 19.0mm Test Sieve (100%).

TEST RESULTS

Material:	TP204 (1.0 – 2.0 & 2.0 to 3.0m) Puketoka Silt/Clay	Test No.:	172770
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	7 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

NZ STANDARD COMPACTION



Maximum Dry Density (t/m³)	Optimum Water Content (%)	Solid Density Measured t/m³	Natural Water Content %
1.22	40.0	2.62	47.0

Water Content (%)	35.2	37.6	39.6	42.5	45.2
Dry Density (t/m³)	1.15	1.20	1.22	1.19	1.16
Shear Strength (kPa)	UTP	201	133	74	21
Remoulded Shear Strength (kPa)	UTP	53	21	15	6

- Notes:
- i. Test performed on material passing 19.0mm sieve (100%).
 - ii. UTP = Unable to Penetrate.
 - iii. Natural water content performed on whole sample.

Test Number: 172772

Report Number: 28858T

Date of Issue: 28th November 2017

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address: PO Box 721
PUKEKOHE 2340

Attention: Philip Kelsey

Reference: No. 4036

Subject: **SOIL TESTING**

Clients Instructions: Conduct the tests as detailed below on the soil sample received.

Test Methods: 1. NZS4402: 1986:Test
2.1: Determination of the Water Content
2.7.2: Determination of the Solid Density of Soil Particles
4.1.1: Dry Density/Water Content Relationship
- NZ Standard Compaction
6.1.1: Determination of the California Bearing Ratio
2. NZ Geotechnical Society, Guideline
Determining the Shear Strength of a Cohesive Soil using a Hand Held Shear Vane

Date Sampled: 8th November 2017

Date Received: 10th November 2017

Date of Test: November 2017

Description of Sample: **TP205 (2.3 – 3.3 & 3.3 – 4.3m), Puketoka Sand**

Source: Lakeside Developments Te Kauwhata

Notes: i. Field sample received in its natural state.
ii. Sample taken by P.Kelsley of Earthtech Consulting Ltd by an unknown method.
iii. Sampling of soil is not covered by this report.

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TEST RESULTS

Material:	TP205 (2.3 – 3.3 & 3.3 – 4.3m), Puketoka Sand	Test No.:	172772
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	8 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

CALIFORNIAN BEARING RATIO

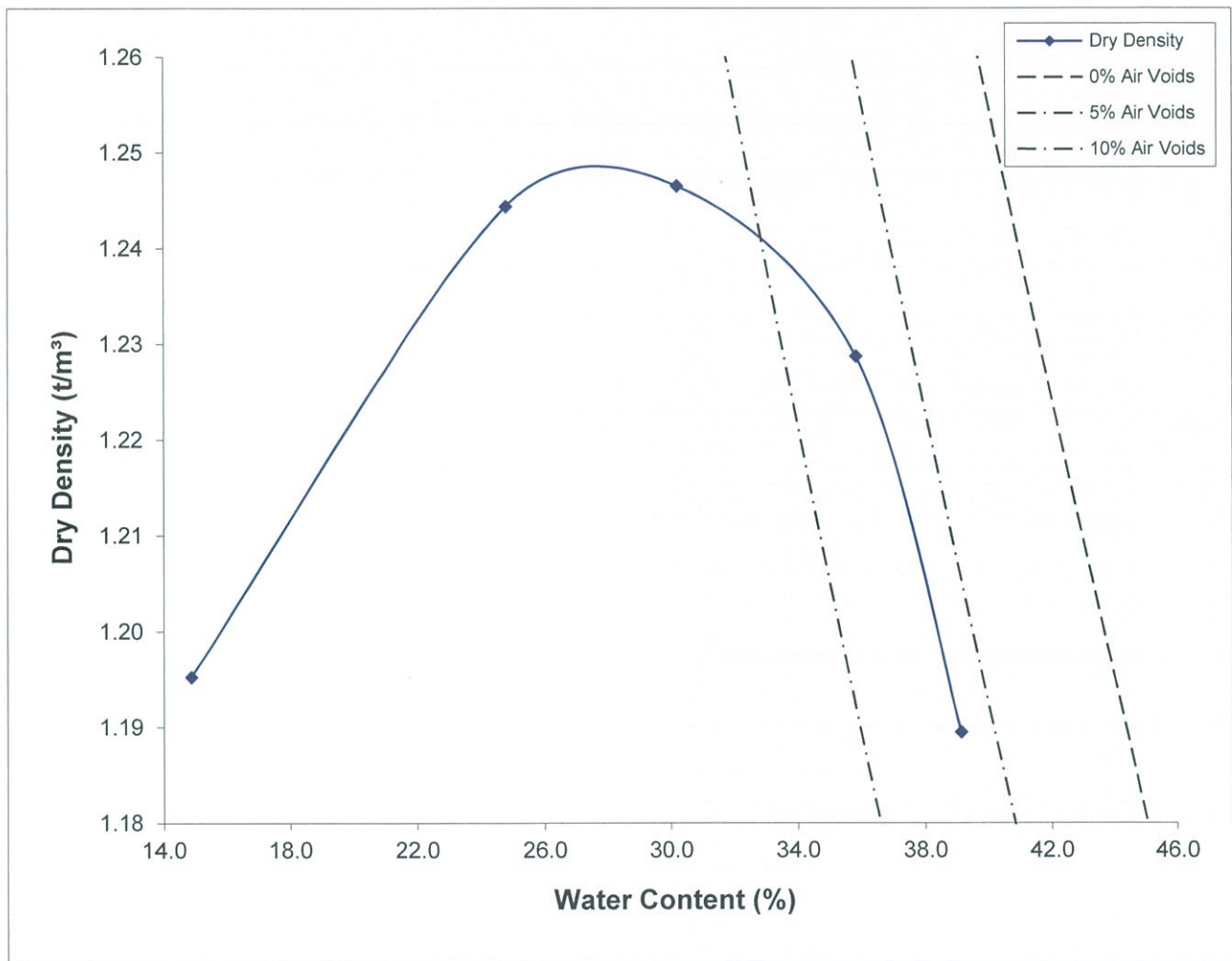
		Result
Compaction effort		NZ Standard Compaction
Sample condition		Soaked
Surcharge mass	(kg)	6.7
Period of Soaking	(Days)	4
Compacted dry density	(t/m ³)	1.24
Compacted water content	(%)	29.7
Soaked water content	(%)	35.3
Swell	(%)	0.0
Rate of penetration	(mm/min)	1
Depth CBR recorded	(mm)	5.0
California Bearing Ratio	CBR	25%

- Notes:
- i. Negative Swell implies shrinkage.
 - ii. Test performed on material passing the 19.0mm Test Sieve (100%).

TEST RESULTS

Material:	TP205 (2.3 – 3.3 & 3.3 – 4.3m), Puketoka Sand	Test No.:	172772
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	8 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

NZ STANDARD COMPACTION



Maximum Dry Density (t/m³)	Optimum Water Content (%)	Solid Density Measured (t/m³)	Natural Water Content %
1.25	30.0	2.52	36.7

Water Content (%)	14.9	24.8	30.2	35.8	39.1
Dry Density (t/m³)	1.20	1.24	1.25	1.23	1.19
Shear Strength (kPa)	UTP	UTP	UTP	UTP	18
Remoulded Shear Strength (kPa)	UTP	UTP	UTP	UTP	0

- Notes:
- i. Test performed on material passing 19.0mm sieve (100%).
 - ii. UTP = Unable to Penetrate.
 - iii. Natural water content performed on whole sample.

Test Number: 172773

Report Number: 28856T

Date of Issue: 23rd November 2017

Page 1 of 2 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTDClients Address: PO Box 721
PUKEKOHE 2340

Attention: Philip Kelsey

Reference: No. 4036

Subject: **SOIL TESTING**

Clients Instructions: Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test
 - 2.1: Determination of the Water Content
 - 4.1.1: Dry Density/Water Content Relationship
- NZ Standard Compaction
2. NZ Geotechnical Society, Guideline
Determining the Shear Strength of a Cohesive Soil using a Hand Held Shear Vane

Date Sampled: 8th November 2017Date Received: 10th November 2017

Date of Test: November 2017

Description of Sample: **TP 205 (4.8 – 5.5m) Puketoka Silt (Sensitive)**

Source: Lakeside Developments Te Kauwhata

- Notes:
- i. Field sample received in its natural state.
 - ii. Sample taken by P.Kelsey of Earthtech Consulting Ltd by an unknown method.
 - iii. Sampling of soil is not covered by this report.

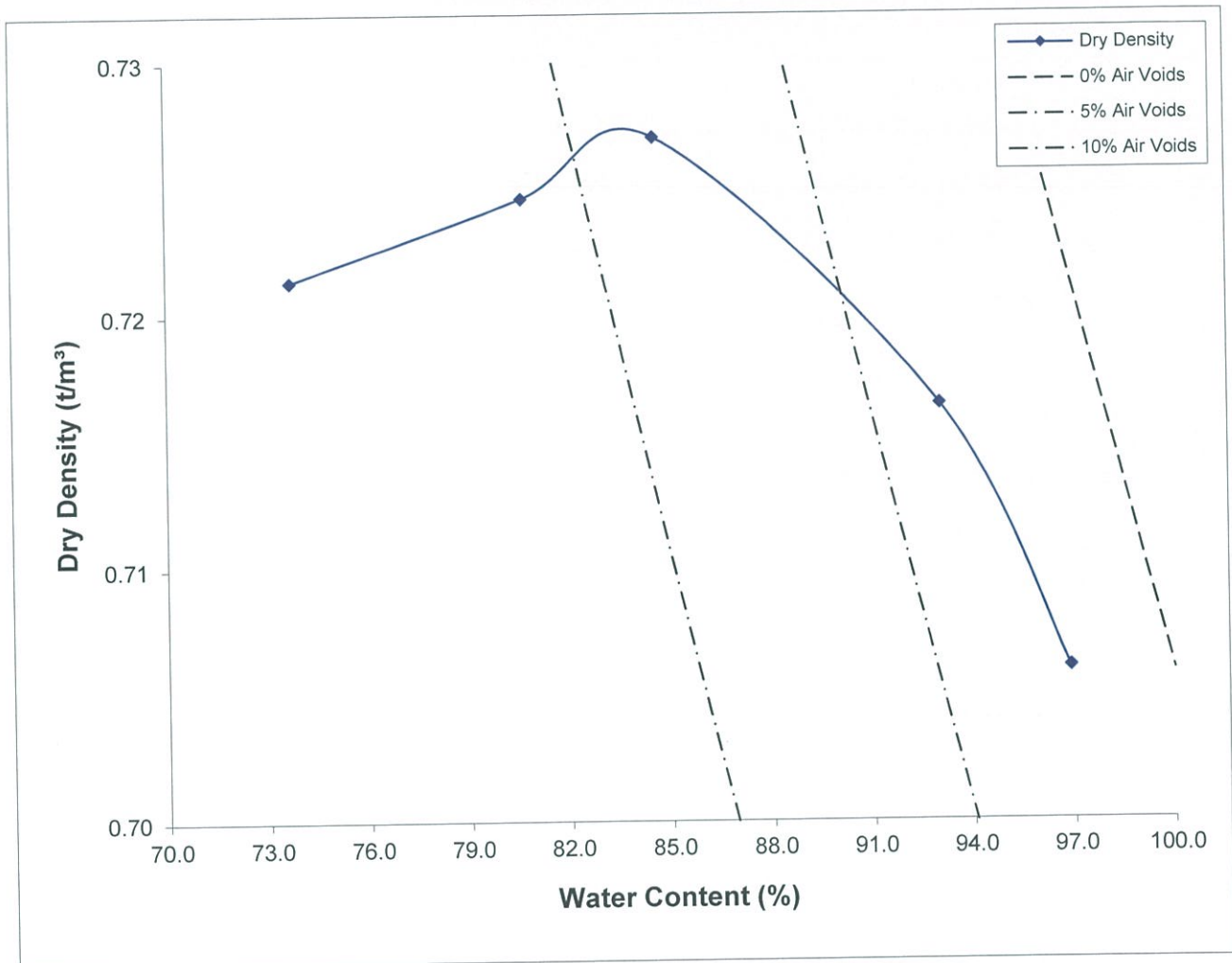
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TEST RESULTS

Material:	TP 205 (4.8 – 5.5m) Puketoka Silt (Sensitive)	Test No.:	172773
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	8 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

NZ STANDARD COMPACTION



Maximum Dry Density (t/m³)	Optimum Water Content (%)	Solid Density Assumed t/m³	Natural Water Content %
0.73	85.0	2.40	94.1

Water Content (%)	73.7	80.6	84.6	93.0	96.9
Dry Density (t/m³)	0.72	0.72	0.73	0.72	0.71
Shear Strength (kPa)	201	162	145	59	38
Remoulded Shear Strength (kPa)	12	27	24	3	0

- Notes:
- i. Test performed on material passing 19.0mm sieve (100%).
 - ii. UTP = Unable to Penetrate.
 - iii. Natural water content performed on whole sample.

Test Number: 172774

Report Number: 28859T – Amendment One

Date of Issue: 5th December 2017

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTDClients Address: PO Box 721
PUKEKOHE 2340

Attention: Philip Kelsey

Reference: No. 4036

Subject: **SOIL TESTING**

Clients Instructions: Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test
 - 2.1: Determination of the Water Content
 - 4.1.1: Dry Density/Water Content Relationship
- NZ Standard Compaction
 - 6.1.1: Determination of the California Bearing Ratio
2. NZ Geotechnical Society, Guideline
Determining the Shear Strength of a Cohesive Soil using a Hand Held Shear Vane

Date Sampled: 7th November 2017Date Received: 10th November 2017

Date of Test: November 2017

Description of Sample: **TP206 (0.3 – 1.5 & 1.5 – 3.0m), Puketoka Silt & Sand**

Source: Lakeside Developments Te Kauwhata

- Notes:
- i. Field sample received in its natural state.
 - ii. Sample taken by P.Kelsley of Earthtech Consulting Ltd by an unknown method.
 - iii. Sampling of soil is not covered by this report.

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TEST RESULTS

Material:	TP206 (0.3 – 1.5 & 1.5 – 3.0m), Puketoka Silt & Sand	Test No.:	172774
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	7 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

CALIFORNIAN BEARING RATIO

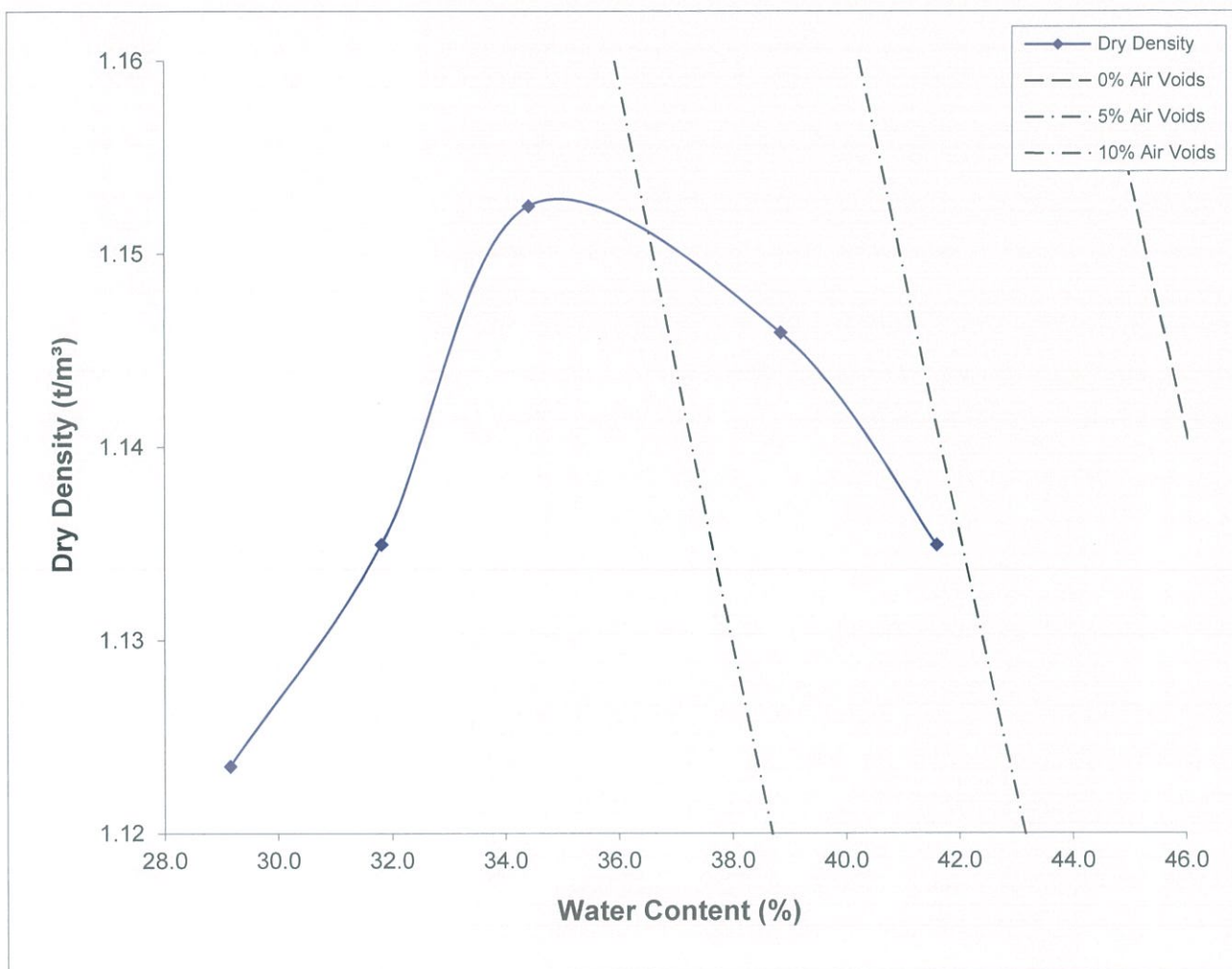
		Result
Compaction effort		NZ Standard Compaction
Sample condition		Soaked
Surcharge mass	(kg)	6.7
Period of Soaking	(Days)	4
Compacted dry density	(t/m ³)	1.16
Compacted water content	(%)	39.4
Soaked water content	(%)	42.5
Swell	(%)	0.0
Rate of penetration	(mm/min)	1
Depth CBR recorded	(mm)	5.0
California Bearing Ratio	CBR	13%

- Notes:
- i. Negative Swell implies shrinkage.
 - ii. Test performed on material passing the 19.0mm Test Sieve (100%).

TEST RESULTS

Material:	TP206 (0.3 – 1.5 & 1.5 – 3.0m), Puketoka Silt & Sand	Test No.:	172774
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	7 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

NZ STANDARD COMPACTION



Maximum Dry Density (t/m³)	Optimum Water Content (%)	Solid Density Assumed t/m³	Natural Water Content %
1.15	34.0	2.40	48.0

Water Content (%)	29.2	31.8	34.4	38.8	41.6
Dry Density (t/m³)	1.12	1.13	1.15	1.15	1.13
Shear Strength (kPa)	UTP	UTP	UTP	UTP	130
Remoulded Shear Strength (kPa)	UTP	UTP	UTP	UTP	15

- Notes:
- i. Test performed on material passing 19.0mm sieve (100%).
 - ii. UTP = Unable to Penetrate.
 - iii. Natural water content performed on whole sample.

Test Number: 172775

Report Number: 28860T

Date of Issue: 28th November 2017

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address: PO Box 721
PUKEKOHE 2340

Attention: Philip Kelsey

Reference: No. 4036

Subject: **SOIL TESTING**

Clients Instructions: Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test
 - 2.1: Determination of the Water Content
 - 2.7.2: Determination of the Solid Density of Soil Particles
 - 4.1.1: Dry Density/Water Content Relationship
- NZ Standard Compaction
 - 6.1.1: Determination of the California Bearing Ratio
2. NZ Geotechnical Society, Guideline
Determining the Shear Strength of a Cohesive Soil using a Hand Held Shear Vane

Date Sampled: 7th November 2017

Date Received: 10th November 2017

Date of Test: November 2017

Description of Sample: **TP206 (4.0 – 5.0 & 5.0 – 5.6m), Puketoka Sand**

Source: Lakeside Developments Te Kauwhata

Notes:

- i. Field sample received in its natural state.
- ii. Sample taken by P.Kelsley of Earthtech Consulting Ltd by an unknown method.
- iii. Sampling of soil is not covered by this report.

for STEVENSON CONSTRUCTION MATERIALS LTD


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TEST RESULTS

Material:	TP206 (4.0 – 5.0 & 5.0 – 5.6m), Puketoka Sand	Test No.:	172775
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	7 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

CALIFORNIAN BEARING RATIO

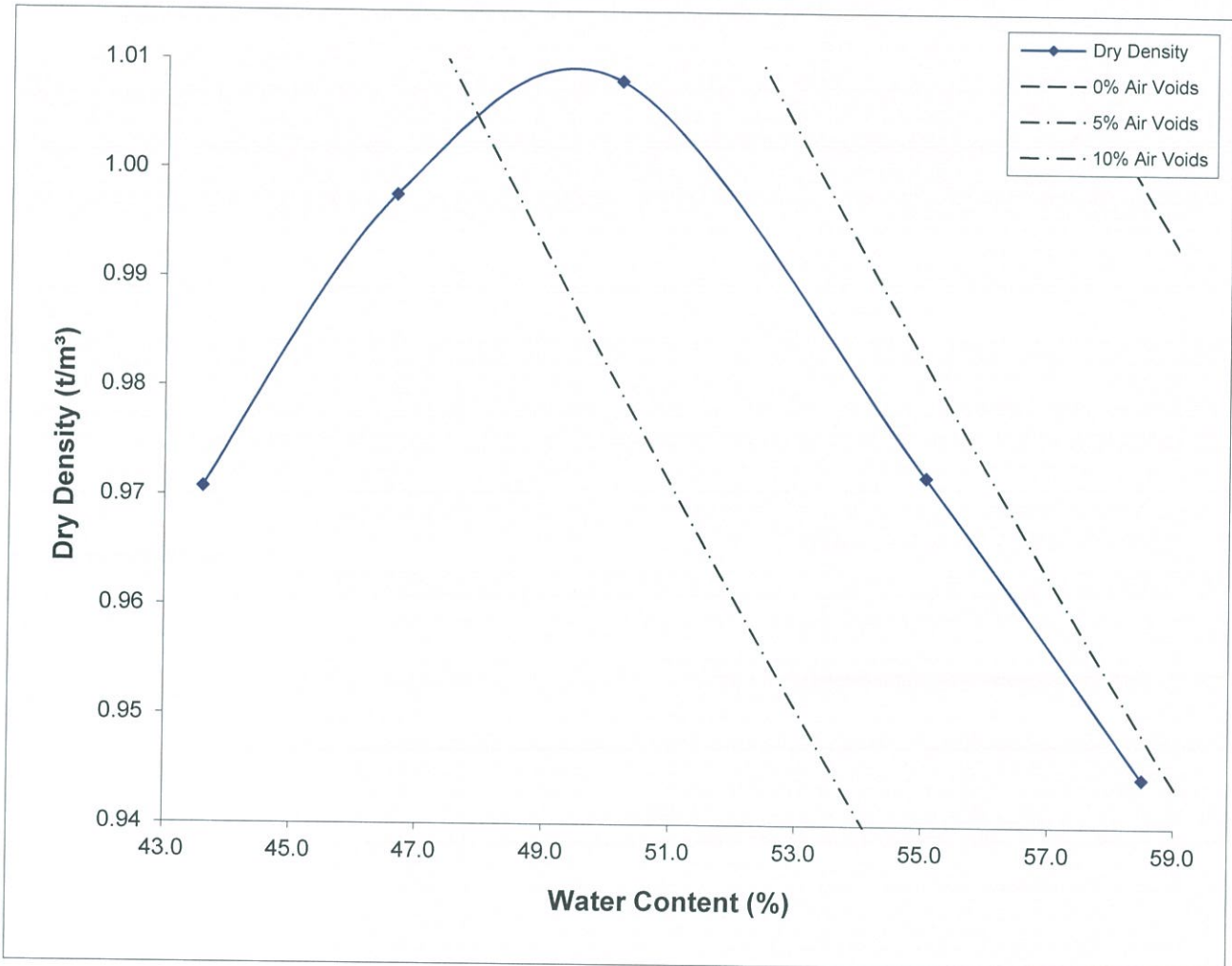
		Result
Compaction effort		<i>NZ Standard Compaction</i>
Sample condition		Soaked
Surcharge mass	(kg)	6.7
Period of Soaking	(Days)	4
Compacted dry density	(t/m ³)	1.00
Compacted water content	(%)	51.2
Soaked water content	(%)	47.8
Swell	(%)	-0.2
Rate of penetration	(mm/min)	1
Depth CBR recorded	(mm)	5.0
California Bearing Ratio	CBR	18%

- Notes:
- i. Negative Swell implies shrinkage.
 - ii. Test performed on material passing the 19.0mm Test Sieve (100%).

TEST RESULTS

Material:	TP206 (4.0 – 5.0 & 5.0 – 5.6m), Puketoka Sand	Test No.:	172775
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	7 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

NZ STANDARD COMPACTION



Maximum Dry Density (t/m ³)	Optimum Water Content (%)	Solid Density Measured (t/m ³)	Natural Water Content %
1.01	50.0	2.40	31.1

Water Content (%)	43.6	46.7	50.2	55.0	58.5
Dry Density (t/m ³)	0.97	1.00	1.01	0.97	0.94
Shear Strength (kPa)	UTP	UTP	UTP	27	15
Remoulded Shear Strength (kPa)	UTP	UTP	UTP	9	3

- Notes:
- i. Test performed on material passing 19.0mm sieve (100%).
 - ii. UTP = Unable to Penetrate.
 - iii. Natural water content performed on whole sample.

Test Number: 172776

Report Number: 28878T

Date of Issue: 30th November 2017

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address: PO Box 721
PUKEKOHE 2340

Attention: Philip Kelsey

Reference: No. 4036

Subject: **SOIL TESTING**

Clients Instructions: Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test
 - 2.1: Determination of the Water Content
 - 2.2: Determination of Liquid Limit
 - 2.3: Determination of Plastic Limit
 - 2.4: Determination of Plasticity Index
 - 2.6: Determination of Linear Shrinkage
 - 2.7.2: Determination of Solid Density of Soil Particles
 - 4.1.1: Dry Density/Water Content Relationship
- NZ Standard Compaction
 - 6.1.1: Determination of the California Bearing Ratio
2. NZ Geotechnical Society, Guideline
Determining the Shear Strength of a Cohesive Soil using a Hand Held Shear Vane

Date Sampled: 7th November 2017

Date Received: 10th November 2017

Date of Test: November 2017

Description of Sample: **TP208 (0.35 – 1.5 & 1.5 & 2.5m) Brown Ash**

Source: Lakeside Developments Te Kauwhata

- Notes:
- i. Field sample received in its natural state.
 - ii. Sample taken by P.Kelsley of Earthtech Consulting Ltd by an unknown method.
 - iii. Sampling of soil is not covered by this report.

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with the laboratory's
scope of accreditation

TEST RESULTS

Material:	TP208 (0.35 – 1.5 & 1.5 & 2.5m) Brown Ash	Test No.:	172776
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	7 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

TEST METHOD	RESULT	SPECIFICATION
Liquid Limit	76	-
Plastic Limit	34	-
Plasticity Index	42	-
Linear Shrinkage	13%	-

Notes: i. Plasticity Index Tests performed on material passing 0.425mm sieve.

CALIFORNIAN BEARING RATIO

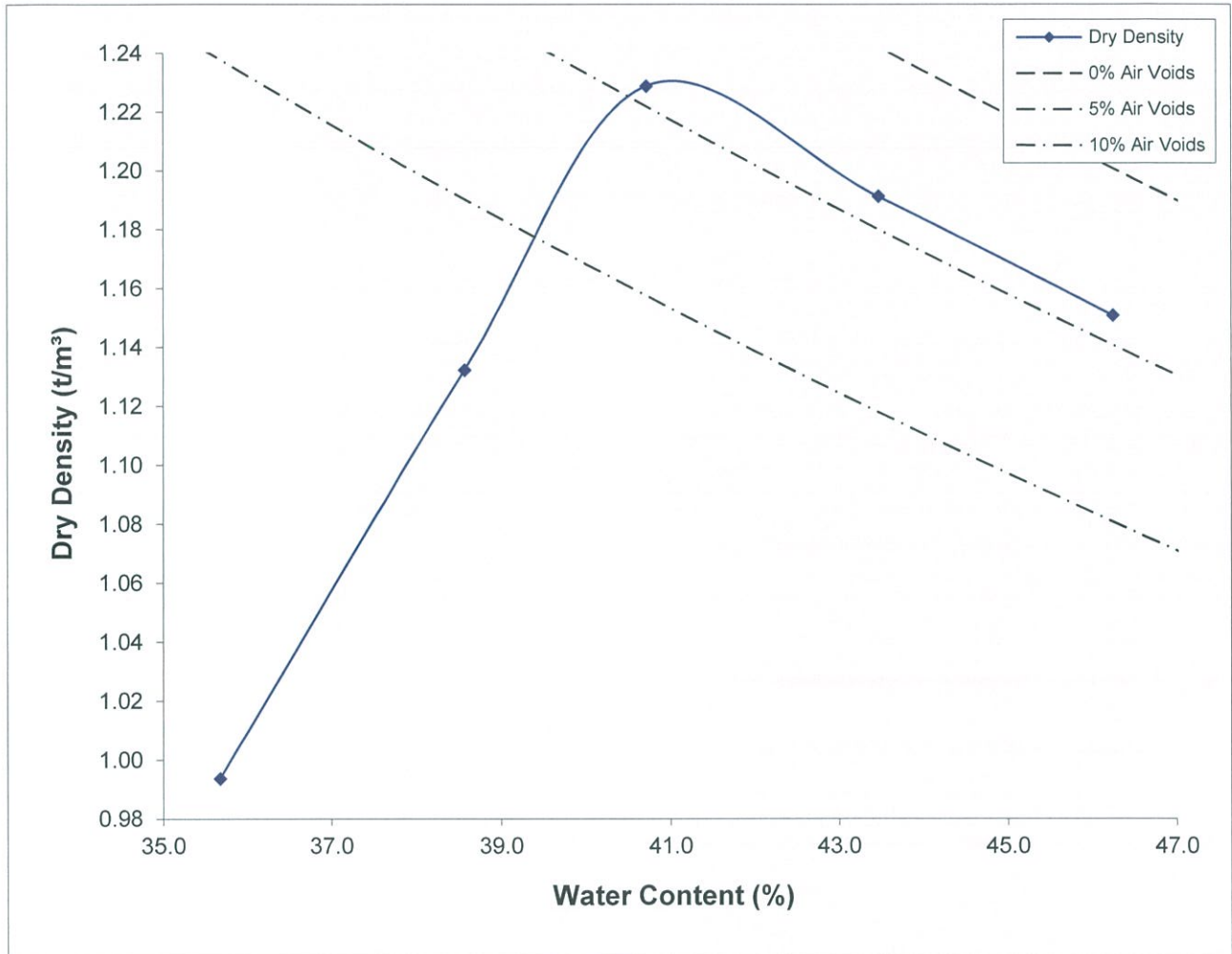
		Result
Compaction effort		NZ Standard Compaction
Sample condition		Soaked
Surcharge mass	(kg)	6.7
Period of Soaking	(Days)	4
Compacted dry density	(t/m ³)	1.24
Compacted water content	(%)	40.6
Soaked water content	(%)	41.8
Swell	(%)	0.0
Rate of penetration	(mm/min)	1
Depth CBR recorded	(mm)	2.5
California Bearing Ratio	CBR	4%

Notes: i. Negative Swell implies shrinkage.
 ii. Test performed on material passing the 19.0mm Test Sieve (100%).

TEST RESULTS

Material:	TP208 (0.35 – 1.5 & 1.5 & 2.5m) Brown Ash	Test No.:	172776
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	7 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

NZ STANDARD COMPACTION



Maximum Dry Density (t/m³)	Optimum Water Content (%)	Solid Density Measured t/m³	Natural Water Content %
1.23	41.0	2.70	45.1

Water Content (%)	35.7	38.6	40.7	43.5	46.2
Dry Density (t/m³)	0.99	1.13	1.23	1.19	1.15
Shear Strength (kPa)	UTP	UTP	115	47	27
Remoulded Shear Strength (kPa)	UTP	UTP	56	30	12

- Notes:
- i. Test performed on material passing 19.0mm sieve (100%).
 - ii. UTP = Unable to Penetrate.
 - iii. Natural water content performed on whole sample.

Test Number: 172777

Report Number: 28861T

Date of Issue: 28th November 2017

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address: PO Box 721
PUKEKOHE 2340

Attention: Philip Kelsey

Reference: No. 4036

Subject: **SOIL TESTING**

Clients Instructions: Conduct the tests as detailed below on the soil sample received.

Test Methods: 1. NZS4402: 1986:Test
2.1: Determination of the Water Content
2.7.2: Determination of the Solid Density of Soil Particles
4.1.1: Dry Density/Water Content Relationship
- NZ Standard Compaction
6.1.1: Determination of the California Bearing Ratio
2. NZ Geotechnical Society, Guideline
Determining the Shear Strength of a Cohesive Soil using a Hand Held Shear Vane

Date Sampled: 7th November 2017

Date Received: 10th November 2017

Date of Test: November 2017

Description of Sample: **TP208 (2.5 – 3.6 & 3.6 – 4.6m), Puketoka Silt/Clay**

Source: Lakeside Developments Te Kauwhata

Notes: i. Field sample received in its natural state.
ii. Sample taken by P.Kelsley of Earthtech Consulting Ltd by an unknown method.
iii. Sampling of soil is not covered by this report.

for STEVENSON CONSTRUCTION MATERIALS LTD


T A WHITMORE
IANZ APPROVED SIGNATORY

TEST RESULTS

Material:	TP208 (2.5 – 3.6 & 3.6 – 4.6m), Puketoka Silt/Clay	Test No.:	172777
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	7 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

CALIFORNIAN BEARING RATIO

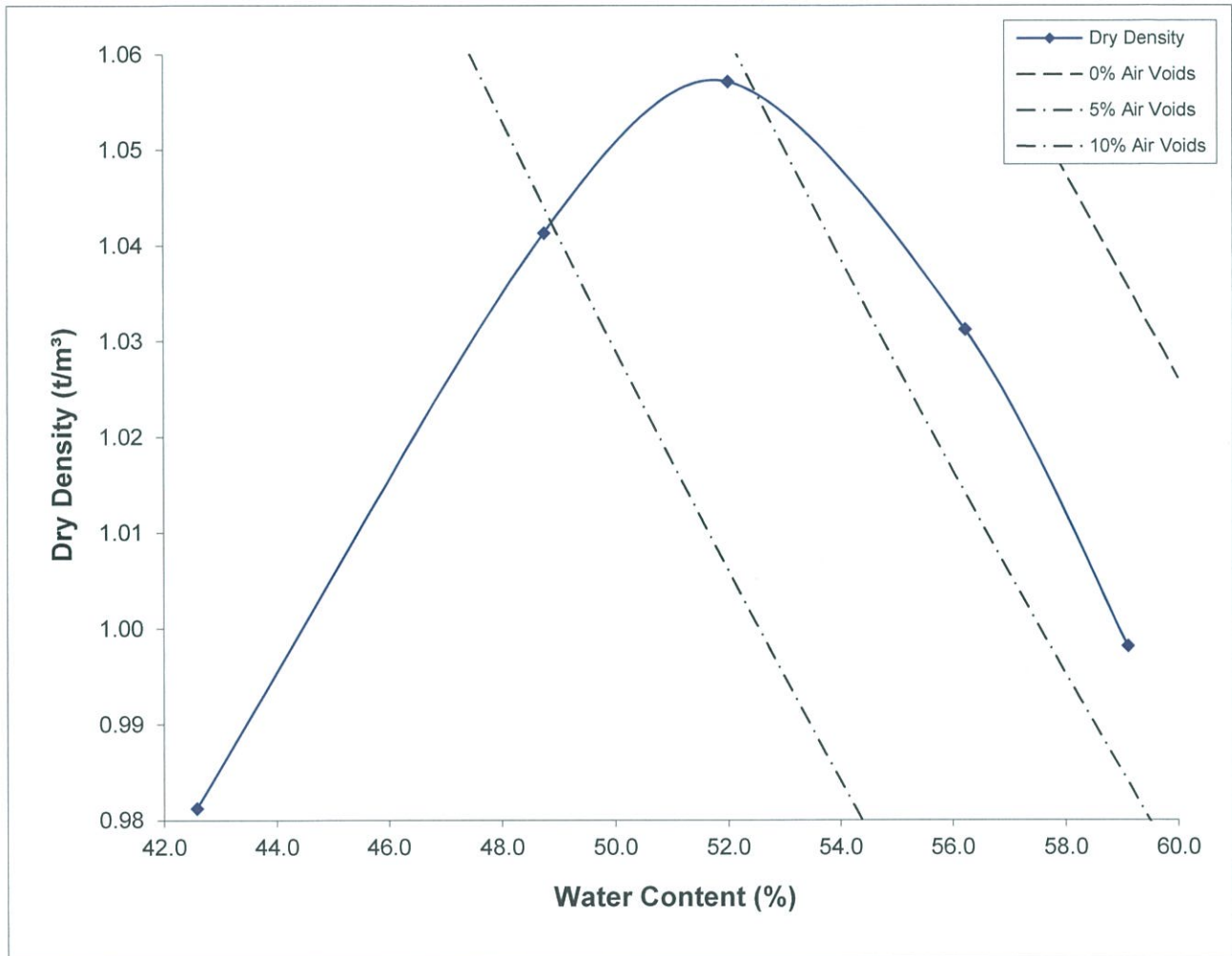
		Result
Compaction effort		NZ Standard Compaction
Sample condition		Soaked
Surcharge mass	(kg)	6.7
Period of Soaking	(Days)	4
Compacted dry density	(t/m ³)	1.00
Compacted water content	(%)	51.8
Soaked water content	(%)	57.2
Swell	(%)	0.2
Rate of penetration	(mm/min)	1
Depth CBR recorded	(mm)	2.5 & 5.0
California Bearing Ratio	CBR	1%

- Notes:
- i. Negative Swell implies shrinkage.
 - ii. Test performed on material passing the 19.0mm Test Sieve (100%).

TEST RESULTS

Material:	TP208 (2.5 – 3.6 & 3.6 – 4.6m), Puketoka Silt/Clay	Test No.:	172777
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	7 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

NZ STANDARD COMPACTION



Maximum Dry Density (t/m³)	Optimum Water Content (%)	Solid Density Measured (t/m³)	Natural Water Content %
1.06	52.0	2.67	62.9

Water Content (%)	42.6	48.8	52.0	56.2	59.1
Dry Density (t/m³)	0.98	1.04	1.06	1.03	1.00
Shear Strength (kPa)	UTP	198	94	59	18
Remoulded Shear Strength (kPa)	UTP	50	27	12	3

- Notes:
- i. Test performed on material passing 19.0mm sieve (100%).
 - ii. UTP = Unable to Penetrate.
 - iii. Natural water content performed on whole sample.

Test Number: 172778

Report Number: 28804T

Date of Issue: 23rd November 2017

Page 1 of 2 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTDClients Address: PO Box 721
PUKEKOHE 2340

Attention: Philip Kelsey

Reference: No. 4036

Subject: **SOIL TESTING**

Clients Instructions: Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test
 - 2.1: Determination of the Water Content
 - 4.1.1: Dry Density/Water Content Relationship
- NZ Standard Compaction
2. NZ Geotechnical Society, Guideline
Determining the Shear Strength of a Cohesive Soil using a Hand Held Shear Vane

Date Sampled: 8th November 2017Date Received: 10th November 2017

Date of Test: November 2017

Description of Sample: **TP210 (1.9 – 2.5 & 2.5 – 3.0m), Puketoka Sand/Silty Sand**

Source: Lakeside Developments Te Kauwhata

- Notes:
- i. Field sample received in its natural state.
 - ii. Sample taken by P.Kelsey of Earthtech Consulting Ltd by an unknown method.
 - iii. Sampling of soil is not covered by this report.

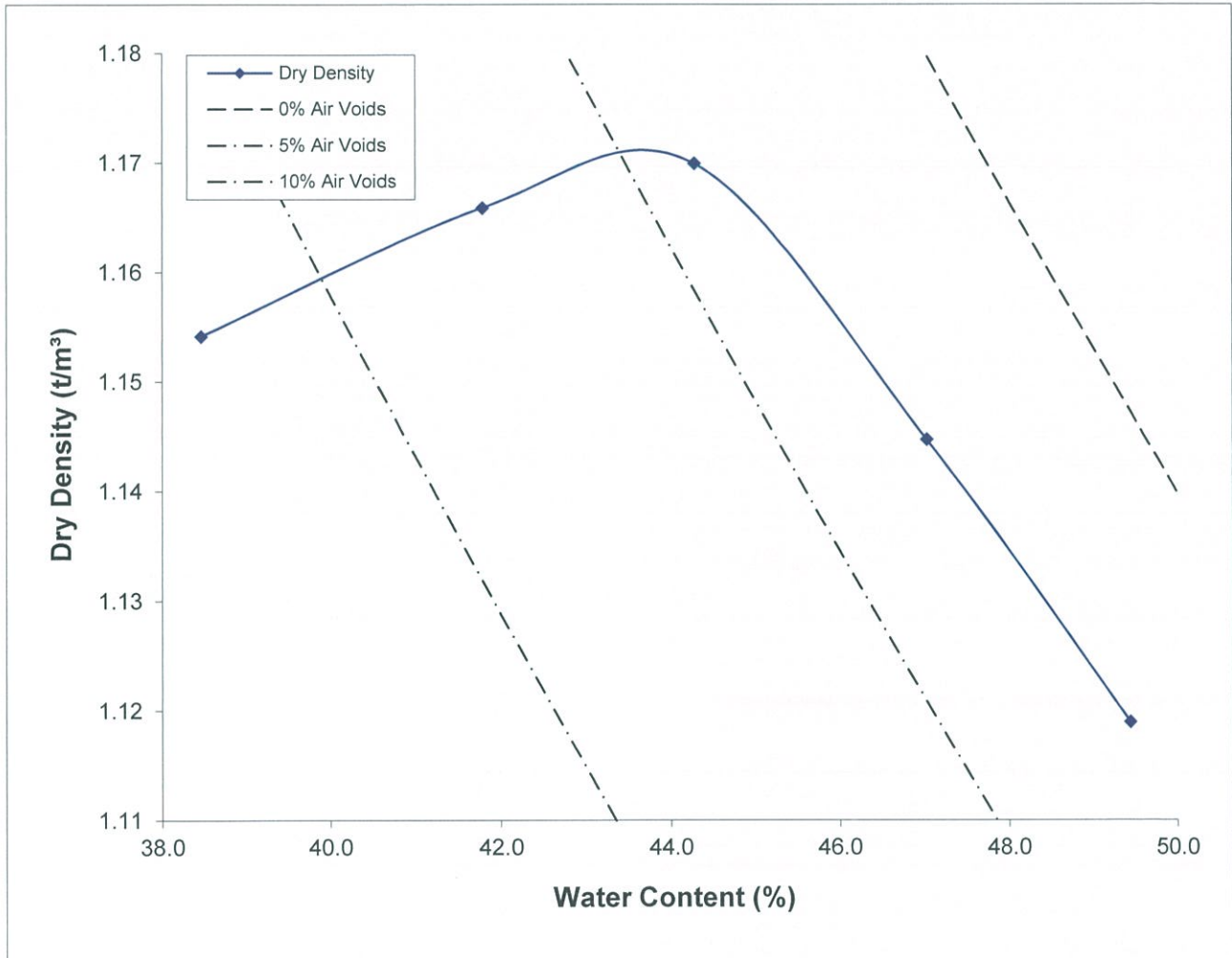
for STEVENSON CONSTRUCTION MATERIALS LTD


T A WHITMORE
IANZ APPROVED SIGNATORY

TEST RESULTS

Material:	TP210 (1.9 – 2.5 & 2.5 – 3.0m), Puketoka Sand/Silty Sand	Test No.:	172778
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	8 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

NZ STANDARD COMPACTION



Maximum Dry Density (t/m³)	Optimum Water Content (%)	Solid Density Assumed t/m³	Natural Water Content %
1.17	44.0	2.65	37.8

Water Content (%)	38.5	41.8	44.3	47.0	49.4
Dry Density (t/m³)	1.15	1.17	1.17	1.14	1.12
Shear Strength (kPa)	UTP	174	94	35	21
Remoulded Shear Strength (kPa)	UTP	27	18	12	3

- Notes:
- i. Test performed on material passing 19.0mm sieve (100%).
 - ii. UTP = Unable to Penetrate.
 - iii. Natural water content performed on whole sample.

Test Number: 172780

Report Number: 28805T

Date of Issue: 23rd November 2017

Page 1 of 2 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address: PO Box 721
PUKEKOHE 2340

Attention: Philip Kelsey

Reference: No. 4036

Subject: **SOIL TESTING**

Clients Instructions: Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test
 - 2.1: Determination of the Water Content
 - 2.7.2: Determination of the Solid Density of Soil Particles
 - 4.1.1: Dry Density/Water Content Relationship
- NZ Standard Compaction
2. NZ Geotechnical Society, Guideline
Determining the Shear Strength of a Cohesive Soil using a Hand Held Shear Vane

Date Sampled: 9th November 2017

Date Received: 10th November 2017

Date of Test: November 2017

Description of Sample: **TP212 (1.7 – 2.7 & 2.7 – 3.7m), Puketoka Sand**

Source: Lakeside Developments Te Kauwhata

- Notes:
- i. Field sample received in its natural state.
 - ii. Sample taken by P.Kelsey of Earthtech Consulting Ltd by an unknown method.
 - iii. Sampling of soil is not covered by this report.

for STEVENSON CONSTRUCTION MATERIALS LTD



T A WHITMORE
IANZ APPROVED SIGNATORY

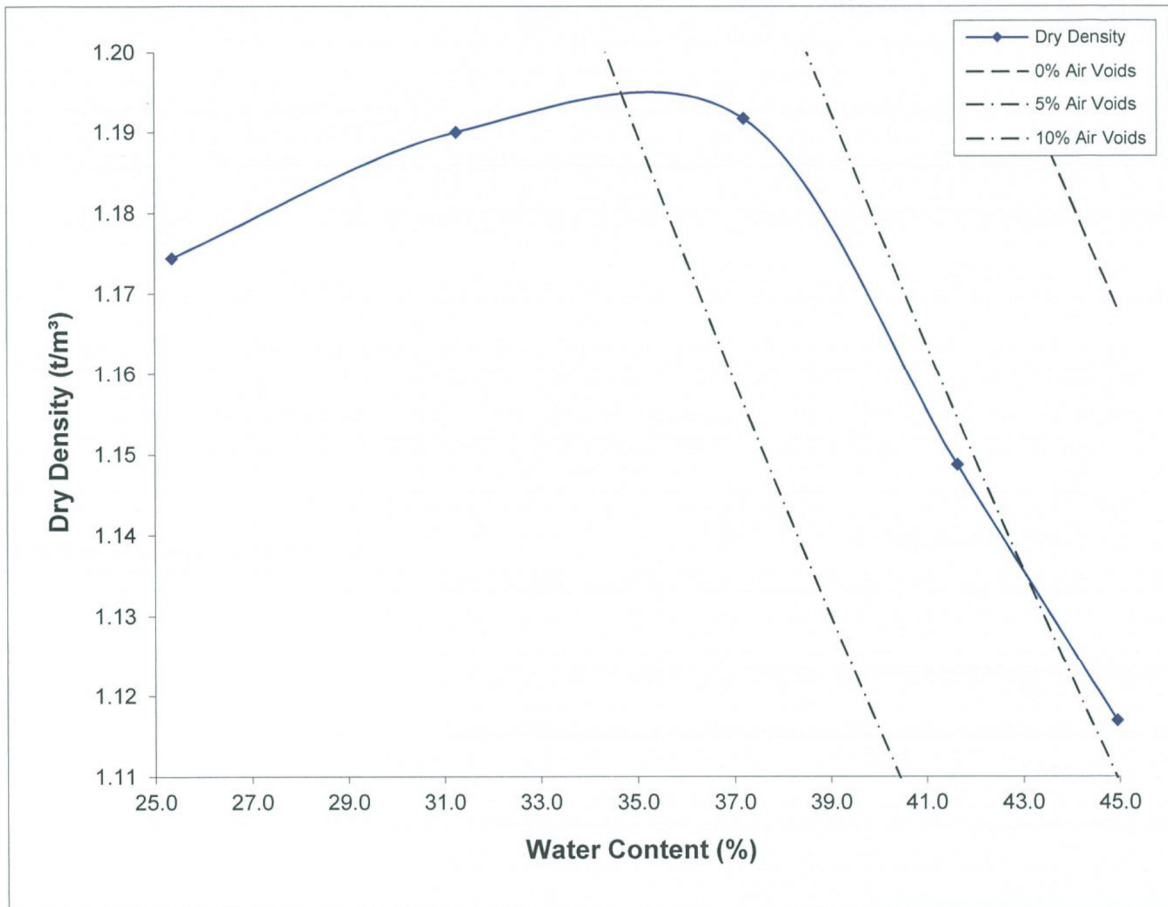


All tests reported
herein have been
performed in accordance
with the laboratory's
scope of accreditation

TEST RESULTS

Material:	TP212 (1.7 – 2.7 & 2.7 – 3.7m), Puketoka Sand	Test No.:	172780
Source:	Lakeside Developments Te Kauwhata	Date Sampled:	9 th November 2017
Job:	Lakeside Developments	Reference No.:	4036

NZ STANDARD COMPACTION



Maximum Dry Density (t/m ³)	Optimum Water Content (%)	Solid Density Measured t/m ³	Natural Water Content %
1.19	37.0	2.46	35.5

Water Content (%)	25.3	31.3	37.2	41.6	44.9
Dry Density (t/m ³)	1.17	1.19	1.19	1.15	1.12
Shear Strength (kPa)	UTP	UTP	UTP	18	12
Remoulded Shear Strength (kPa)	UTP	UTP	UTP	3	0

- Notes:
- i. Test performed on material passing 19.0mm sieve (100%).
 - ii. UTP = Unable to Penetrate.
 - iii. Natural water content performed on whole sample.

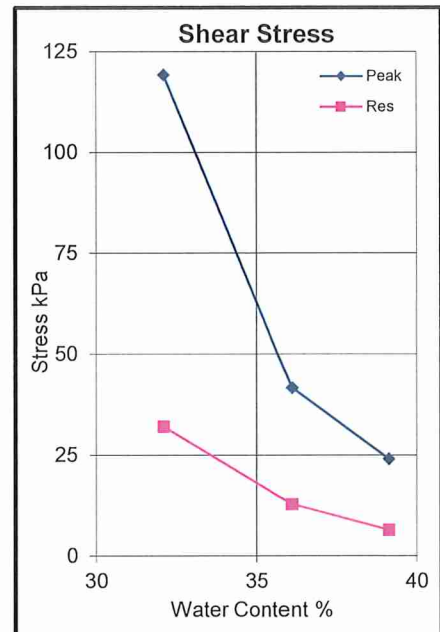
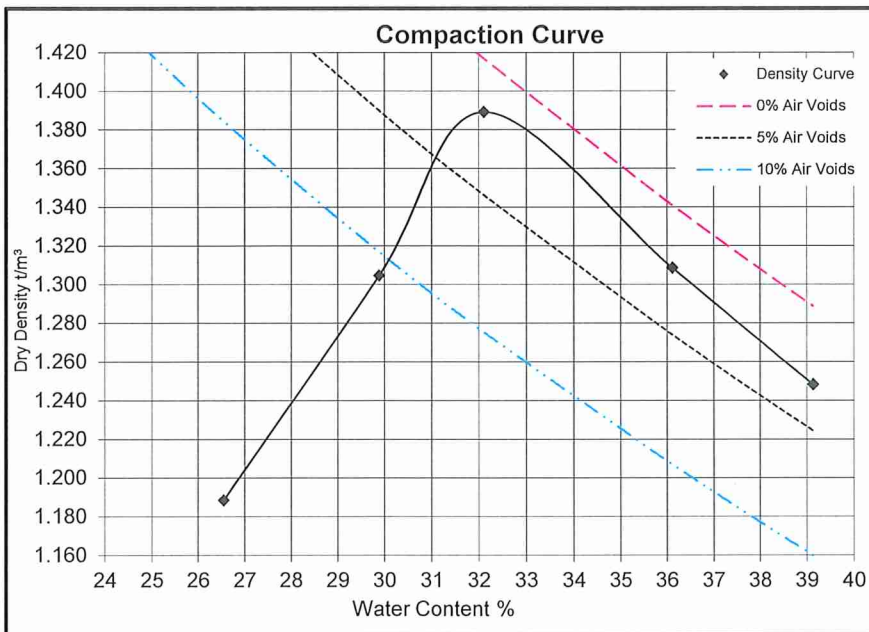
**DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION**



Project : **Lakeside Developments**
 Location : **Lakeside Developments**
 Client : **CMW (NZ) Limited**
 Contractor : **-**
 Sampled by : **Client**
 Date sampled : **Unknown**
 Sampling method : **Bulk Sample (as received)**
 Sample description : **SILT with some clay**
 Sample condition : **As received**
 Solid density : **2.60 t/m³ (Tested)**
 Source : **S01 (Stage 1 Bulk Fill)**

Project No : **2-68014.00**
 Lab Ref No : **HA3889_1_MDD**
 Client Ref No : **HAM2018-0106**

Test Results							
Maximum dry density	1.39	t/m ³	Natural water content	32.1	%		
Optimum water content	32	%	Fraction tested	100%	Passing 19mm		
Sample ID	-180	-120	-60	NAT	60	120	
Bulk density	t/m ³	1.473	1.504	1.694	1.835	1.781	1.737
Water content	%	23.6	26.5	29.9	32.1	36.1	39.1
Dry density	t/m ³	1.192	1.188	1.305	1.389	1.309	1.248
Sample condition		Very Stiff Dry	Stiff Dry	Stiff Dry-Moist	Firm Moist	Soft Moist	Very Soft Wet
Peak stress	kPa	Refusal	Refusal	Refusal	119	42	24
Remoulded stress	kPa	Refusal	Refusal	Refusal	32	13	6



Test Methods	Notes
Compaction NZS 4402 : 1986 Test 4.1.1 (Standard)	
Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001	

Date tested : 30/01/19 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
 Date reported : 04/02/19 This report may only be reproduced in full

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
 Date : 04/02/19



Tests indicated as not accredited are outside the scope of the laboratory's accreditation

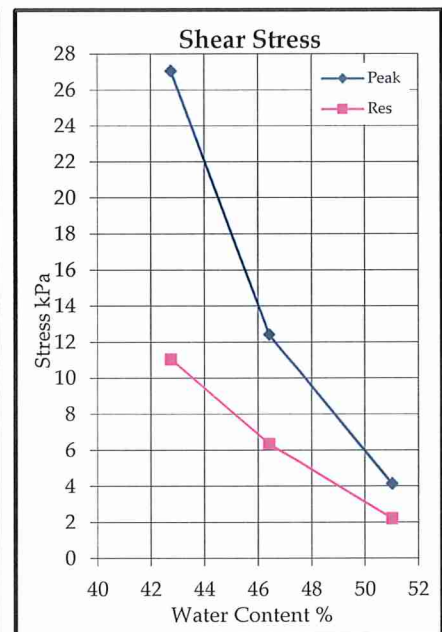
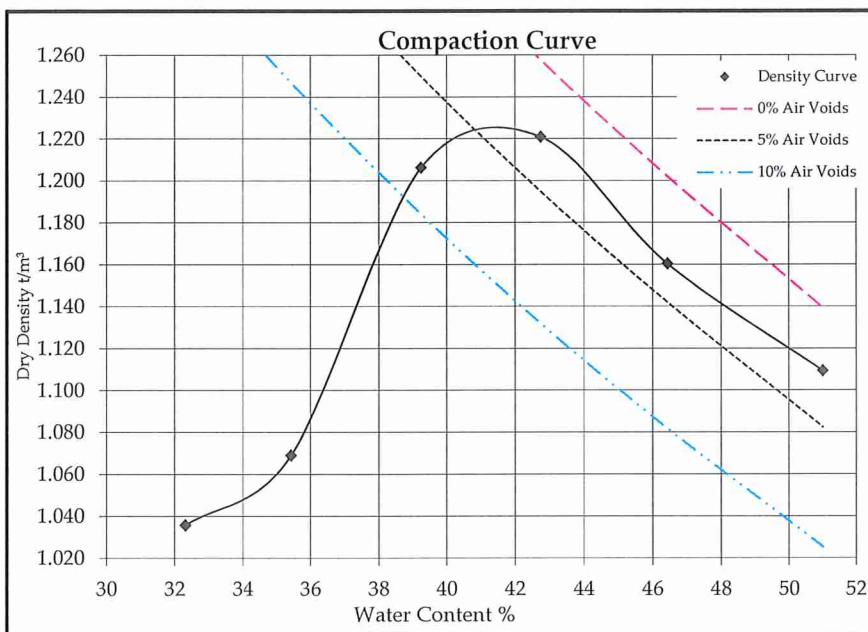
**DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION**



Project : **Lakeside**
 Location : **Lakeside**
 Client : **CMW (NZ) Limited**
 Contractor : **-**
 Sampled by : **Client**
 Date sampled : **Unknown**
 Sampling method : **Bulk Sample (As received)**
 Sample description : **CLAY (Ash mix)**
 Sample condition : **As received**
 Solid density : **2.72 t/m³ (Tested)**
 Source : **S02 Stage 1 fill**

Project No : **2-68014.00**
 Lab Ref No : **HA4413_MDD**
 Client Ref No : **HAM2018-0106**

Test Results							
Maximum dry density	1.22	t/m ³	Natural water content	42.7	%		
Optimum water content	41	%	Fraction tested	100%	passing 19mm sieve		
Sample ID	-180	-120	-60	Nat	60	120	
Bulk density	t/m ³	1.370	1.448	1.679	1.743	1.699	1.675
Water content	%	32.3	35.4	39.2	42.7	46.4	51.0
Dry density	t/m ³	1.036	1.069	1.206	1.221	1.160	1.109
Sample condition		V.Stiff Dry	V.Stiff Dry - Moist	Stiff Moist	Firm Moist	Soft Moist	Soft Moist-wet
Peak stress	kPa	Refusal	Refusal	Refusal	27	12	4
Remoulded stress	kPa	Refusal	Refusal	Refusal	11	6	2



Test Methods	Notes
Compaction NZS 4402 : 1986 Test 4.1.1 (Standard)	
Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001	

Date tested : 16/05/19 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
 Date reported : 20/05/19 This report may only be reproduced in full

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
 Date : 20/05/19



Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Appendix D: Subdivision Earthworks Specification

17 October 2018

Document Ref: HAM2018-0106AB Rev 1

Land Development Earthworks Specification

For: Stages 1 to 7 Lakeside Residential Development, Scott Road, Te Kauwhata

1 INTRODUCTION AND SCOPE

This specification covers compaction control criteria for the cut-to-fill material at the above site. This is based on and cut-to-fill workability trials carried out on site by the earthworks contractor, use of the material during placement on the 80,000m³ site, suitability of the cut to fill materials on site, compaction testing carried out by CMW Geosciences (CMW) and our review of the compaction test results provided in the Earthtech Limited report referenced R4036-2-Rev B, dated 30 March 2017. It provides detail on the required specification for:

- Cut to fill earthworks operations;
- Fill materials and testing requirements;
- Earthworks finishing and respread of topsoil; and,
- As-built records.

Excluded from the scope are site clearance and preparation, geotextile reinforced slopes, subsoil drainage installation or retaining structures covered by a building consent.

Unless varied onsite by the Geotechnical Engineer, the following specification requirements must be met in order for CMW to provide a Geotechnical Completion Report for the works. Where there is any conflict or discrepancy in the requirements of this specification and the documents listed above the matter shall be referred to the Geotechnical Engineer (CMW) for clarification.

2 RELEVANT DOCUMENTS

2.1 Standards, Guidelines and Consents

The works shall comply with the relevant sections of the following standards, guidelines and consents:

1. Health and Safety at Work Act 2015 and Regulations 2016;
2. All Project Resource Consent Conditions and Engineering Works Approvals;
3. Waikato District Council Development and Subdivision Manual 2012;

4. The Waikato Regional Council, Erosion and Sediment Control Guidelines - Technical Report No. 2009/02;
5. NZS 4431:1989 Code of Practice for Earth Fill for Residential Development;
6. NZS 4402: 1986 Methods of Testing Soils for Civil Engineering Purposes; and,
7. NZS 4404: 2010 Code of Practice for Urban Land Subdivision.

3 GEOTECHNICAL OBSERVATION REQUIREMENTS

3.1 Fill Materials and Conditioning

3.1.1 Soil Fill, Rock Fill or Soil and Rock Mixed Fill

Site won materials used as engineered filling shall be free of topsoil, organic matter and other unsuitable materials. The maximum particle size for soil and rock blended fill shall be 200mm and mixing and/ or crushing shall be carried in a manner that ensures that significant voids are not present in the filling between rock fragments.

For rock fill without soil blending, crushing is to occur to comply with the requirements for blended fills and needs to ensure that uniform compaction can occur without significant voids between particles in the absence of the soil fill.

3.1.2 Blending of Unsuitable Material to Create Acceptable Fill

The blending of 'unsuitable material' into structural fills may be undertaken only at the discretion of the Geotechnical Engineer following a request by the contractor and with sufficient time for appropriate consideration and onsite trials to demonstrate effectiveness of proposed blending

Approval for any such blending must be sought from and provided by the Geotechnical Engineer in writing prior to the commencement of any blending or trial.

Hardfill used as structural fill shall be a well graded, unweathered, durable, crushed rock product approved by the Geotechnical Engineer, with a grading suitable for compaction.

3.1.3 Material Conditioning

The cut materials on site may require some drying or wetting prior to compaction to achieve the required specification. This may be done by harrowing (such as with discs) and air drying when conditions permit or by the addition of hydrated lime.

Should the material require drying the addition of cement to engineered filling in concentrations greater than 3% requires the approval of the Geotechnical Engineer.

All additives such as cement proposed for use in backfill materials in contact with geosynthetics must be approved and monitored by the Geotechnical Engineer.

3.2 Fill Placement, Compaction and Testing Requirements

3.2.1 Site Won Cohesive Fill

Attention is drawn to the blending of cohesive and granular material. The appropriate testing method will be determined by the Geotechnical Engineer on-site.

The test criteria and frequency for cohesive materials (Clays & Silts) are set out in Table 1 and 2 below.

Table 1 – Cohesive Materials Compaction Test Criteria for Engineered Filling:

	Air Voids ⁽¹⁾		Shear Vane Strength ⁽²⁾	
	Average	Maximum Single Value	Average	Minimum Single Value
General Fill (cohesive)	8%	10%	120 kPa	100 kPa
Landscape Fill	TBC by Geotechnical Engineer in case by case basis			

⁽¹⁾ Air Voids Percentage (as defined in NZS 4402:1986)

⁽²⁾ Undrained Shear Strength (Measured by hand shear vane – calibrated using NZGS 2001 method)

Table 2 – Cohesive Materials Compaction Testing Frequencies for Engineered Filling:

Soil Type	Field Density & Air Voids %	Vane Shear Strength	Solid Density	Compaction Curve
General Fill (cohesive)	1 test per 1000m ³ to 1500m ³ of fill placed (subject to width and depth of fill) with not less than 1 test per 500mm lift of fill and for each 50m length of shear key excavation.	1 set of tests (4 readings within 1 metre of each other) per 1000m ³ to 1500m ³ of filling placed with not less than 1 set of tests per 500mm lift of fill for each fill area	Testing at CMW's discretion during the first month of earthworks and where different / unique soils conditions are exposed.	Testing at CMW's discretion during the first month of earthworks and where different / unique soils conditions are exposed.
Landscape Filling	TBC by Geotechnical Engineer of case by case basis			

The test criteria and/or frequency may be modified (relaxed or made more stringent) at the discretion of the Geotechnical Engineer (CMW) for the project or in a discrete fill area subject to the consistency of the results achieved being acceptable over a specified period of time.

3.2.2 Granular Fill or Hardfill

Granular fill and/or hardfill shall be placed and compacted to 95% of the MDD determined from the laboratory MDD. If these conditions are not able to be met then appropriate adjustment of the moisture content or compaction equipment will be required. The Geotechnical Engineer may at their discretion, alter the compaction specification to a method compaction specification based on the compaction trial result for materials with a maximum particle size greater than 65mm.

Test frequencies and criteria for granular fill/hardfill are presented in Tables 3 and 4.

Table 3 – Granular Fill Compaction Test Criteria for Engineered Filling:

Fill Type	Air Voids ⁽¹⁾	Dry Density ⁽¹⁾	Scala Penetrometer
	Maximum Single Value	Minimum	Minimum
General Fill (Granular)	20%	95% MDD	5 blows per 100mm penetration

⁽¹⁾ Minimum dry density non-compliance may be accepted on site by the Geotechnical Engineer on a case by case basis depending on the nature of the material and the other criteria results.

Table 4 – Granular Fill Compaction Testing Frequencies for Engineered Filling:

Test	Frequency
Nuclear Densometer (NDM) OR Density Tube	Minimum 1 test per 1,000m ³ to 1500m ³ (subject to width and depth of fill). To be distributed over extent and depth of filling and tests recorded at least every 0.5 metre depth of filling, where practical.
Moisture Content	Minimum 1 test per 1,000m ³ to 1500m ³ (subject to width and depth of fill). To be distributed over extent and depth of filling and tests recorded at least every 0.5 metre depth of filling, where practical.
Scala Penetrometer	Minimum 1 x 0.8 metre deep test per 1,000m ³ of filling to 1500m ³ (subject to width and depth of fill), at least every 0.5 metre depth of filling, where practical.
Compaction Curve (NZ Standard Compaction) and Solid Density Test	Testing at CMW's discretion during the first month of earthworks and where different / unique soils conditions are exposed.

The test frequency may be modified (relaxed or made more stringent) at the discretion of the Geotechnical Engineer (CMW) for the project or in a discrete fill area subject to the consistency of the results achieved being acceptable over a specified period of time.

3.2.3 Compaction Trials

Compaction trials may be carried out to determine the optimum layer thickness, number of passes and material condition for the proposed plant in order to meet the specified degree of compaction.

The contractor shall construct a pad such that on one side there are layers of one constant thickness, and on the other side layers of a different constant thickness. Both sides shall be subjected to increasing passes of the roller and sequentially tested until no further benefit of rolling is obtained.

If the required compaction criteria cannot be achieved the test shall be repeated after appropriate conditioning of the soil. The Contractor shall agree with the Geotechnical engineer the most appropriate soil conditioning before proceeding.

3.2.4 Compaction Testing Reporting Requirements

- 1 All test location coordinates are to be recorded by GPS survey using the Moturiki 1953 Datum. Test location coordinates, with date and test number reference are to be provided to the Geotechnical Engineer in electronic (excel) format on a weekly basis). Alternatively, the Geotechnical Engineer may approve the use of site plans to mark the location of tests in lieu of GPS location.
2. The level within the fill of each test location is to be recorded.
3. The volume of fill placed for each progress claim month (typically ending 20th of the month) including all fill placed (undercut and cut to fill) are to be provided to the Geotechnical Engineer monthly by the contractor or Engineer to the Contract to allow assessment of test frequency adequacy.

3.3 Finishing Works and Topsoil Respread

3.3.1 Overcut

All areas cut to below finished level shall be reinstated with engineered filling to the satisfaction of the Geotechnical Engineer.

3.3.2 Topsoil Depth

Topsoil respread depth shall be between 100mm and 300mm, or as directed by the Engineer to the contractor. On ground steeper than 1V:3H the surface shall be roughened under the supervision of the Geotechnical Engineer prior to topsoil placement.

3.3.3 Unsuitable Materials

At the conclusion of earthworks all surplus unsuitable materials shall be removed from site or placed in designated reserve areas. The size and location of such stockpiles must be approved by the Geotechnical Engineer and recorded on the asbuilt drawings.

3.3.4 Road Subgrades

Testing and formation of road subgrades will be carried out as part of the subdivision civil works package.

4 ASBUILT INFORMATION REQUIREMENTS

In order to provide a Geotechnical Completion Report (GCR) certain asbuilt information must be provided to CMW. It is the contractor's responsibility to ensure that all of the following items are surveyed prior to placing filling. The survey of these items shall therefore form a hold point in the construction sequence.

1. The location and invert of all subsoil drainage; and,
2. The depth of filling placed including all benching, undercuts, and temporary ponds which have been backfilled.

CMW require the following asbuilt information to be provided for the GCR:

1. Cut and fill depth plan (including undercuts);
2. Final contour plan;
3. Drainage locations and inverts (surface and subsurface);
4. Drainage outlet locations (surface and subsurface);
5. Details of any defined overland flow paths;
6. Material data for imported products used such as draincoils, aggregates and geofabrics as well as confirmation that products installed comply with the requirements of the project drawings and this specification; and,
7. Any settlement monitoring data.

Appendix E: EarthFill Quality Control Data



LF11 Rev.8 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAA Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes: Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.



Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data									Comments
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m ³) *	Oven Dry Density (t/m ³)	Calculated Air Voids (%) *	
19/10/2018	N1	Refer to Fill Test Location Plan	-	Silty CLAY	2087	2087	102	170	139	135	1.81	1.34	34.8	2	250	36.0	2.62	1.34	1		
23/10/2018	N2	Refer to Fill Test Location Plan	10.8	Silty CLAY	2087	2087	217	217	217	217	1.84	1.39	32.5	2	300	28.7	2.62	1.44	4		
	N3	Refer to Fill Test Location Plan	10.5	Silty CLAY	2087	2087	217	217	217	186	1.85	1.43	29.2	1	300	23.4	2.62	1.50	8		
24/10/2018	N4	Refer to Fill Test Location Plan	13.5	Silty CLAY	1911	1911	204	183	204	199	1.72	1.28	34.1	7	300	33.3	2.62	1.28	8		
	N5	Refer to Fill Test Location Plan	13.9	Silty CLAY	1911	1911	204	175	204	122	1.77	1.37	29.6	7	300	30.3	2.62	1.36	7		
25/10/2018	N6	Refer to Fill Test Location Plan	6.6	Silty CLAY	1911	1911	UTP	UTP	UTP	UTP	1.78	1.39	27.5	8	300	26.1	2.62	1.40	10		
	N7	Refer to Fill Test Location Plan	14.3	Silty CLAY	1911	1911	131	119	116	189	1.83	1.40	30.8	3	300	34.9	2.62	1.36	1		
	N8	Refer to Fill Test Location Plan	12.8	Silty CLAY	1911	1911	204	204	204	151	1.71	1.26	35.5	7	300	34.9	2.62	1.26	8		
	N9	Refer to Fill Test Location Plan	12.6	Silty CLAY	1911	1911	119	204	189	172	1.84	1.38	33.3	1	300	30.6	2.62	1.40	3		
	N10	Refer to Fill Test Location Plan	11.9	Silty CLAY	1911	1911	204	128	157	157	1.78	1.27	40.2	1	300	34.2	2.62	1.32	4		
9/11/2018	N11	Refer to Fill Test Location Plan	13.9	Silty CLAY	2349	2349	186	201	120	178	1.82	1.37	33.3	2	250	36.5	2.62	1.34	0		
	N12	Refer to Fill Test Location Plan	12.3	Silty CLAY	2349	2349	UTP	UTP	UTP	UTP	1.82	1.40	30.4	4	250	33.3	2.62	1.36	2		
	N13	Refer to Fill Test Location Plan	12.4	CLAY	2349	2349	UTP	UTP	UTP	UTP	1.78	1.32	34.6	3	250	32.8	2.62	1.34	5		
	N14	Refer to Fill Test Location Plan	13.7	CLAY	2349	2349	UTP	UTP	UTP	UTP	1.79	1.34	33.5	4	250	34.0	2.62	1.34	4		
15/11/2018	N15	Refer to Fill Test Location Plan	13.2	Sandy CLAY	1911	1911	125	201	154	204+	1.79	1.31	36.8	2	300	36.2	2.62	1.32	2		
	N16	Refer to Fill Test Location Plan	13.0	Sandy CLAY	1911	1911	172	189	204+	175	1.84	1.35	36.2	-1	300	33.8	2.62	1.38	1		
	N17	Refer to Fill Test Location Plan	14.2	CLAY	1911	1911	UTP	UTP	UTP	UTP	1.87	1.38	35.5	-2	300	34.4	2.62	1.40	-1		
	N18	Refer to Fill Test Location Plan	14.9	Sandy CLAY	1911	1911	160	160	186	131	1.78	1.30	36.9	2	300	34.9	2.62	1.32	4		
	N19	Refer to Fill Test Location Plan	14.0	Sandy CLAY	1911	1911	UTP	204+	204+	204+	1.82	1.37	33.3	2	300	37.4	2.62	1.32	0		
5/12/2018	N20	Refer to Fill Test Location Plan	8.3	Silty CLAY	2087	2087	UTP	UTP	UTP	UTP	1.88	1.46	28.7	2	300	23.4	2.62	1.52	6		
	N21	Refer to Fill Test Location Plan	7.4	Silty CLAY	2087	2087	UTP	UTP	UTP	UTP	1.87	1.43	30.8	1	300	25.0	2.62	1.50	6		
	N22	Refer to Fill Test Location Plan	20.6	CLAY	2087	2087	201	201	192	211	1.75	1.27	37.5	4	300	30.1	2.62	1.34	8		
	N23	Refer to Fill Test Location Plan	21.1	CLAY	2087	2087	130	127	149	135	1.80	1.30	38.8	0	300	38.2	2.62	1.30	1		
8/12/2018	N24	Refer to Fill Test Location Plan	-	CLAY	1911	1911	52	73	84	70									No sample taken. See N36 for retest		
	N25	Refer to Fill Test Location Plan	-	CLAY	1911	1911	105	55	70	64									No sample taken. See N37 for retest		
	N26	Refer to Fill Test Location Plan	-	CLAY	1911	1911	111	119	102	125									No sample taken. See N30 for retest		
	N27	Refer to Fill Test Location Plan	-	CLAY	1911	1911	102	99	116	113									No sample taken. See N31 for retest		

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** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m³ are not accredited and are outside the laboratories scope of accreditation.

Created By: JLM Date: 19/10/2018
 Checked By: JLM Date: 10/05/2019
 Authorised Signatory: AC Date: 30/05/2019



LF11 Rev.9 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAB Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes: Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.



Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data							Comments	
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m ³) *		Oven Dry Density (t/m ³)
10/12/2018	N28	Refer to Fill Test Location Plan	6.1	CLAY	2087	2087	108	46	115	77	87									No sample taken. Retest of N24. See N36 for retest
	N29	Refer to Fill Test Location Plan	5.4	CLAY	2087	2087	105	80	146	87	105									No sample taken. Retest of N25. See N37 for retest
	N30	Refer to Fill Test Location Plan	14.6	CLAY	2087	2087	UTP	UTP	UTP	211	211	1.81	1.31	38.3	0	300	34.3	2.62	1.34	2 Retest of N26
11/12/2018	N31	Refer to Fill Test Location Plan	12.4	CLAY	2087	2087	UTP	111	UTP	167	139	1.83	1.36	34.3	1	300	33.2	2.62	1.38	2 Retest of N27
	N32	Refer to Fill Test Location Plan	-	CLAY	2532	2532	201	201	201	201	201	1.80	1.33	34.9	4	300	38.7	2.70	1.30	2
12/12/2018	N33	Refer to Fill Test Location Plan	-	CLAY	2352	2352	201	201	201	201	201	1.76	1.28	36.9	5	300	43.0	2.70	1.22	2
	N34	Refer to Fill Test Location Plan	5.7	CLAY	2349	2349	UTP	UTP	UTP	UTP	UTP	1.90	1.53	23.7	5	300	18.8	2.62	1.60	9
13/12/2018	N35	Refer to Fill Test Location Plan	4.9	CLAY	2349	2349	UTP	UTP	UTP	UTP	UTP	1.94	1.55	24.8	2	300	17.6	2.62	1.64	8
	N36	Refer to Fill Test Location Plan	5.5	Clayey SILT	2349	2349	UTP	UTP	UTP	UTP	UTP	1.88	1.47	27.5	3	300	21.1	2.62	1.56	8 Retest of N28
17/12/2018	N37	Refer to Fill Test Location Plan	5.3	Clayey SILT	2349	2349	UTP	UTP	UTP	UTP	UTP	1.82	1.45	26.0	7	300	22.6	2.62	1.48	10 Retest of N29
	N38	Refer to Fill Test Location Plan	17.8	CLAY	2349	2349	201+	109	201	158	167+	1.76	1.18	48.5	-1	300	49.6	2.70	1.18	-2
	N39	Refer to Fill Test Location Plan	19.0	CLAY	2349	2349	201+	UTP	UTP	106	154+	1.73	1.16	48.6	0	300	49.2	2.70	1.16	0
	N40	Refer to Fill Test Location Plan	6.5	CLAY	2359	2359	201+	201+	201+	UTP	201+	1.79	1.30	38.2	1	300	35.7	2.62	1.32	2
	N41	Refer to Fill Test Location Plan	5.9	CLAY	2359	2359	201+	166	149	201+	179+	1.83	1.37	34.4	1	300	38.1	2.62	1.32	-1
	N42	Refer to Fill Test Location Plan	14.9	CLAY	2359	2359	UTP	201+	UTP	UTP	201+	1.87	1.46	28.6	3	300	25.1	2.62	1.50	5
18/12/2018	N43	Refer to Fill Test Location Plan	15.3	CLAY	2359	2359	195	UTP	UTP	UTP	195+	1.76	1.25	40.4	1	300	34.7	2.62	1.30	5
	N44	Refer to Fill Test Location Plan	22.0	CLAY	2359	2359	UTP	UTP	UTP	UTP	UTP	1.69	1.19	41.9	5	300	48.0	2.62	1.14	2
	N45	Refer to Fill Test Location Plan	21.0	CLAY	2359	2359	186	201	201	UTP	196+	1.70	1.15	48.9	0	300	49.9	2.62	1.14	0
	N46	Refer to Fill Test Location Plan	5.3	CLAY	2087	2087	201	UTP	214	139	185+	1.86	1.41	31.6	2	300	30.0	2.62	1.42	3
	N47	Refer to Fill Test Location Plan	6.1	CLAY	2087	2087	158	217+	UTP	UTP	158+	1.83	1.46	25.5	7	300	33.0	2.62	1.38	2
	N48	Refer to Fill Test Location Plan	20.1	CLAY	2087	2087	133	UTP	211	UTP	172+	1.72	1.19	43.8	3	300	44.7	2.70	1.18	3
19/12/2018	N49	Refer to Fill Test Location Plan	18.1	CLAY	2087	2087	139	UTP	UTP	108	124+	1.64	1.04	58.1	1	300	51.5	2.70	1.08	4
	N50	Refer to Fill Test Location Plan	6.2	CLAY	2087	2087	UTP	UTP	124	UTP	124+	1.92	1.53	25.4	3	300	16.6	2.62	1.64	10
	N51	Refer to Fill Test Location Plan	6.4	CLAY	2087	2087	UTP	UTP	UTP	UTP	UTP	1.74	1.30	34.3	6	300	31.9	2.62	1.32	8
	N52	Refer to Fill Test Location Plan	6.6	Sandy SILT	2087	2087	UTP	217	121	173	170+	1.93	1.51	27.5	1	300	26.1	2.62	1.52	2
	N53	Refer to Fill Test Location Plan	19.6	CLAY	2087	2087	173	124	139	158	149	1.69	1.14	47.5	2	300	55.7	2.62	1.08	-2
	N54	Refer to Fill Test Location Plan	20.3	CLAY	2087	2087	UTP	UTP	UTP	UTP	UTP	1.70	1.15	47.2	1	300	46.7	2.62	1.16	2

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** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m³ are not accredited and are outside the laboratories scope of accreditation.

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 Authorised Signatory: AC Date: 30/05/2019



LF11 Rev.9 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAC Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes: Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.



Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments	
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m ³) *	Oven Dry Density (t/m ³)		Calculated Air Voids (%) *
4/01/2019	N55	Refer to Fill Test Location Plan	-	SILT, some Sand	2087	2087	186	217+	201	217+	205+	1.73	1.26	37.3	6	300	38.7	2.62	1.24	4	
	N56	Refer to Fill Test Location Plan	-	SILT, some Clay	2087	2087	UTP	217+	217+	146	193+	1.76	1.27	38.4	3	300	40.3	2.62	1.26	2	
	N57	Refer to Fill Test Location Plan	20.3	CLAY	2087	2087	186	211	170	UTP	189+	1.66	1.09	52.2	2	300	56.1	2.70	1.06	1	
7/01/2019	N58	Refer to Fill Test Location Plan	20.2	CLAY	2087	2087	UTP	UTP	UTP	UTP	UTP	1.66	1.11	50.4	2	300	53.4	2.70	1.08	2	
	N59	Refer to Fill Test Location Plan	15.6	Sandy SILT	1911	1911	151	204	122	116	148	1.76	1.27	38.3	3	300	36.1	2.62	1.30	4	
8/01/2019	N60	Refer to Fill Test Location Plan	16.2	SILT, some Clay	1911	1911	204+	UTP	131	148	161+	1.83	1.41	30.3	4	300	36.7	2.62	1.34	0	
	N61	Refer to Fill Test Location Plan	6.7	SILT, some Sand	1911	1911	119	204+	204+	204+	183+	1.68	1.24	35.1	9	300	24.0	2.62	1.36	16	See N69 for retest
	N62	Refer to Fill Test Location Plan	7.0	SILT	1911	1911	148	160	151	177	159	1.80	1.36	32.6	4	300	29.8	2.62	1.38	6	
	N63	Refer to Fill Test Location Plan	18.5	CLAY	1911	1911	189	189	189	UTP	189+	1.63	1.06	53.5	3	300	53.3	2.70	1.06	4	
	N64	Refer to Fill Test Location Plan	19.0	CLAY	1911	1911	125	UTP	163	UTP	144+	1.67	1.11	50.7	1	300	54.6	2.70	1.08	1	
	N65	Refer to Fill Test Location Plan	8.5	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.66	1.13	46.8	4	300	35.5	2.70	1.22	11	See N73 for retest
	N66	Refer to Fill Test Location Plan	9.0	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.65	1.12	47.5	4	250	40.5	2.70	1.18	9	
10/01/2019	N67	Refer to Fill Test Location Plan	9.2	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.57	0.95	64.9	2	250	58.0	2.70	1.00	5	
	N68	Refer to Fill Test Location Plan	16.4	Silty CLAY	1911	1911	204+	204+	204+	UTP	204+	1.85	1.38	33.6	1	300	28.0	2.62	1.44	5	
	N69	Refer to Fill Test Location Plan	7.1	Silty CLAY	1911	1911	UTP	UTP	UTP	204+	204+	1.82	1.38	32.5	3	300	27.1	2.62	1.44	6	Retest of N61
	N70	Refer to Fill Test Location Plan	7.3	Silty CLAY	1911	1911	204+	204+	201	204+	203+	1.79	1.23	45.6	-3	300	50.7	2.62	1.18	-6	
	N71	Refer to Fill Test Location Plan	19.0	Silty CLAY	1911	1911	UTP	204+	UTP	204+	204+	1.77	1.34	31.7	6	300	26.9	2.62	1.40	9	
	N72	Refer to Fill Test Location Plan	7.9	CLAY	1911	1911	177	154	113	172	154	1.73	1.16	49.8	-2	300	49.7	2.70	1.16	0	
	N73	Refer to Fill Test Location Plan	8.8	CLAY	1911	1911	154	137	172	154	154	1.68	1.13	48.1	3	300	54.1	2.70	1.08	1	Retest of N65
	N74	Refer to Fill Test Location Plan	9.1	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.59	1.01	57.7	4	300	55.3	2.70	1.02	6	
	N75	Refer to Fill Test Location Plan	18.1	CLAY	1911	1911	105	204+	145	157	153+	1.65	1.04	57.8	1	300	56.9	2.70	1.04	1	
	N76	Refer to Fill Test Location Plan	15.4	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.79	1.30	37.4	3	300	35.3	2.70	1.32	5	
11/01/2019	N77	Refer to Fill Test Location Plan	14.9	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.83	1.28	42.5	-2	300	33.8	2.70	1.36	3	
	N78	Refer to Fill Test Location Plan	8.4	SILT, some Clay	1785	1785	175	142	162	231+	178+	1.82	1.37	32.2	3	300	31.0	2.60	1.38	4	
	N79	Refer to Fill Test Location Plan	8.0	SILT, some Clay	1785	1785	UTP	UTP	UTP	231+	231+	1.80	1.35	33.4	3	300	25.9	2.60	1.44	8	
	N80	Refer to Fill Test Location Plan	18.0	CLAY	1785	1785	UTP	162	132	UTP	147+	1.71	1.15	49.5	1	300	48.2	2.70	1.16	2	
	N81	Refer to Fill Test Location Plan	19.2	CLAY	1785	1785	UTP	129	192	UTP	161+	1.76	1.22	44.6	0	300	45.9	2.70	1.20	0	

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 Authorised Signatory: AC Date: 30/05/2019



LF11 Rev.9 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAD Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes: Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.



Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data									Comments
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m ³) *	Oven Dry Density (t/m ³)	Calculated Air Voids (%) *	
11/01/2019	N82	Refer to Fill Test Location Plan	19.2	CLAY	1785	1785	UTP	UTP	UTP	UTP	UTP	1.70	1.14	49.0	1	300	37.8	2.70	1.24	7	
	N83	Refer to Fill Test Location Plan	10.3	CLAY	1785	1785	UTP	UTP	UTP	UTP	UTP	1.63	1.05	54.9	3	300	50.2	2.70	1.08	5	
17/01/2019	N84	Refer to Fill Test Location Plan	17.2	CLAY	1911	1911	160	108	108	163	135	1.74	1.18	47.0	1	300	55.1	2.70	1.12	-3	
	N85	Refer to Fill Test Location Plan	18.9	CLAY	1911	1911	183	UTP	UTP	192	188+	1.76	1.19	47.8	-1	300	55.0	2.70	1.14	-5	
	N86	Refer to Fill Test Location Plan	20.6	CLAY	1911	1911	UTP	UTP	119	UTP	119+	1.75	1.18	48.4	-1	300	54.0	2.70	1.14	-4	
18/01/2019	N87	Refer to Fill Test Location Plan	20.2	CLAY	1785	1785	162	119	129	135	136	1.67	1.13	48.4	4	300	54.2	2.70	1.08	1	
	N88	Refer to Fill Test Location Plan	18.6	CLAY	1785	1785	139	109	122	116	122	1.68	1.12	50.4	2	300	53.2	2.70	1.10	1	
21/01/2019	N89	Refer to Fill Test Location Plan	18.9	CLAY	2352	2352	112	158	170	147	147	1.72	1.21	42.5	4	300	50.4	2.70	1.14	0	
	N90	Refer to Fill Test Location Plan	20.9	CLAY	2352	2352	187	167	UTP	UTP	177+	1.73	1.22	41.9	4	300	49.1	2.70	1.16	0	
22/01/2019	N91	Refer to Fill Test Location Plan	-	CLAY	2352	2352	UTP	UTP	UTP	UTP	UTP	1.76	1.26	39.7	3	300	41.6	2.70	1.24	2	
	N92	Refer to Fill Test Location Plan	-	CLAY	2352	2352	UTP	UTP	UTP	UTP	UTP	1.70	1.21	41.1	6	300	48.3	2.70	1.14	2	
	N93	Refer to Fill Test Location Plan	7.5	Clayey SILT	2352	2352	147	141	141	UTP	143+	1.74	1.26	38.2	4	300	36.0	2.62	1.28	5	
	N94	Refer to Fill Test Location Plan	8.4	SILT	2352	2352	UTP	UTP	UTP	UTP	UTP	1.78	1.36	31.2	6	300	31.2	2.62	1.36	6	
23/01/2019	N95	Refer to Fill Test Location Plan	16.1	CLAY	2352	2352	147	112	150	109	130	1.71	1.18	44.6	3	300	46.3	2.70	1.16	3	
	N96	Refer to Fill Test Location Plan	17.1	CLAY	2352	2352	129	106	127	201+	141+	1.72	1.19	44.3	3	300	52.0	2.70	1.14	-1	
24/01/2019	N97	Refer to Fill Test Location Plan	4.7	Silty CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.77	1.27	39.9	2	300	44.9	2.70	1.22	0	
	N98	Refer to Fill Test Location Plan	5.4	CLAY	1911	1911	UTP	204+	UTP	UTP	204+	1.76	1.27	38.9	4	300	35.9	2.70	1.30	5	
	N99	Refer to Fill Test Location Plan	13.9	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.66	1.17	42.1	7	300	32.4	2.70	1.26	13	
	N100	Refer to Fill Test Location Plan	14.0	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.71	1.13	51.8	0	300	59.9	2.70	1.06	-4	
25/01/2019	N101	Refer to Fill Test Location Plan	5.2	CLAY	1911	1911	UTP	189	131	204+	175+	1.81	1.31	38.4	1	300	45.7	2.70	1.24	-3	
	N102	Refer to Fill Test Location Plan	4.9	CLAY	1911	1911	108	204+	145	189	162+	1.69	1.16	45.6	4	300	43.0	2.70	1.18	6	

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** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m³ are not accredited and are outside the laboratories scope of accreditation.

Created By: JLM Date: 17/01/2019
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 Authorised Signatory: AC Date: 30/05/2019



LF11 Rev.9 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAE Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes: Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.



Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments	
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m ³) *	Oven Dry Density (t/m ³)		Calculated Air Voids (%) *
30/01/2019	N103	Refer to Fill Test Location Plan	6.3	Sandy CLAY	1911	1911	195	145	148	175	166	1.81	1.39	30.2	6	300	32.4	2.70	1.36	5	
	N104	Refer to Fill Test Location Plan	5.9	CLAY	1911	1911	204	UTP	UTP	UTP	204+	1.79	1.32	35.8	4	300	36.0	2.70	1.32	4	
31/01/2019	N105	Refer to Fill Test Location Plan	18.2	CLAY	1911	1911	163	UTP	UTP	UTP	163+	1.58	1.00	56.9	5	300	60.2	2.70	0.98	4	
	N106	Refer to Fill Test Location Plan	22.2	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.68	1.17	43.3	6	300	37.3	2.70	1.22	9	
1/02/2018	N107	Refer to Fill Test Location Plan	9.2	CLAY	2087	2087	UTP	217+	204	UTP	211+	1.74	1.22	41.8	3	300	32.5	2.70	1.32	9	
	N108	Refer to Fill Test Location Plan	9.0	CLAY	2087	2087	UTP	217+	217+	UTP	217+	1.82	1.33	37.2	1	300	29.7	2.70	1.40	6	
4/02/2019	N109	Refer to Fill Test Location Plan	3.9																		No sample taken. See N116 for retest
	N110	Refer to Fill Test Location Plan	4.8																		No sample taken. See N125 for retest
	N111	Refer to Fill Test Location Plan	7.4	Sandy CLAY	2349	2349	UTP	UTP	UTP	UTP	UTP	1.85	1.42	30.9	4	300	30.4	2.70	1.42	4	
	N112	Refer to Fill Test Location Plan	6.2	Sandy CLAY	2349	2349	UTP	UTP	UTP	UTP	UTP	1.83	1.36	33.8	3	300	28.2	2.70	1.42	7	
	N113	Refer to Fill Test Location Plan	12.4	CLAY	2349	2349	152	158	160	175	161	1.65	1.10	50.0	4	300	45.8	2.70	1.14	6	
	N114	Refer to Fill Test Location Plan	11.4	CLAY	2349	2349	190	117	204+	204+	179+	1.66	1.12	48.4	4	300	44.2	2.70	1.16	6	
	N115	Refer to Fill Test Location Plan	20.5	CLAY	2349	2349	UTP	UTP	UTP	UTP	UTP	1.70	1.22	39.2	7	300	35.0	2.70	1.26	10	
5/02/2019	N116	Refer to Fill Test Location Plan	3.8	CLAY	2349	2349	UTP	UTP	UTP	UTP	UTP	1.86	1.41	31.9	2	300	34.7	2.70	1.38	1	Retest of N109
	N117	Refer to Fill Test Location Plan	5.2	CLAY	2349	2349	193	175	UTP	204+	191+	1.76	1.27	38.2	4	300	38.9	2.70	1.26	4	
8/02/2019	N118	Refer to Fill Test Location Plan	5.0	Clayey SILT	2349	2349	169	UTP	204	UTP	187+	1.83	1.34	36.2	0	300	33.2	2.62	1.38	2	
	N119	Refer to Fill Test Location Plan	5.5	Clayey SILT	2349	2349	UTP	UTP	UTP	UTP	UTP	1.80	1.34	34.2	3	300	36.3	2.62	1.32	2	
	N120	Refer to Fill Test Location Plan	4.1	Clayey SILT	2349	2349	143	UTP	169	UTP	156+	1.78	1.35	31.5	6	300	34.5	2.62	1.32	4	
	N121	Refer to Fill Test Location Plan	4.7	Clayey SILT	2349	2349	UTP	UTP	UTP	UTP	UTP	1.84	1.38	33.0	1	300	30.7	2.62	1.40	3	
	N122	Refer to Fill Test Location Plan	3.6	SILT	2349	2349	UTP	UTP	UTP	UTP	UTP	1.65	1.23	34.6	11	300	36.0	2.62	1.22	10	
	N123	Refer to Fill Test Location Plan	3.7	CLAY	2349	2349	UTP	UTP	UTP	UTP	UTP	1.74	1.25	39.9	3	300	34.5	2.62	1.30	6	

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Created By: JLM Date: 1/02/2019
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 Authorised Signatory: AC Date: 30/05/2019



LF11 Rev.9 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAF Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes: Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.



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Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data									Comments	
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m ³) *	Oven Dry Density (t/m ³)	Calculated Air Voids (%) *		
11/02/2019	N124	Refer to Fill Test Location Plan	4.8	Clayey SILT	2087	2087	UTP	UTP	UTP	UTP	UTP	1.78	1.34	33.2	4	300	27.7	2.62	1.40	8		
	N125	Refer to Fill Test Location Plan	-	Clayey SILT	2087	2087	UTP	UTP	UTP	UTP	UTP	1.87	1.43	30.3	2	300	28.6	2.62	1.46	3	Retest of N110	
	N126	Refer to Fill Test Location Plan	17.8	Clayey SILT	2087	2087	UTP	UTP	UTP	UTP	UTP	1.79	1.30	38.4	1	300	37.2	2.62	1.30	1		
	N127	Refer to Fill Test Location Plan	15.4	Sandy CLAY	2087	2087	UTP	UTP	UTP	UTP	UTP	1.78	1.27	39.9	1	300	41.8	2.62	1.26	0		
	N128	Refer to Fill Test Location Plan	-	CLAY	2087	2087	UTP	UTP	UTP	UTP	UTP	1.74	1.20	44.5	2	300	50.4	2.70	1.16	-1		
	N129	Refer to Fill Test Location Plan	12.7	Sandy CLAY	2087	2087	UTP	UTP	UTP	UTP	UTP	1.73	1.27	35.7	7	300	29.8	2.70	1.34	11	See N214 for retest	
	N130	Refer to Fill Test Location Plan	14.0	Clayey SILT	2087	2087	UTP	UTP	UTP	UTP	UTP	1.74	1.25	39.3	3	300	40.2	2.62	1.24	3		
	N131	Refer to Fill Test Location Plan	14.3	Clayey SILT	2087	2087	189	192	UTP	UTP	190+	1.71	1.26	35.0	8	300	46.0	2.70	1.18	3	Retest of N99	
	12/02/2019	N132	Refer to Fill Test Location Plan	5.4	Clayey SILT	1911	1911	UTP	UTP	UTP	UTP	UTP	1.79	1.35	33.0	4	300	30.5	2.62	1.38	6	
		N133	Refer to Fill Test Location Plan	5.5	Clayey SILT	1911	1911	160	148	148	204+	165+	1.81	1.33	36.1	1	300	37.9	2.62	1.32	0	
N134		Refer to Fill Test Location Plan	5.1	Clayey SILT	1911	1911	UTP	UTP	UTP	UTP	UTP	1.72	1.31	31.7	9	300	28.4	2.62	1.34	11		
N135		Refer to Fill Test Location Plan	3.2	Clayey SILT	1911	1911	111	175	UTP	UTP	143+	1.79	1.35	32.6	4	300	29.8	2.62	1.38	6		
N136		Refer to Fill Test Location Plan	3.8	Clayey SILT	1911	1911	UTP	UTP	UTP	UTP	UTP	1.80	1.36	32.2	4	300	32.2	2.62	1.36	4		
N137		Refer to Fill Test Location Plan	15.3	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.86	1.41	31.2	3	300	24.3	2.70	1.50	8		
N138		Refer to Fill Test Location Plan	15.9	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.85	1.44	28.2	6	300	24.6	2.70	1.48	9		
N139		Refer to Fill Test Location Plan	-	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.83	1.37	33.5	3	300	27.6	2.70	1.44	7		
N140		Refer to Fill Test Location Plan	-	Clayey SILT	1911	1911	UTP	UTP	UTP	UTP	UTP	1.72	1.36	26.6	14	300	28.9	2.70	1.34	12	See N148 for retest	
13/02/2019		N141	Refer to Fill Test Location Plan	5.9	Clayey SILT	1911	1911	177	166	UTP	UTP	172+	1.82	1.34	35.6	1	300	34.3	2.62	1.36	2	
	N142	Refer to Fill Test Location Plan	5.9	Clayey SILT	1911	1911	160	UTP	183	UTP	172+	1.82	1.36	33.5	2	300	31.4	2.62	1.38	4		
	N143	Refer to Fill Test Location Plan	8.7	Silty SAND	1911	1911	49	38	58	96	60											No sample taken. See N152 for retest
	N144	Refer to Fill Test Location Plan	7.1	Clayey SILT	1911	1911	UTP	UTP	UTP	UTP	UTP	1.67	1.28	30.6	12	300	30.8	2.60	1.28	12	See N151 for retest	
	N145	Refer to Fill Test Location Plan	-	Clayey SILT	1911	1911	UTP	UTP	UTP	UTP	UTP	1.70	1.25	35.7	7	300	32.1	2.60	1.28	9	See N152 for retest	
14/02/2019	N146	Refer to Fill Test Location Plan	4.9	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.84	1.37	34.0	1	300	29.4	2.62	1.42	4		
	N147	Refer to Fill Test Location Plan	5.2	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.86	1.35	37.7	-2	300	31.8	2.62	1.40	1		

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 Authorised Signatory: AC Date: 30/05/2019



LF11 Rev.8 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAG Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes: Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.



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Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments	
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m ³) *	Oven Dry Density (t/m ³)		Calculated Air Voids (%) *
15/02/2019	N148	Refer to Fill Test Location Plan	-	CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.74	1.28	36.2	6	300	30.7	2.70	1.34	10	Retest of N140
18/02/2019	N149	Refer to Fill Test Location Plan	5.0	Clayey SILT	1911	1911	UTP	UTP	UTP	UTP	1.83	1.33	37.7	-1	300	31.3	2.62	1.40	3		
	N150	Refer to Fill Test Location Plan	2.9	Clayey SILT	1911	1911	204+	UTP	UTP	UTP	204+	1.77	1.28	38.4	2	300	33.9	2.62	1.32	5	
	N151	Refer to Fill Test Location Plan	7.2	Sandy SILT	1911	1911	UTP	UTP	UTP	UTP	1.77	1.39	28.0	8	300	25.5	2.62	1.42	10	Retest of N144. See 166/167	
	N152	Refer to Fill Test Location Plan	8.3	Clayey SILT	1911	1911	UTP	UTP	UTP	UTP	1.81	1.43	26.7	7	300	22.0	2.62	1.48	11	Retest of N143 & N145. See 166/167	
	N153	Refer to Fill Test Location Plan	15.5	Clayey SILT	1911	1911	UTP	UTP	UTP	UTP	1.83	1.41	29.7	4	300	26.6	2.62	1.44	6		
	N154	Refer to Fill Test Location Plan	15.4	CLAY	1911	1911	UTP	UTP	UTP	UTP	1.83	1.32	39.0	0	300	34.8	2.70	1.36	3		
	N155	Refer to Fill Test Location Plan	15.1	CLAY	1911	1911	UTP	UTP	UTP	UTP	1.66	1.16	43.4	7	300	35.9	2.70	1.22	11		
20/02/2019	N156	Refer to Fill Test Location Plan	3.5	Clayey SILT	1911	1911	UTP	UTP	UTP	UTP	1.79	1.32	35.3	3	300	30.0	2.62	1.38	6		
	N157	Refer to Fill Test Location Plan	3.7	Clayey SILT	1911	1911	UTP	UTP	UTP	UTP	1.79	1.32	35.6	2	300	30.7	2.62	1.38	6		
	N158	Refer to Fill Test Location Plan	4.8	Silty CLAY	1911	1911	UTP	UTP	UTP	UTP	1.79	1.30	38.0	1	300	30.3	2.62	1.38	6		
	N159	Refer to Fill Test Location Plan	5.5	CLAY	1911	1911	UTP	UTP	UTP	UTP	1.83	1.31	39.9	-2	300	38.4	2.62	1.32	-1		
	N160	Refer to Fill Test Location Plan	-	Silty CLAY	1911	1911	UTP	UTP	UTP	UTP	1.70	1.34	26.7	13	300	21.4	2.62	1.40	17	Retest of N140. See N164 for retest.	
	N161	Refer to Fill Test Location Plan	-	Silty CLAY	1911	1911	49	145	160	29	96										No sample taken. See N165 for retest
21/02/2019	N162	Refer to Fill Test Location Plan	3.6	Clayey SILT	1911	1911	145	148	175	169	159	1.76	1.32	33.4	5	300	32.1	2.62	1.34	6	
	N163	Refer to Fill Test Location Plan	3.4	Clayey SILT	1911	1911	UTP	204+	UTP	UTP	204+	1.77	1.37	29.4	7	300	27.7	2.62	1.38	9	
	N164	Refer to Fill Test Location Plan	15.6	Silty CLAY	1911	1911	UTP	UTP	UTP	UTP	1.75	1.30	34.7	7	300	29.6	2.62	1.34	9	Retest of N160	
	N165	Refer to Fill Test Location Plan	15.9	Silty CLAY	1911	1911	157	204	UTP	UTP	181+	1.75	1.29	36.3	6	300	29.3	2.62	1.36	9	Retest of N161
26/02/2019	N166	Refer to Fill Test Location Plan	8.5	CLAY, minor Sand	1911	1911	180	UTP	204+	175	186+	1.76	1.35	30.5	7	300	29.8	2.62	1.36	8	Retest of N152. See N184-186
	N167	Refer to Fill Test Location Plan	7.6	CLAY, some Sand, minor Silt	1911	1911	UTP	UTP	UTP	204+	204+	1.76	1.36	29.4	8	300	27.3	2.62	1.38	10	Retest of N151. See N184-186
27/02/2019	N168	Refer to Fill Test Location Plan	6.6	CLAY, Some Sand	1911	1911	177	UTP	204+	204+	195+	1.81	1.37	32.3	4	300	29.5	2.62	1.40	6	
	N169	Refer to Fill Test Location Plan	6.7	CLAY, minor Silt and Sand	1911	1911	102	105	79	99	96										No sample taken. See N195 for retest
28/02/2019	N170	Refer to Fill Test Location Plan	18.5	CLAY	1911	1911	UTP	UTP	UTP	UTP	1.68	1.09	53.4	1	300	56.6	2.70	1.08	0		
	N171	Refer to Fill Test Location Plan	18.9	CLAY	1911	1911	UTP	UTP	UTP	UTP	1.74	1.19	46.2	1	300	47.9	2.70	1.18	0		
	N172	Refer to Fill Test Location Plan	20.0	CLAY, minor Silt	1911	1911	UTP	UTP	UTP	204+	204+	1.73	1.21	42.4	3	300	36.8	2.70	1.26	7	
	N173	Refer to Fill Test Location Plan	18.7	CLAY	1911	1911	UTP	UTP	UTP	UTP	1.79	1.25	42.6	0	300	39.7	2.70	1.28	2		
	N174	Refer to Fill Test Location Plan	18.9	CLAY	1911	1911	UTP	UTP	UTP	UTP	1.70	1.16	46.9	3	300	40.8	2.70	1.20	6		
	N175	Refer to Fill Test Location Plan	3.1	CLAY, minor Silt and Sand	1911	1911	UTP	UTP	UTP	UTP	1.72	1.24	39.0	6	300	29.9	2.62	1.32	10		
	N176	Refer to Fill Test Location Plan	2.3	CLAY, minor Silt and Sand	1911	1911	UTP	UTP	UTP	UTP	1.72	1.28	34.2	8	300	33.2	2.62	1.30	8		

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Created By: JLM Date: 18/02/2019
 Checked By: JLM Date: 14/05/2019
 Authorised Signatory: AC Date: 30/05/2019



LF11 Rev.8 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAH Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes: Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Measurements marked * are not accredited and are outside the scope of the laboratories accreditation



Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data									Comments	
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m ³) *	Oven Dry Density (t/m ³)	Calculated Air Voids (%) *		
1/03/2019	N177	Refer to Fill Test Location Plan	20.0	CLAY	1911	1911	172	UTP	204+	UTP	188+	1.69	1.14	49.0	2	300	44.9	2.70	1.16	4		
	N178	Refer to Fill Test Location Plan	21.3	CLAY	1911	1911	UTP	UTP	UTP	UTP	1.72	1.18	46.3	2	300	45.5	2.70	1.18	3			
	N179	Refer to Fill Test Location Plan	19.4	CLAY	1911	1911	UTP	UTP	UTP	UTP	1.67	1.11	50.3	3	300	56.7	2.70	1.06	0			
	N180	Refer to Fill Test Location Plan	19.6	CLAY	1911	1911	UTP	UTP	UTP	UTP	1.64	1.09	51.4	4	300	56.7	2.70	1.04	2			
	N181	Refer to Fill Test Location Plan	20.6	CLAY, minor Silt	1911	1911	160	119	116	96	123											No Sample taken, See N188
	N182	Refer to Fill Test Location Plan	15.7	Sandy CLAY	1911	1911	UTP	177	175	UTP	176+	1.80	1.36	32.7	4	300	27.6	2.62	1.40	7		
4/03/2019	N183	Refer to Fill Test Location Plan	16.3	Sandy CLAY	1911	1911	UTP	UTP	UTP	UTP	1.82	1.35	35.3	1	300	29.5	2.62	1.40	5			
	N184	Refer to Fill Test Location Plan	7.3	CLAY, some Silt and Sand	2532	2532	UTP	UTP	UTP	UTP	1.78	1.40	26.8	9	300	27.2	2.62	1.40	9		Retest of N166 + 167	
	N185	Refer to Fill Test Location Plan	8.2	CLAY, some Silt and Sand	2532	2532	UTP	UTP	UTP	UTP	1.76	1.25	41.5	1	300	45.0	2.62	1.22	-1		Retest of N166 + 167	
5/03/2019	N186	Refer to Fill Test Location Plan	7.6	CLAY, some Silt and Sand	2532	2532	UTP	UTP	UTP	UTP	1.77	1.33	33.4	5	300	34.1	2.62	1.32	5	Retest of N166 + 167		
	N187	Refer to Fill Test Location Plan	21.5	CLAY	1785	1785	147	129	UTP	152	143+	1.66	1.15	43.5	7	300	47.5	2.70	1.12	5		
	N188	Refer to Fill Test Location Plan	21.5	CLAY	1785	1785	UTP	UTP	UTP	UTP	1.61	1.09	48	8	300	52.9	2.70	1.06	6	Retest of N181		
	N189	Refer to Fill Test Location Plan	19.7	CLAY	1785	1785	UTP	142	139	UTP	141+	1.70	1.10	54.1	0	300	48.4	2.70	1.14	2		
	N190	Refer to Fill Test Location Plan	20.1	CLAY	1785	1785	178	182	UTP	145	168+	1.68	1.17	43.8	5	300	44.4	2.70	1.16	5		
	N191	Refer to Fill Test Location Plan	21.2	CLAY	1785	1785	165	168	UTP	142	158+	1.69	1.13	50.2	2	300	54.0	2.70	1.10	0		
	N192	Refer to Fill Test Location Plan	-	Sandy CLAY	1785	1785	89	96	135	UTP	107+										No sample taken. See N205 for retest	
	N193	Refer to Fill Test Location Plan	3.5	Sandy CLAY	1785	1785	99	96	UTP	99	98+										No sample taken. See N204 for retest	
	N194	Refer to Fill Test Location Plan	-	Sandy CLAY	1785	1785	79	99	UTP	89+											No sample taken. See N203 for retest	
	N195	Refer to Fill Test Location Plan	4.6	Sandy CLAY	1785	1785	145	116	UTP	76	112+										No sample taken. Retest of N169. See N202 for retest	
	N196	Refer to Fill Test Location Plan	4.8	CLAY, some Silt and Sand	1785	1785	231+	231+	UTP	UTP	231+	1.79	1.29	38.1	1	300	37.9	2.62	1.30	1		
	N197	Refer to Fill Test Location Plan	4.6	CLAY, some Silt and Sand	1785	1785	182	UTP	149	231+	187+	1.72	1.28	34.4	7	300	39.8	2.62	1.22	4		
	N198	Refer to Fill Test Location Plan	4.7	CLAY, some Silt and Sand	1785	1785	149	149	UTP	185	161+	1.77	1.27	39.1	2	300	43.9	2.62	1.24	-1		
	N199	Refer to Fill Test Location Plan	-	CLAY, some Silt and Sand	1785	1785	UTP	UTP	UTP	UTP	UTP	1.75	1.36	28.8	9	300	26.1	2.62	1.38	11	See N201 for retest	
	N200	Refer to Fill Test Location Plan	-	CLAY, some Silt and Sand	1785	1785	231+	231+	231+	218	228+	1.74	1.36	27.9	10	300	28.6	2.62	1.36	10		
6/03/2019	N201	Refer to Fill Test Location Plan	3.4	Sandy SILT	1911	1911	UTP	UTP	UTP	UTP	1.77	1.37	29.6	7	300	28.2	2.62	1.38	8	Retest of N199		
	N202	Refer to Fill Test Location Plan	6.2	Sandy SILT	1911	1911	102	102	79	87	93									No sample taken. Retest of N195. See N219 for retest		
	N203	Refer to Fill Test Location Plan	7.2	Clayey SILT	1911	1911	UTP	UTP	UTP	UTP	1.81	1.37	31.8	4	300	23.0	2.62	1.48	10	Retest of N194. See N218		
	N204	Refer to Fill Test Location Plan	7.7	Sandy SILT	1911	1911	154	52	47	140	98										No sample taken. Retest of N193. See N217	
	N205	Refer to Fill Test Location Plan	7.4	Sandy SILT	1911	1911	UTP	UTP	UTP	UTP	1.81	1.45	24.8	8	300	32.1	2.62	1.38	4	Retest of N192		

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LF11 Rev.8 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAI Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes: Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.



Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments		
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m ³) *	Oven Dry Density (t/m ³)		Calculated Air Voids (%) *	
7/03/2019	N206	Refer to Fill Test Location Plan	10.3	Sandy SILT	2349	2349	UTP	UTP	UTP	UTP	UTP	1.70	1.27	40.6	5	300	37.5	2.62	1.24	7		
	N207	Refer to Fill Test Location Plan	11.3	Sandy SILT	2349	2349	UTP	UTP	140	120	130+	1.69	1.23	37.9	6	300	49.8	2.62	1.14	1		
	N208	Refer to Fill Test Location Plan	8.3	Sandy SILT	2349	2349	UTP	UTP	UTP	UTP	UTP	1.77	1.33	33.4	5	300	35.6	2.62	1.30	4		
	N209	Refer to Fill Test Location Plan	6.9	Sandy SILT	2349	2349	UTP	UTP	UTP	UTP	UTP	1.77	1.39	26.6	9	300	23.9	2.62	1.44	11	See N225 for retest	
	N210	Refer to Fill Test Location Plan	7.6	Sandy SILT	2349	2349	UTP	UTP	UTP	UTP	UTP	1.76	1.33	32.6	6	300	26.5	2.62	1.40	10		
12/03/2019	N211	Refer to Fill Test Location Plan	-	CLAY	2087	2087	93	96	UTP	93	94											No sample taken. See N259 for retest
	N212	Refer to Fill Test Location Plan	-	CLAY	2087	2087	90	UTP	158	93	114+											No sample taken. See N258 for retest
	N213	Refer to Fill Test Location Plan	-	CLAY, some Silt and Sand	2087	2087	UTP	217+	UTP	UTP	217+	1.83	1.36	33.9	2	300	30.0	2.62	1.40	4		
	N214	Refer to Fill Test Location Plan	-	CLAY, minor Silt	2087	2087	217+	UTP	214	217+	216+	1.76	1.32	33.1	6	300	34.6	2.62	1.30	5		
	N215	Refer to Fill Test Location Plan	-	CLAY, some Silt	2087	2087	84	74	77	65	75											No sample taken. Outstanding
13/03/2019	N216	Refer to Fill Test Location Plan	7.3	Clayey SILT	2087	2087	164	UTP	UTP	UTP	164+	1.77	1.33	33.6	5	300	31.2	2.62	1.36	6	Retest of N205	
	N217	Refer to Fill Test Location Plan	7.6	Clayey SILT	2087	2087	UTP	UTP	UTP	UTP	UTP	1.86	1.39	33.8	0	300	30.5	2.62	1.42	2	Retest of N204	
	N218	Refer to Fill Test Location Plan	7.2	Clayey SILT	2087	2087	UTP	UTP	UTP	UTP	UTP	1.87	1.42	31.5	1	300	27.3	2.62	1.48	4	Retest of N203	
	N219	Refer to Fill Test Location Plan	5.8	Clayey SILT	2087	2087	149	186	UTP	UTP	168+	1.82	1.30	39.4	-1	300	36.2	2.62	1.34	1	Retest of N202	
	N220	Refer to Fill Test Location Plan	6.2	Clayey SILT	2087	2087	108	149	59	59	94											No sample taken, See N252
15/03/2019	N221	Refer to Fill Test Location Plan	4.3	CLAY	1785	1785	139	149	132	149	142	1.69	1.12	50.9	1	300	51.3	2.70	1.12	1		
	N222	Refer to Fill Test Location Plan	4.4	CLAY	1785	1785	135	165	UTP	UTP	150+	1.69	1.16	46.0	4	300	49.2	2.70	1.14	2		
21/03/2019	N223	Refer to Fill Test Location Plan	9.4	CLAY	217	217	UTP	UTP	UTP	UTP	UTP	1.76	1.24	41.6	2	300	35.4	2.70	1.30	6		
	N224	Refer to Fill Test Location Plan	9.8	CLAY	217	217	UTP	UTP	211	UTP	211+	1.75	1.24	41.6	3	300	42.1	2.70	1.24	3		
	N225	Refer to Fill Test Location Plan	7.1	CLAY	217	217	UTP	UTP	UTP	UTP	UTP	1.76	1.22	44.1	1	300	34.4	2.70	1.30	7	Retest of N209	
25/03/2019	N226	Refer to Fill Test Location Plan	5.5	CLAY	217	217	221+	148	UTP	UTP	185+	1.72	1.25	36.9	7	300	42.7	2.70	1.20	4		
	N227	Refer to Fill Test Location Plan	8.1	CLAY, some Silt, minor Sand	2560	2560	UTP	UTP	UTP	UTP	UTP	1.84	1.36	34.6	1	300	27.3	2.62	1.44	6		
	N228	Refer to Fill Test Location Plan	7.6	CLAY	2560	2560	UTP	191+	191+	UTP	191+	1.62	1.12	43.9	9	300	35.5	2.70	1.20	13		
	N229	Refer to Fill Test Location Plan	10.4	CLAY, some Silt and Sand	2560	2560	UTP	191+	191+	191+	191+	1.80	1.38	31.0	5	300	27.4	2.62	1.42	7		
	N230	Refer to Fill Test Location Plan	9.6	CLAY, some Silt and Sand	2560	2560	UTP	UTP	UTP	UTP	UTP	1.80	1.34	35.1	2	300	33.9	2.62	1.34	3		
	N231	Refer to Fill Test Location Plan	6.8	CLAY, minor Silt, minor Sand	2560	2560	UTP	UTP	UTP	UTP	UTP	1.71	1.21	41.5	3	300	33.2	2.62	1.28	8		
	N232	Refer to Fill Test Location Plan	8.1	CLAY, minor Silt	2560	2560	UTP	UTP	UTP	UTP	UTP	1.73	1.17	48.1	-1	300	38.8	2.62	1.24	4		
	N233	Refer to Fill Test Location Plan	9.3	CLAY, minor Silt	2560	2560	UTP	UTP	UTP	UTP	UTP	1.71	1.24	38.5	5	300	29.5	2.62	1.32	11	See N280 for retest	

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 Authorised Signatory: AC Date: 30/05/2019



LF11 Rev.8 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAJ Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes: Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.



Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data										Comments
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³)**	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m ³)*	Oven Dry Density (t/m ³)	Calculated Air Voids (%) *		
27/03/2019	N234	Refer to Fill Test Location Plan	6.1	CLAY	2560	2560	UTP	UTP	UTP	UTP	UTP	1.75	1.23	42.8	2	250	39.4	2.70	1.26	4		
	N235	Refer to Fill Test Location Plan	17.4	Sandy SILT	2560	2560	UTP	UTP	UTP	UTP	UTP	1.85	1.44	27.9	5	300	29.4	2.62	1.42	4		
	N236	Refer to Fill Test Location Plan	17.1	Sandy SILT	2560	2560	UTP	UTP	UTP	UTP	UTP	1.53	1.25	22.5	24	250	26.7	2.62	1.20	22	See N256 for retest	
	N237	Refer to Fill Test Location Plan	15.6	SILT	2560	2560	UTP	UTP	UTP	UTP	UTP	1.51	1.22	23.8	24	200	20.4	2.62	1.26	26	See N294 for retest	
	N238	Refer to Fill Test Location Plan	5.7	CLAY	2349	2349	204+	204+	204+	134	187+	1.70	1.18	44.2	4	300	38.8	2.70	1.22	7		
3/04/2019	N239	Refer to Fill Test Location Plan	6.4	CLAY	2349	2349	UTP	204+	204+	204+	204+	1.78	1.27	40.6	1	300	37.5	2.70	1.30	3		
	N240	Refer to Fill Test Location Plan	6.7	CLAY	2349	2349	204+	204+	204+	190	201+	1.82	1.27	42.5	-1	300	40.1	2.70	1.30	0		
	N241	Refer to Fill Test Location Plan	6.6	CLAY	2349	2349	UTP	184	204+	204+	197+	1.80	1.26	42.4	-1	300	37.0	2.70	1.32	3		
	N242	Refer to Fill Test Location Plan	7.6	CLAY	2349	2349	UTP	UTP	204+	204+	204+	1.82	1.32	37.8	1	300	34.8	2.70	1.36	3		
	N243	Refer to Fill Test Location Plan	-	CLAY	1785	1785	122	129	162	182	149	1.79	1.24	44.8	-1	300	48.4	2.70	1.20	-3		
4/04/2019	N244	Refer to Fill Test Location Plan	-	CLAY	1785	1785	195	231+	168	182	194+	1.73	1.19	45.4	2	300	48.5	2.70	1.16	0		
	N245	Refer to Fill Test Location Plan	-	CLAY	1785	1785	139	UTP	201	231+	190+	1.82	1.30	40.4	-1	300	41.2	2.70	1.30	-1		
	N246	Refer to Fill Test Location Plan	-	CLAY	1785	1785	UTP	UTP	UTP	UTP	UTP	1.68	1.13	48.4	3	300	43.8	2.70	1.16	6		
	N247	Refer to Fill Test Location Plan	-	CLAY	1785	1785	165	149	231+	132	169+	1.71	1.16	48.0	2	300	49.5	2.70	1.14	1		
	N248	Refer to Fill Test Location Plan	2.5	Silty CLAY	2087	2087	183	164	UTP	UTP	174+	1.87	1.41	32.9	1	300	28.9	2.70	1.46	4		
5/04/2019	N249	Refer to Fill Test Location Plan	3.8	CLAY	2087	2087	UTP	UTP	UTP	189	189+	1.90	1.39	36.8	-3	300	32.9	2.70	1.42	0		
	N250	Refer to Fill Test Location Plan	4.1	CLAY	2087	2087	195	173	170	149	172	1.85	1.39	32.9	3	300	33.4	2.70	1.38	2		
	N251	Refer to Fill Test Location Plan	6.7	CLAY	2087	2087	UTP	UTP	193	211	202	1.80	1.30	38.6	2	300	41.5	2.70	1.28	0		
	N252	Refer to Fill Test Location Plan	6.2	CLAY	2087	2087	173	173	183	121	163	1.75	1.21	44.3	1	300	44.7	2.70	1.20	1	Retest of N220	
	N253	Refer to Fill Test Location Plan	7.0	CLAY	2087	2087	217	UTP	UTP	UTP	217	1.78	1.27	40.7	1	300	41.8	2.70	1.26	1		
8/04/2019	N254	Refer to Fill Test Location Plan	8.5	CLAY	2087	2087	UTP	UTP	UTP	UTP	UTP	1.82	1.32	37.5	1	300	39.8	2.70	1.30	0		
	N255	Refer to Fill Test Location Plan	8.4	CLAY	2087	2087	173	155	217+	UTP	182+	1.86	1.31	42.4	-4	300	43.3	2.70	1.30	-4		
	N256	Refer to Fill Test Location Plan	-	Clayey SILT	2087	2087	217+	173	170	186	187+	1.73	1.24	39.6	3	300	35.6	2.62	1.28	6	Retest of N236	
	N257	Refer to Fill Test Location Plan	8.9	CLAY, minor Silt	2349	2349	UTP	UTP	204+	UTP	204+	1.81	1.35	33.5	3	300	29.7	2.62	1.40	5		
	N258	Refer to Fill Test Location Plan	-	CLAY	2349	2349	UTP	UTP	UTP	UTP	UTP	1.74	1.27	37.3	6	200	38.8	2.70	1.26	5	Retest of N212	
10/04/2019	N259	Refer to Fill Test Location Plan	-	CLAY	2349	2349	UTP	UTP	UTP	UTP	UTP	1.64	1.21	35.9	12	200	41.0	2.70	1.16	9	Retest of N211	
	N260	Refer to Fill Test Location Plan	9.7	CLAY, minor Silt	2349	2349	UTP	UTP	UTP	UTP	UTP	1.74	1.22	42.8	1	200	36.6	2.62	1.28	5		
	N261	Refer to Fill Test Location Plan	9.7	CLAY, minor Silt	2349	2349	140	111	UTP	204+	126+	1.79	1.30	37.6	1	300	34.4	2.62	1.34	3		
	N262	Refer to Fill Test Location Plan	8.3	CLAY, minor Silt	2349	2349	UTP	204+	50	61	56+										No sample taken. See N278 for retest	
	N263	Refer to Fill Test Location Plan	8.3	CLAY, minor Silt	2349	2349	UTP	204+	204+	UTP	204+	1.77	1.25	41.2	1	300	40.1	2.62	1.26	1		
N264	Refer to Fill Test Location Plan	-	CLAY	2349	2349	UTP	204+	UTP	UTP	204+	1.78	1.28	39.7	2	300	38.9	2.70	1.28	3			
N265	Refer to Fill Test Location Plan	-	CLAY	2349	2349	204+	204+	UTP	181	196+	1.79	1.25	42.8	0	300	43.0	2.70	1.24	0			
N266	Refer to Fill Test Location Plan	-	CLAY	2349	2349	149	175	UTP	UTP	162+	1.76	1.26	39.3	4	300	43.0	2.70	1.22	2			

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 Authorised Signatory: AC Date: 30/05/2019



LF11 Rev.8 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAK Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes: Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.



Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments	
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m ³) *	Oven Dry Density (t/m ³)		Calculated Air Voids (%) *
16/04/2019	N267	Refer to Fill Test Location Plan	2.7	CLAY	2087	2087	UTP	UTP	UTP	UTP	UTP	1.89	1.38	37.4	-3	300	35.4	2.70	1.40	-1	
	N268	Refer to Fill Test Location Plan	1.3	CLAY	2087	2087	140	UTP	146	UTP	143+	1.74	1.22	42.4	3	300	37.3	2.70	1.26	6	
17/04/2019	N269	Refer to Fill Test Location Plan	5.8	CLAY	1785	1785	231+	UTP	122	175	176+	1.73	1.19	44.9	2	300	37.8	2.70	1.26	6	
	N270	Refer to Fill Test Location Plan	6.0	CLAY	1785	1785	195	UTP	175	UTP	185+	1.77	1.25	42.0	1	300	35.8	2.70	1.30	5	
	N271	Refer to Fill Test Location Plan	5.0	CLAY	1785	1785	149	149	149	155	151	1.66	1.12	48.9	4	300	47.8	2.70	1.12	5	
	N272	Refer to Fill Test Location Plan	6.9	CLAY	1785	1785	UTP	UTP	UTP	UTP	UTP	1.74	1.23	41.3	3	300	39.0	2.70	1.26	5	
	N273	Refer to Fill Test Location Plan	7.0	CLAY	1785	1785	185	129	182	231+	182+	1.69	1.11	52.6	0	300	56.9	2.70	1.08	-1	
	N274	Refer to Fill Test Location Plan	8.3	CLAY	1785	1785	66	139	92	63	90										No sample taken. See N290 for retest
	N275	Refer to Fill Test Location Plan	8.0	CLAY	1785	1785	201	182	155	UTP	179+	1.69	1.16	46.0	4	300	47.6	2.70	1.14	3	
	N276	Refer to Fill Test Location Plan	8.9	CLAY	1785	1785	158	UTP	UTP	UTP	158+	1.69	1.14	48.2	3	300	47.8	2.70	1.14	3	
	N277	Refer to Fill Test Location Plan	9.5	CLAY	1785	1785	92	102	116	66	94										No sample taken. See N320 for retest
	N278	Refer to Fill Test Location Plan	9.0	CLAY	1785	1785	UTP	UTP	UTP	UTP	UTP	1.78	1.29	37.3	4	300	31.6	2.70	1.34	7	Retest of N262
	N279	Refer to Fill Test Location Plan	7.8	CLAY	1785	1785	129	231+	UTP	215	192+	1.83	1.29	41.8	-2	300	38.0	2.70	1.32	0	
	N280	Refer to Fill Test Location Plan	9.3	CLAY	1785	1785	UTP	UTP	UTP	UTP	UTP	1.79	1.32	36.0	4	300	32.0	2.70	1.36	7	Retest of N233
	N281	Refer to Fill Test Location Plan	11.5	CLAY	1785	1785	UTP	UTP	UTP	UTP	UTP	1.79	1.28	39.6	2	300	41.5	2.70	1.26	1	
	N282	Refer to Fill Test Location Plan	12.3	CLAY	1785	1785	UTP	UTP	132	149	141+	1.74	1.17	48.2	0	300	42.4	2.70	1.22	3	
	N283	Refer to Fill Test Location Plan	12.2	CLAY	1785	1785	UTP	UTP	UTP	145	145+	1.79	1.23	45.2	-2	300	47.4	2.70	1.22	-3	
	N284	Refer to Fill Test Location Plan	11.7	CLAY	1785	1785	116	139	205	198	165	1.75	1.24	41.4	3	300	37.2	2.70	1.28	5	
	N285	Refer to Fill Test Location Plan	11.0	CLAY	1785	1785	UTP	UTP	UTP	231+	231+	1.76	1.22	43.8	1	300	29.6	2.70	1.36	10	
	N286	Refer to Fill Test Location Plan	11.0	Sandy CLAY	1785	1785	UTP	215	UTP	215	215	1.79	1.37	30.5	7	300	27.4	2.70	1.40	10	
18/04/2019	N287	Refer to Fill Test Location Plan	17.2	CLAY	2087	2087	130	108	136	180	139	1.73	1.19	45.5	2	300	46.1	2.70	1.18	1	See N292 for retest
	N288	Refer to Fill Test Location Plan	17.0	CLAY	2087	2087	130	207	136	105	145	1.85	1.41	31.6	3	300	27.5	2.70	1.46	6	See N293 for retest
	N289	Refer to Fill Test Location Plan	8.3	CLAY	2087	2087	108	136	176	105	131	1.71	1.71	44.9	3	300	41.9	2.70	1.20	5	
	N290	Refer to Fill Test Location Plan	8.5	CLAY	2087	2087	UTP	UTP	192	176	184+	1.76	1.22	44.2	1	300	41.0	2.70	1.24	3	Retest of N274
	N291	Refer to Fill Test Location Plan	5.9	CLAY	2087	2087	217+	UTP	UTP	158	188+	1.73	1.27	36.3	7	300	30.9	2.70	1.32	10	

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** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m³ are not accredited and are outside the laboratories scope of accreditation.

Created By: JLM Date: 17/04/2019
 Checked By: JLM Date: 15/05/2019
 Authorised Signatory: AC Date: 30/05/2019



LF11 Rev.9 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAL Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods:
 NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes:
 Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.



Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data										Comments	
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m ³) *	Oven Dry Density (t/m ³)	Calculated Air Voids (%) *			
24/04/2019	N292	Refer to Fill Test Location Plan	16.9	CLAY	2087	2087	155	173	207	167	176	1.74	1.19	46.3	1	300	41.5	2.70	1.24	3	Retest of N287		
	N293	Refer to Fill Test Location Plan	17.0	CLAY	2087	2087	UTP	UTP	UTP	UTP	UTP	1.79	1.28	39.7	2	300	37.7	2.70	1.30	3	Retest of N288		
	N294	Refer to Fill Test Location Plan	15.7	CLAY	2087	2087	UTP	UTP	UTP	UTP	UTP	1.78	1.28	33.4	10	250	25.1	2.70	1.42	12	Retest of N237. Outstanding		
26/04/2019	N295	Refer to Fill Test Location Plan	5.6	CLAY	2087	2087	211	UTP	133	217+	187+	1.78	1.28	39.2	2	300	37.1	2.70	1.30	4			
	N296	Refer to Fill Test Location Plan	6.4	CLAY	2087	2087	UTP	204	UTP	UTP	204+	1.72	1.16	48.6	1	300	46.5	2.70	1.18	2			
	N297	Refer to Fill Test Location Plan	5.6	CLAY	2087	2087	167	214	204	186	193	1.76	1.19	47.9	-1	300	39.6	2.70	1.26	3			
1/05/2019	N298	Refer to Fill Test Location Plan	11.9	CLAY	2087	2087	UTP	UTP	UTP	UTP	UTP	1.79	1.26	42.8	0	300	36.3	2.70	1.32	4			
	N299	Refer to Fill Test Location Plan	11.9	CLAY	2087	2087	UTP	UTP	UTP	UTP	UTP	1.76	1.25	40.4	3	300	34.2	2.70	1.30	7			
	N300	Refer to Fill Test Location Plan	7.5	CLAY	2087	2087	170	201	155	124	163	1.85	1.34	37.7	0	300	37.2	2.70	1.34	0			
2/05/2019	N301	Refer to Fill Test Location Plan	7.1	CLAY	2087	2087	195	UTP	180	UTP	188+	1.80	1.30	38.1	2	300	32.6	2.70	1.36	5			
	N302	Refer to Fill Test Location Plan	6.8	CLAY	2087	2087	139	139	136	155	142	1.77	1.25	42.0	1	300	40.3	2.70	1.26	3			
	N303	Refer to Fill Test Location Plan	7.6	Clayey SILT	2087	2087	62	87	100	65	79											No sample taken. See N316 for retest.	
	N304	Refer to Fill Test Location Plan	6.4	Clayey SILT	2087	2087	87	84	77	93	85											No sample taken. See N310 for retest.	
	N305	Refer to Fill Test Location Plan	5.8	CLAY	2087	2087	UTP	UTP	155	UTP	155+	1.82	1.25	45.2	-3	300	38.6	2.70	1.32	1			
	N306	Refer to Fill Test Location Plan	4.0	Clayey SILT	2087	2087	84	84	56	93	79												No sample taken. See N312 for retest.
	N307	Refer to Fill Test Location Plan	6.9	CLAY	1785	1785	231+	UTP	UTP	UTP	231+	1.77	1.23	43.5	1	300	39.5	2.70	1.26	3			
	N308	Refer to Fill Test Location Plan	6.3	CLAY	1785	1785	172	188	198	231+	186	1.85	1.41	31.1	4	300	26.6	2.70	1.46	7			
	N309	Refer to Fill Test Location Plan	5.7	CLAY	1785	1785	152	158	149	145	151	1.81	1.30	39.0	1	300	36.2	2.70	1.32	3			
	N310	Refer to Fill Test Location Plan	6.3	CLAY	1785	1785	172	168	112	149	150	1.77	1.25	41.0	2	300	45.1	2.70	1.22	0	Retest of N304		
3/05/2019	N311	Refer to Fill Test Location Plan	6.1	CLAY	1785	1785	102	135	135	149	130	1.77	1.28	38.2	4	300	36.9	2.70	1.30	5			
	N312	Refer to Fill Test Location Plan	4.0	CLAY	1785	1785	UTP	205	UTP	116	161+	1.76	1.22	43.0	2	300	39.1	2.70	1.26	4	Retest of N306		
	N313	Refer to Fill Test Location Plan	7.2	CLAY	1785	1785	116	129	158	132	134	1.75	1.27	38.0	5	300	34.9	2.70	1.30	7			
	N314	Refer to Fill Test Location Plan	12.6	CLAY	1785	1785	UTP	UTP	UTP	UTP	UTP	1.83	1.29	41.6	-2	300	35.9	2.70	1.34	2			
	N315	Refer to Fill Test Location Plan	13.0	CLAY	1785	1785	UTP	UTP	UTP	UTP	UTP	1.88	1.38	37.3	-2	300	36.9	2.70	1.38	-2			
	N316	Refer to Fill Test Location Plan	-	CLAY	1785	1785	149	175	195	UTP	173+	1.80	1.28	40.4	1	300	42.4	2.70	1.26	0	Retest of N303		
	N317	Refer to Fill Test Location Plan	-	CLAY	1785	1785	195	116	145	228	171	1.60	1.12	43.2	10	300	39.2	2.70	1.14	12	See N321 for retest		
	N318	Refer to Fill Test Location Plan	-	CLAY	1785	1785	UTP	UTP	201	142	172+	1.78	1.29	37.9	3	300	33.7	2.70	1.32	6			

This report should only be reproduced in full.

** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m³ are not accredited and are outside the laboratories scope of accreditation.

Created By: JLM Date: 26/04/2019
 Checked By: JLM Date: 15/05/2019
 Authorised Signatory: AC Date: 30/05/2019



LF11 Rev.9 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAM Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes: Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.



Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data										Comments
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m ³) *	Oven Dry Density (t/m ³)	Calculated Air Voids (%) *		
7/05/2019	N319	Refer to Fill Test Location Plan	8.8	CLAY	2560	2560	UTP	145	156	153	151+	1.79	1.33	35.0	4	300	34.9	2.70	1.32	5		
8/05/2019	N320	Refer to Fill Test Location Plan	-	CLAY	2560	2560	UTP	UTP	UTP	UTP	UTP	1.72	1.16	47.7	1	300	41.8	2.70	1.22	5	Retest of N277	
	N321	Refer to Fill Test Location Plan	8.2	CLAY	2560	2560	142	191+	191	191+	175+	1.62	1.15	41.2	10	300	35.3	2.70	1.20	13	Retest of N317. See N327 for retest	
	N322	Refer to Fill Test Location Plan	7.5	CLAY	2560	2560	191+	191	UTP	UTP	191+	1.82	1.33	36.6	2	300	36.3	2.70	1.34	2		
	N323	Refer to Fill Test Location Plan	4.5	CLAY	2560	2560	191+	172	UTP	191+	185+	1.78	1.27	40.2	2	300	36.5	2.70	1.30	4		
	N324	Refer to Fill Test Location Plan	7.4	CLAY	2560	2560	120	131	175	189	154	1.83	1.37	34.4	2	300	34.5	2.70	1.36	2		
	N325	Refer to Fill Test Location Plan	6.9	CLAY	2560	2560	UTP	UTP	UTP	142	142+	1.81	1.33	36.2	2	300	35.5	2.70	1.34	3		
	N326	Refer to Fill Test Location Plan	6.6	CLAY	2560	2560	137	186	150	183	164	1.78	1.30	37.0	3	300	33.8	2.70	1.34	6		
	N327	Refer to Fill Test Location Plan	9.0	CLAY	2560	2560	UTP	UTP	UTP	UTP	UTP	1.78	1.30	36.7	4	300	36.1	2.70	1.30	4	Retest of N321	
9/05/2019	N328	Refer to Fill Test Location Plan	8.2	CLAY	2560	2560	150	153	191+	186	170+	1.80	1.36	32.8	5	300	32.1	2.70	1.36	6		
	N329	Refer to Fill Test Location Plan	8.4	CLAY	2560	2560	145	180	170	159	164	1.75	1.29	35.1	7	300	33.3	2.70	1.32	8		
	N330	Refer to Fill Test Location Plan	8.1	CLAY	2560	2560	UTP	UTP	UTP	UTP	UTP	1.83	1.37	34.0	3	300	34.4	2.70	1.36	3		

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** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m³ are not accredited and are outside the laboratories scope of accreditation.

Created By: JLM Date: 14/05/2019
 Checked By: JLM Date: 15/05/2019
 Authorised Signatory: AC Date: 30/05/2019



LF11 Rev.9 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Hamilton Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 Suite 2, 5 Hill Street, Hamilton 3204
 PO Box 995, Waikato Mail Centre, Hamilton 3240
 Phone: +64 (07) 2820 039

Project: Lakeside Development
Project No: HAM2018-0106
Location: 98 Scott Road, Te Kauwhata.
Report No: HAM2018-0106LAN Rev.0
Report Date: 15/05/2019
Client: Lakeside Developments (2017) Limited
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
 NZS 4407.4.2.2:2015
 NZGS:August 2001

Notes: Solid Density: Assumed
 Testing Locations Selected By: CMW Field Staff
 ① Blade size of 19mm used.



Tests indicated as not accredited are outside the scope of the laboratory's accreditation

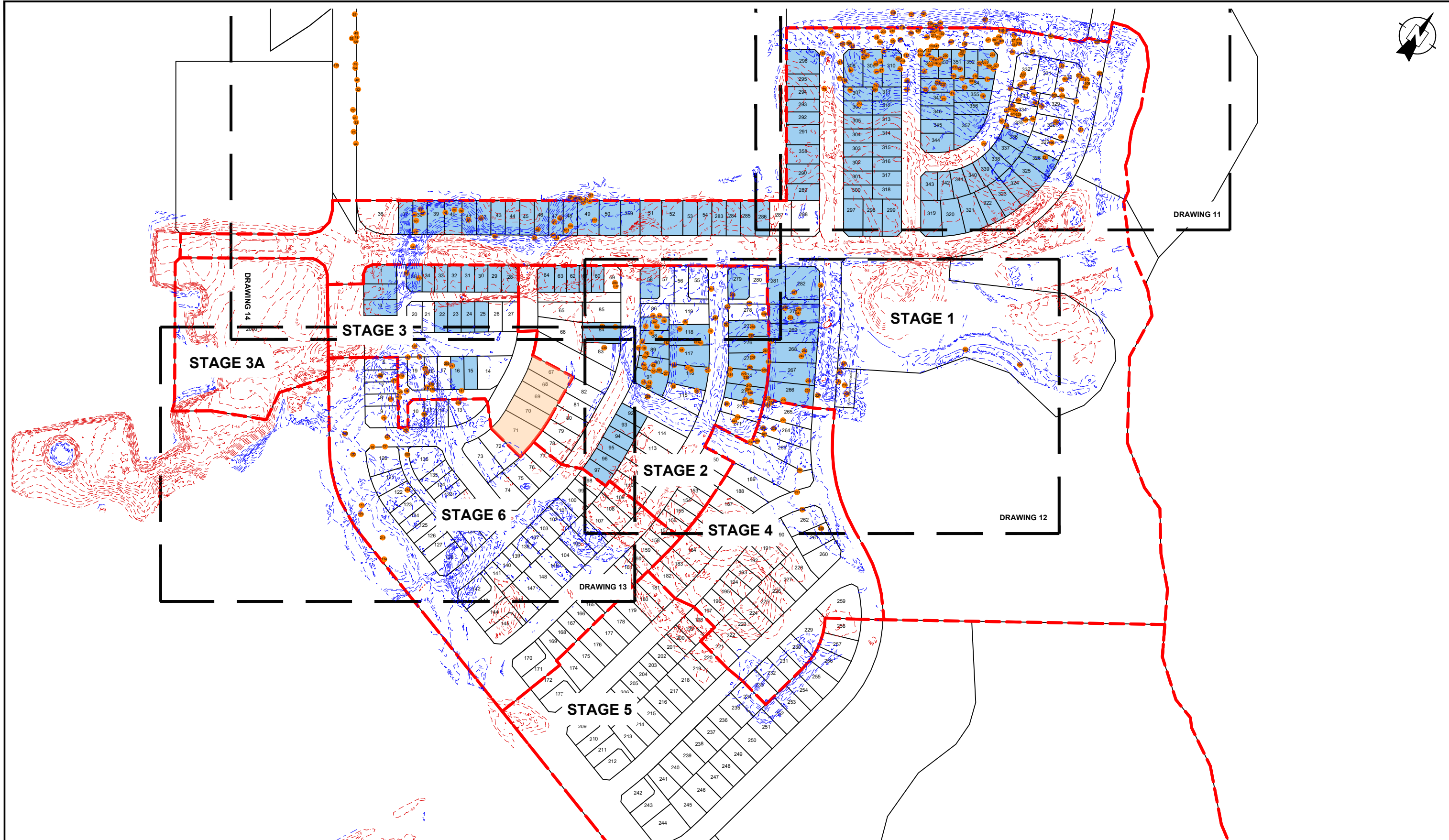
Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data									Comments
		Location	RL		Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth	Oven Water Content (%)	Solid Density (t/m ³) *	Oven Dry Density (t/m ³)	Calculated Air Voids (%) *	
16/05/2019	N331	Refer to Fill Test Location Plan	8.3	Clayey SILT	2560	2560	UTP	UTP	UTP	UTP	UTP	1.81	1.37	32.6	3	300	35.9	2.62	1.34	1	
	N332	Refer to Fill Test Location Plan	9.1	Clayey SILT	2560	2560	UTP	UTP	UTP	UTP	UTP	1.84	1.47	24.7	7	300	31.5	2.62	1.40	3	
23/05/2019	N333	Refer to Fill Test Location Plan	-	CLAY	2532	2532	UTP	UTP	UTP	UTP	UTP	1.77	1.30	36.5	4	300	33.6	2.70	1.32	6	
25/05/2019	N334	Refer to Fill Test Location Plan	5.2	CLAY	2560	2560	UTP	UTP	UTP	UTP	UTP	1.86	1.37	35.3	1	300	33.8	2.70	1.38	2	
	N335	Refer to Fill Test Location Plan	6.2	CLAY	2560	2560	191+	170	191+	156	177+	1.80	1.29	39.6	1	300	36.1	2.70	1.32	3	

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** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m³ are not accredited and are outside the laboratories scope of accreditation.

Created By: JLM Date: 21/05/2019
 Checked By: JLM Date: 30/05/2019
 Authorised Signatory: AC Date: 30/05/2019



LEGEND:

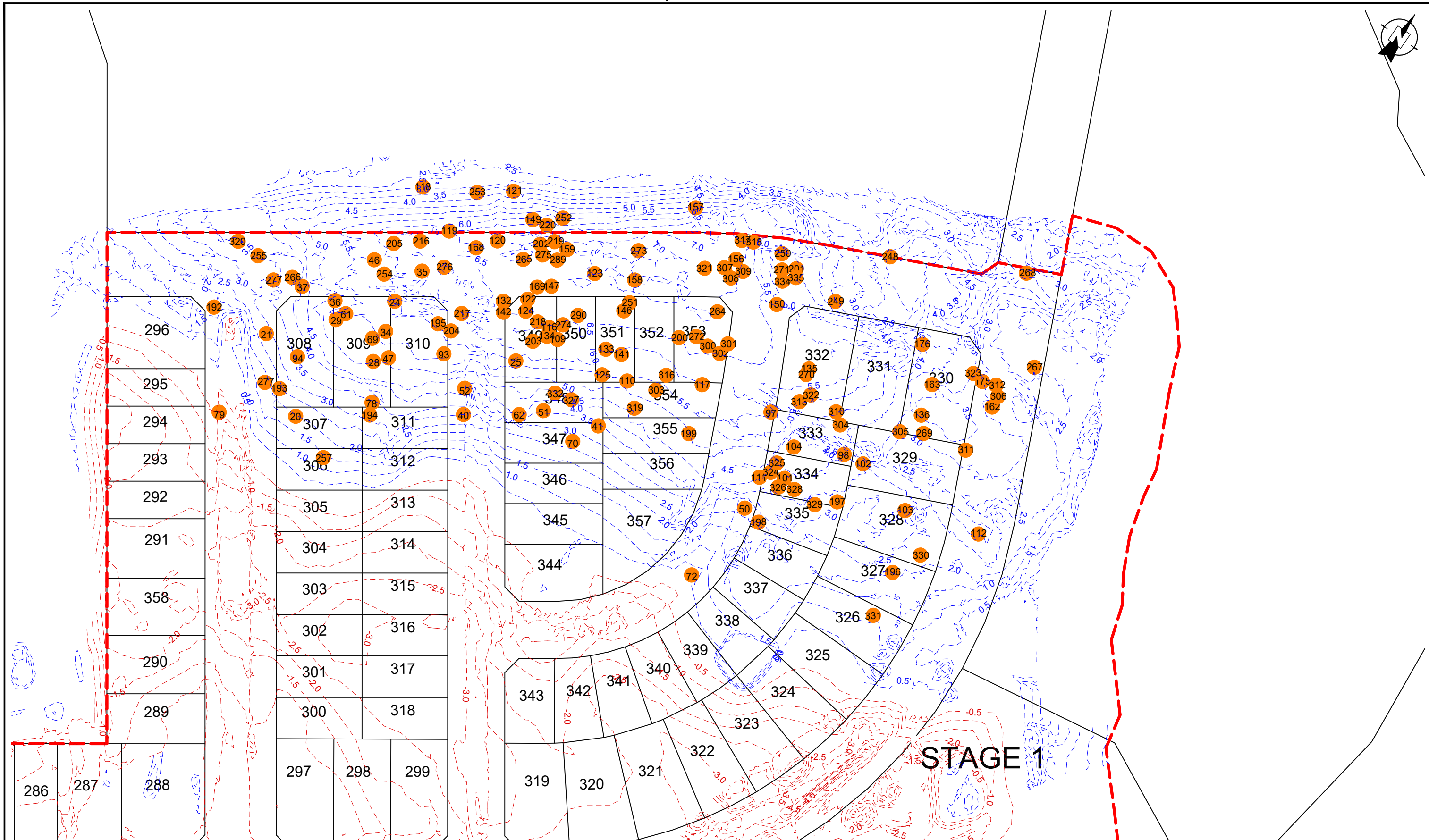
- STAGE BOUNDARY
- SHOW HOMES AREA PREVIOUSLY REPORTED ON
- LOTS COVERED BY GCR REPORT RE. HAM2018-106AM REV 1
- CUT CONTOURS
- FILL CONTOURS
- 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION

NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 27.05.19 AND PROVIDED BY CANDOR3. OUTSIDE THESE LOTS CONTOURS DERIVED FROM DRONE SURVEY 17.05.19 AND ARE APPROXIMATE ONLY.
5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.

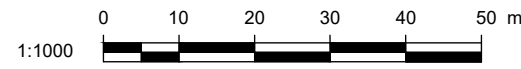


CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN: WPJ	PROJECT No: HAM2018-0106
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED: LYK	DRAWING: 10
TITLE: FILL TEST LOCATION SITE PLAN A	REVISION: 0	SCALE: 1:3000
	DATE: 28.05.19	SHEET: A3 L

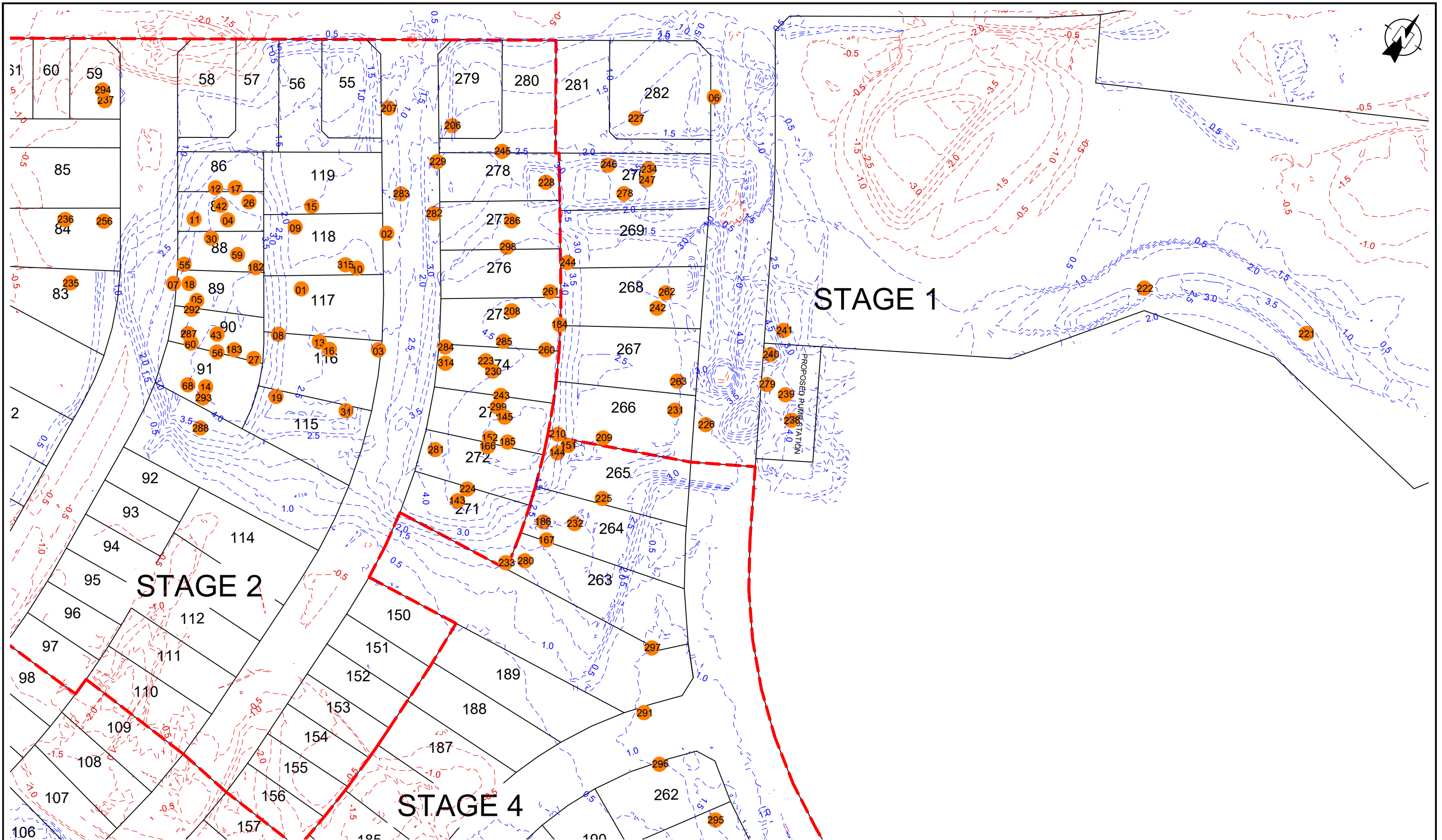


- LEGEND:**
- - - STAGE BOUNDARY
 - - - CUT CONTOURS
 - - - FILL CONTOURS
 - 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION

- NOTES:**
1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
 2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
 3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.
 4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 27.05.19 AND PROVIDED BY CANDOR3. OUTSIDE THESE LOTS CONTOURS DERIVED FROM DRONE SURVEY 17.05.19 AND ARE APPROXIMATE ONLY.
 5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.



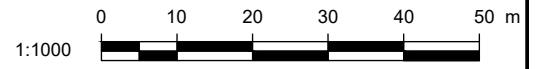
	CLIENT:	LAKESIDE DEVELOPMENTS (2017) LTD	
	PROJECT:	LAKESIDE DEVELOPMENT, TE KAUWHATA	
	TITLE:	FILL TEST LOCATION SITE PLAN B	
	DRAWN:	WPJ	PROJECT No: HAM2018-0106
	CHECKED:	LYK	DRAWING: 11
	REVISION:	0	SCALE: 1:1000
	DATE:	28.05.19	SHEET: A3 L



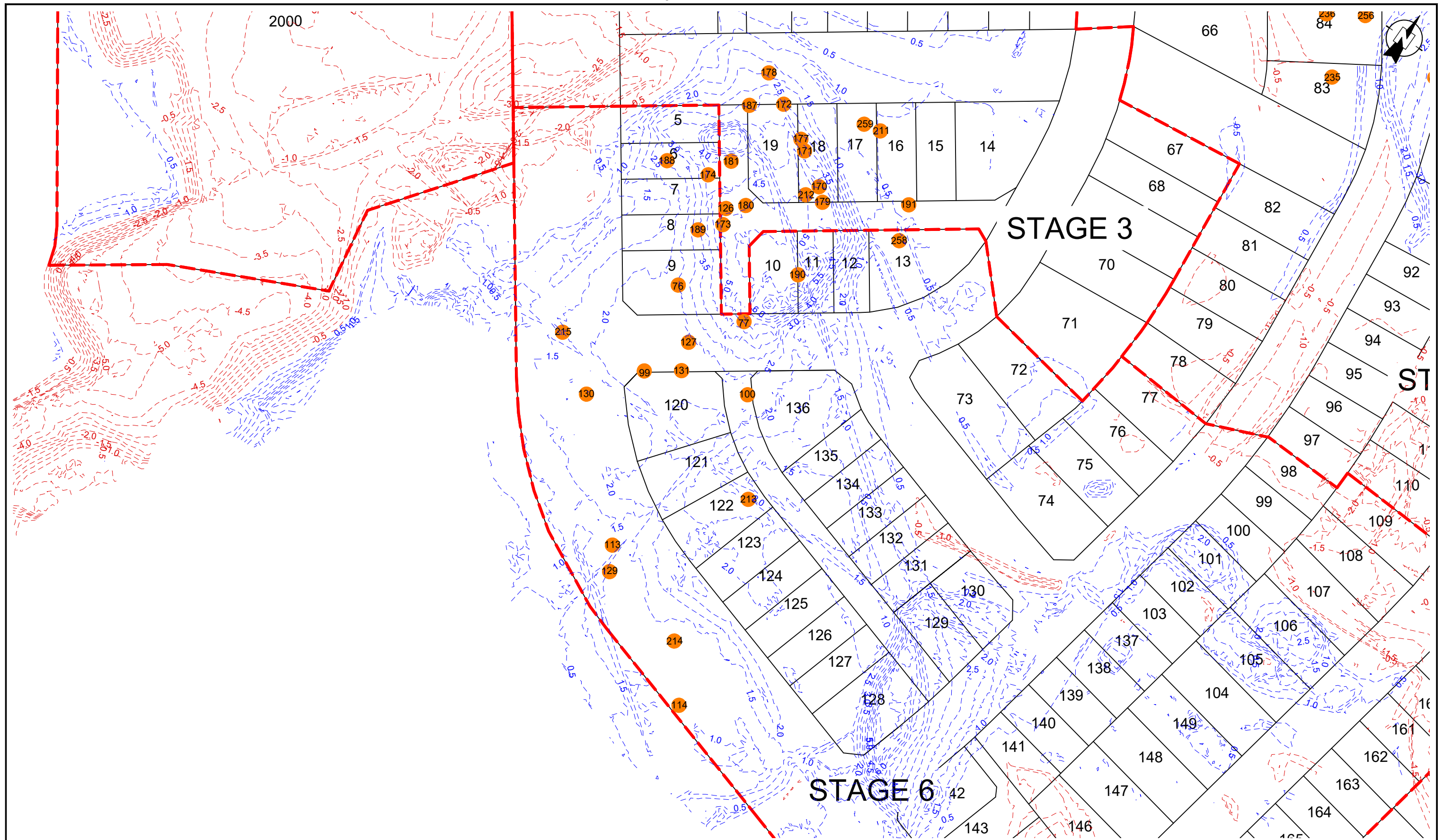
LEGEND:

	STAGE BOUNDARY
	CUT CONTOURS
	FILL CONTOURS
	NUCLEAR DENSITY METER (NDM) TEST LOCATION

- NOTES:**
1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
 2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
 3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.
 4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 27.05.19 AND PROVIDED BY CANDOR3. OUTSIDE THESE LOTS CONTOURS DERIVED FROM DRONE SURVEY 17.05.19 AND ARE APPROXIMATE ONLY.
 5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.



CLIENT:	LAKESIDE DEVELOPMENTS (2017) LTD	
PROJECT:	LAKESIDE DEVELOPMENT, TE KAUWHATA	
TITLE:	FILL TEST LOCATION SITE PLAN C	
DRAWN:	WPJ	PROJECT No: HAM2018-0106
CHECKED:	LYK	DRAWING: 12
REVISION:	0	SCALE: 1:1000
DATE:	28.05.19	SHEET: A3 L

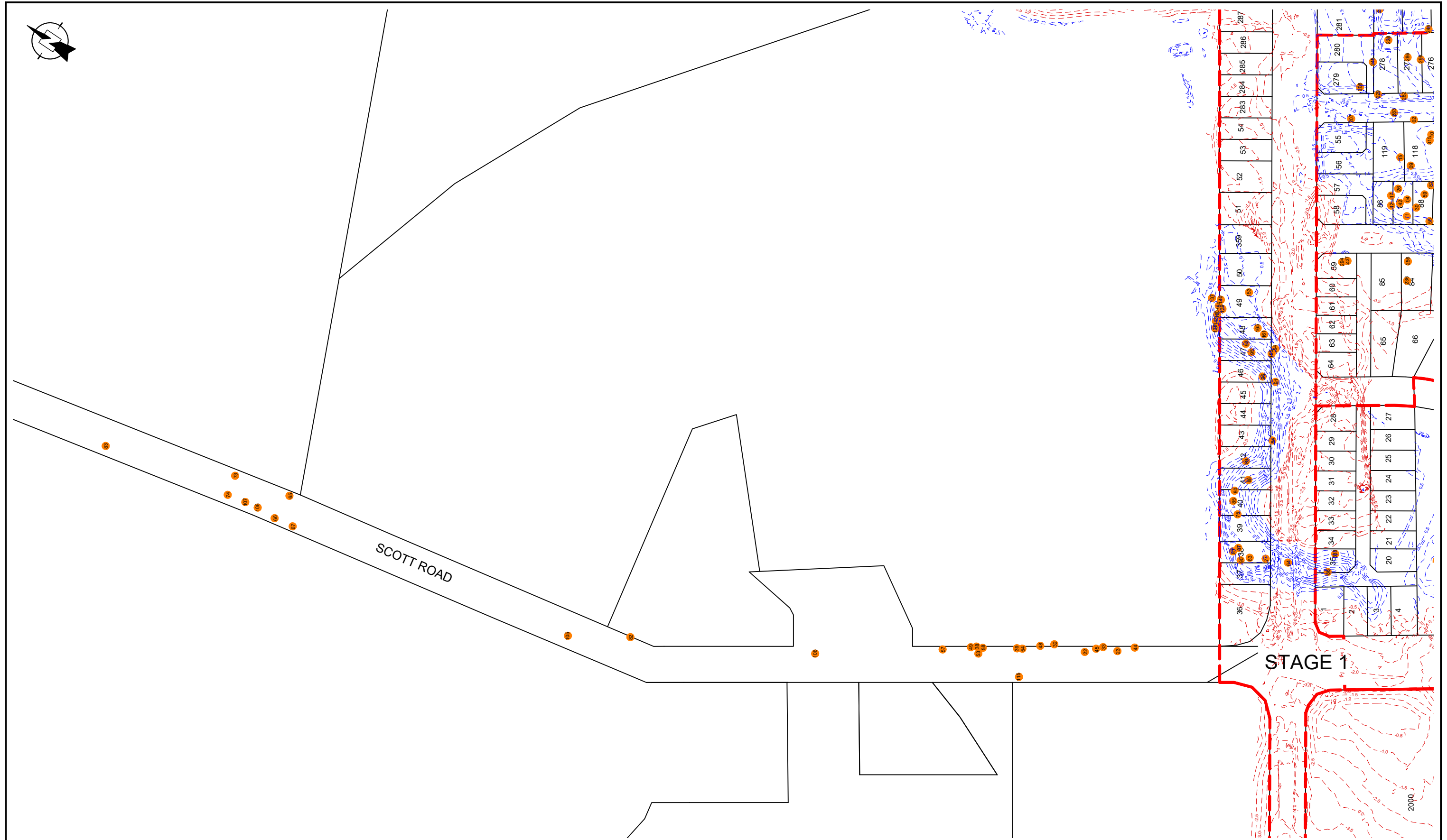


- LEGEND:**
- STAGE BOUNDARY
 - CUT CONTOURS
 - FILL CONTOURS
 - 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION

- NOTES:**
1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
 2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
 3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.
 4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 27.05.19 AND PROVIDED BY CANDOR3. OUTSIDE THESE LOTS CONTOURS DERIVED FROM DRONE SURVEY 17.05.19 AND ARE APPROXIMATE ONLY.
 5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.

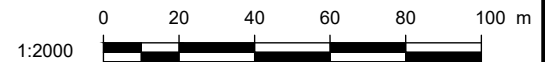


CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN: WPJ	PROJECT No: HAM2018-0106
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED: LYK	DRAWING: 13
TITLE: FILL TEST LOCATION SITE PLAN D	REVISION: 0	SCALE: 1:1000
	DATE: 28.05.19	SHEET: A3 L



- LEGEND:**
- STAGE BOUNDARY
 - CUT CONTOURS
 - FILL CONTOURS
 - 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION

- NOTES:**
1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
 2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 OVERALL REF. 1239 DRAWING NO. 1-200 DATED 23.07.2018.
 3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOUNT EDEN DATUM.
 4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 27.05.19 AND PROVIDED BY CANDOR3. OUTSIDE THESE LOTS CONTOURS DERIVED FROM DRONE SURVEY 17.05.19 AND ARE APPROXIMATE ONLY.
 5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.



	CLIENT:	LAKESIDE DEVELOPMENTS (2017) LTD	
	PROJECT:	LAKESIDE DEVELOPMENT, TE KAUWHATA	
	TITLE:	FILL TEST LOCATION SITE PLAN E	
	DRAWN:	WPJ	PROJECT No: HAM2018-0106
	CHECKED:	LYK	DRAWING: 14
	REVISION:	0	SCALE: 1:2000
	DATE:	28.05.19	SHEET: A3 L

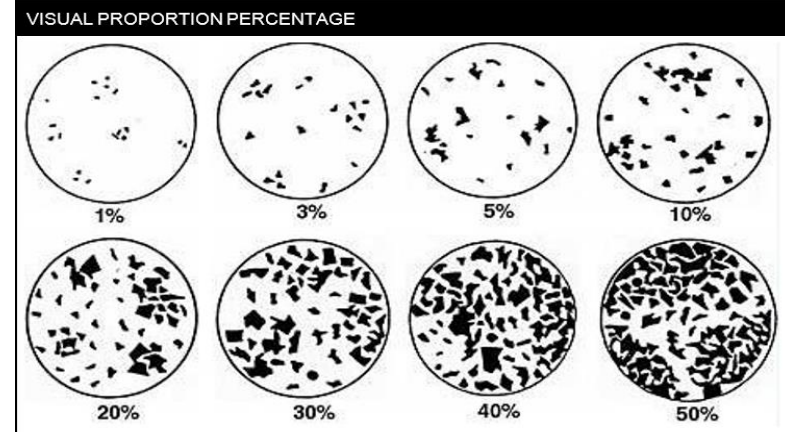
Appendix F: Post-Construction Hand Auger Borehole Logs












SEQUENCE OF TERMS:





Fine: Soil Symbol – Soil Type – Colour – Structure – (Consistency) – (Moisture) – Bedding – Plasticity – Sensitivity – Additional Comments – Origin/Geological Unit
Coarse: Soil Symbol – Soil Type – Colour – Structure – Grading – Particle shape – (Relative Density) – (Moisture) – Bedding – Additional Comments – Origin/Geological Unit

BEHAVIOURAL SOIL CLASSIFICATION SYSTEM				
Major Divisions (behaviour based logging)		Soil Symbol	Soil Name	
Coarse grained soils more than 65% >0.06mm	Gravel >50% of coarse fraction >2mm	Clean gravel <5% smaller 0.075mm	GW	Well graded gravel, fine to coarse gravel
		Gravel with >12% fines	GP	Poorly graded gravel
			GM	Silty gravel
	Sand ≥50% of coarse fraction <2mm	Clean sand	SW	Well-graded sand, fine to coarse sand
		Sand with >12% fines	SP	Poorly graded sand
			SM	Silty sand
Fine grained soils 35% or more <0.06mm	Exhibits dilatant behaviour	inorganic	ML	Silt
			MH	Silt of high plasticity
		organic	OL	Organic silt
	No dilatant behaviour	inorganic	CL	Clay of low plasticity
			CH	Clay of high plasticity
		organic	OH	Organic clay
Highly Organic Soils		Pt	Peat	

PROPORTIONAL TERMS DEFINITION			
Fraction	Term	% of Soil Mass	Example
Major	(...) [UPPER CASE]	≥50 [major constituents]	GRAVEL
Subordinate	(...) [lower case]	20 – 50	Sandy
Minor	with some...	12 – 20	with some sand
	with minor...	5 – 12	with minor sand
	with trace of (or slightly)	< 5	with trace of sand (slightly sandy)



GRAIN SIZE CRITERIA											
TYPE	Boulders	Cobbles	COARSE			FINE			Silt	Clay	ORGANIC
			Gravel	Sand							
Size Range (mm)	200	60	coarse	medium	fine	coarse	medium	fine	0.002		
Graphic Symbol											





ADDITIONAL GRAPHIC LOG SYMBOLS	
Term	Symbol
Topsoil	
Fill	
Bitumen	
Concrete	

ORGANIC SOILS / DESCRIPTORS	
Term	Description
Topsoil	Surficial organic soil layer that may contain living matter. However, topsoil may occur at greater depth, having been buried by geological processes or man-made fill, and should be termed a buried topsoil.
Organic clay, silt or sand	Contains finely divided organic matter; may have distinctive smell; may stain; may oxidize rapidly. Describe as for inorganic soils.
Peat	Consists predominantly of plant remains. Firm: Fibres already compressed together Spongy: Very compressible and open structure Plastic: Can be moulded in hand and smears in fingers Fibrous: Plant remains recognisable and retain some strength Amorphous: No recognisable plant remains
Rootlets	Fine, partly decomposed roots, normally found in the upper part of a soil profile or in a redeposited soil (e.g. colluvium or fill)
Carbonaceous	Discrete particles of hardened (carbonised) plant material.

SHADE AND COLOUR		
1	2	3
light dark mottled streaked	pinkish reddish yellowish brownish greenish bluish greyish	pink red orange yellow brown green blue white grey black

SOIL STRUCTURE	
Term	Description
Homogeneous	The total lack of visible bedding and the same colour and appearance throughout
Bedded	The presence of layers
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Polished	Fracture planes are polished or glossy
Slickensided	Fracture planes are striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensoidal	Discontinuous pockets of a soil within a different soil mass

GRADING (GRAVELS & SANDS)		
Term	Description	
Well Graded	Good representation of all particle size ranges from largest to smallest	
Poorly Graded	Limited representation of grain sizes – further divided into:	
	Uniformly graded	Most particles about the same size
	Gap graded	Absence of one or more intermediate sizes

ROUNDING/PARTICLE SHAPE			
Rounded	Subrounded	Subangular	Angular
			

CONSISTENCY TERMS FOR FINE SOILS			
Descriptive term	Undrained Shear Strength (kPa)	Diagnostic Features	Abbreviation
Very Soft	<12	Easily exudes between fingers when squeezed	VS
Soft	12-25	Easily indented by fingers	S
Firm	25-50	Indented by strong finger pressure and can be indented by thumb pressure	F
Stiff	50-100	Cannot be indented by thumb pressure	St
Very Stiff	100-200	Can be indented by thumb nail	VSt
Hard	200-500	Difficult to indent by thumb nail	H

DENSITY INDEX (RELATIVE DENSITY) TERMS FOR COARSE SOILS				
Descriptive term	Density Index (RD)	SPT "N" value (blows/300mm)	Dynamic Cone (blows/100mm)	Abbreviation
Very Dense	> 85	> 50	> 17	VD
Dense	65 - 85	30 - 50	7 - 17	D
Medium dense	35 - 65	10 - 30	3 - 7	MD
Loose	15 - 35	4 - 10	1 - 3	L
Very loose	< 15	< 4	0 - 2	VL

Note:

- Where strength data cannot be confirmed Loosely Packed (LP) and Tightly Packed (TP) may be used.
- No correlation is implied between Standard Penetration Test (SPT) and Dynamic Cone Penetrometer (Scala) Test values.
- SPT "N" values are uncorrected.

MOISTURE CONDITION					BEDDING THICKNESS (Sedimentary)		BEDDING INCLINATION	
Condition	Description	Coarse Soils	Fine Soils	Abbreviation	Term	Bed Thickness	Term	Inclination (from horizontal)
Dry	Looks and feels dry	Runs freely through hands	Hard, powdery or friable	D	Thinly laminated	< 2mm	Sub-horizontal	0° - 5°
					Laminated	2mm - 6mm	Gently inclined	6° - 15°
Moist	Feels cool, darkened in colour	Tends to cohere	Weakened by moisture, but no free water on hands when remoulding	M	Very thin	6mm - 20mm	Moderately inclined	16° - 30°
					Thin	20mm - 60mm	Steeply inclined	31° - 60°
					Moderately thin	60mm - 200mm	Very steeply inclined	61° - 80°
Wet			Weakened by moisture, free water forms on hands when handling	W	Moderately thick	0.2m - 0.6m	Sub vertical	81° - 90°
					Thick	0.6m - 2m		
					Very thick	> 2m		
Saturated	Feels cool, darkened in colour and free water is present on the sample			S				

PLASTICITY (CLAYS & SILTS)	
Term	Description
High plasticity	Can be moulded or deformed over a wide range of moisture contents without cracking or showing any tendency to volume change
Low plasticity	When moulded can be crumbled in the fingers; may show quick or dilatant behaviour

SENSITIVITY OF SOIL	
Descriptive Term	Shear Strength Ratio = $\frac{\text{undisturbed}}{\text{remoulded}}$
Insensitive, normal	< 2
Moderately sensitive	2 – 4
Sensitive	4 – 8
Extra sensitive	8 – 16
Quick	> 16

BOREHOLE LOG - PCHA 01

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 16/05/2019
 Borehole Location: Stage 1 - Lot 01



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 23.00m		Hole Diameter: 50mm						
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				23.0		OL: Organic SILT: black. Low plasticity. (Topsoil)	W					
		0.3	Peak = 183kPa Residual = 60kPa	22.8		CH: CLAY: grey, mottled orange and brown. High plasticity, moderately sensitive to sensitive. (Whangamarino Formation)	M					
		0.6	Peak = 101kPa Residual = 16kPa									
		0.9	Peak = 123kPa Residual = 11kPa	22.2		CL: Silty CLAY: white, mottled orange and black. Low plasticity, sensitive to extra sensitive; organic odour. (Whangamarino Formation)	W					
		1.2	Peak = 123kPa Residual = 14kPa	22.0		ML: SILT with minor clay and trace sand: light whitish brown, mottled orange. Low plasticity, extra sensitive; sand, fine. (Whangamarino Formation)	W to S			HA		
		1.6	Peak = 128kPa Residual = 36kPa	21.4		ML: SILT with some sand: white. Low plasticity, moderately sensitive; sand, fine. (Whangamarino Formation)						
				21.2		SM: Silty fine SAND: white. Poorly graded; tightly packed. (Whangamarino Formation)						
				2		Borehole terminated at 2.0 m						
				3								
				4								
				5								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 03

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 16/05/2019
 Borehole Location: Stage 1 - Lot 03



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 23.00m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks	
		Depth	Type & Results								RL (m)	5	10		15
				23.0		CL: CLAY: pinkish brown, mottled white. Low plasticity. (Fill)									
		0.3	Peak = UTP												
		0.6	Peak = UTP												
		0.9	Peak = 93kPa Residual = 30kPa	22.2			CH: Silty CLAY with trace sand: blueish grey. High plasticity, moderately sensitive; sand, fine. (Whangamarino Formation)				HA				
		1.2	Peak = 71kPa Residual = 14kPa												
		1.6	Peak = UTP	21.4		SP: Fine SAND with some silt: blueish grey. Poorly graded. (Whangamarino Formation)	W to S					10	13		
						Borehole terminated at 2.0 m									

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 15/16

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 14/05/2019
 Borehole Location: Stage 3 - Lot 15/16 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 21.00m		Hole Diameter: 50mm						
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
		0.3	Peak = UTP	21.0		OL: Organic SILT: black. Low plasticity. (Topsoil)						
				20.8		CL: CLAY: brown mottled grey. Low plasticity. (Fill)	M	H		HA		
				20.4		SP: Fine SAND with minor silt: white. Poorly graded; pumiceous. (Whangamarino Formation)					20	
						Borehole terminated at 0.8 m					22	0.8m: DCP Refusal
				1								
				2								
				3								
				4								
				5								

Termination reason: Hand Auger refusal in dense sand.

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 22/23

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/03/2019
 Borehole Location: Stage 3 - Lot 22/23 Boundary



1:25 Sheet 1 of 1

Logged by: ES		Position:		Elevation: RL 21.50m		Hole Diameter: 50mm						
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
		0.3	Peak = UTP	21.5		OL: Organic SILT with some rootlets: dark brown. Low plasticity. (Topsoil)					9	0.6m: DCP Refusal
				21.4		CL: CLAY with trace sand: dark brown, mottled grey and orange. Low plasticity; sand, fine.	H				6	
				21.2		(Fill) SP: Fine SAND with minor silt: white. Poorly graded; pumiceous. (Whangamarino Formation)	D			HA	5	
						Borehole terminated at 0.7 m						
				1							28	
				2							41	
				3								
				4								
				5								

Termination reason: Hand Auger refusal in dense sand.

Remarks: Groundwater not encountered. Shear vane #2087

BOREHOLE LOG - PCHA 24/25

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/03/2019
 Borehole Location: Stage 3 - Lot 24/25 Boundary



1:25 Sheet 1 of 1

Logged by: ES		Position:		Elevation: RL 20.50m		Hole Diameter: 50mm								
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°								
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks	
		Depth	Type & Results											
				20.5			CL: CLAY with trace sand: brown, mottled orange and black. Low plasticity; sand, fine. (Fill)	D to M	H		HA	6		
				19.9			ML: Fine SAND: light grey. Poorly graded. (Whangamarino Formation)					4		
							Borehole terminated at 0.8 m					20		
												26		0.8m: DCP Refusal
				1										
				2										
				3										
				4										
				5										

Termination reason: Hand Auger refusal in dense sand.

Remarks: Groundwater not encountered.

BOREHOLE LOG - PCHA 28/29

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 31/01/2019
 Borehole Location: Stage 3 - Lot 28/29 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 19.00m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
31-01-2019				19.0			CH: CLAY with minor silt: grey. High plasticity. (Whangamarino Formation)						
		0.3	Peak = UTP				... at 0.30m, contains a lens of silty fine to medium SAND: grey. Poorly graded.						
		0.6	Peak = 191kPa	18.6			ML: SILT with some sand and trace clay: grey. Low plasticity; sand, fine. (Whangamarino Formation)	M	H				
		0.9	Peak = UTP								HA		
				17.8			SP: Medium SAND with some silt: grey. Poorly graded. (Whangamarino Formation)	W	D to VD			13 13 16 15 22 20	
						... at 1.75m, becoming medium to coarse sand.	W...						1.8m: DCP Refusal
						Borehole terminated at 1.8 m							
					2								
					3								
					4								
					5								

Termination reason: No recovery due to hole collapse.

Remarks: Groundwater encountered at 1.85m. Shear vane no. 2560.

BOREHOLE LOG - PCHA 30/31

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 31/01/2019
 Borehole Location: Stage 3 - Lot 30/31 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 20.00m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
		Depth	Type & Results										
				20.0			SP: Fine to medium SAND with minor silt: light grey. Poorly graded. (Whangamarino Formation)					14	0.2m: DCP refusal.
		0.8	Peak = >200kPa Residual = 36kPa	19.2			MH: Clayey SILT: grey. High plasticity, sensitive. (Whangamarino Formation)					25	
		1.0	Peak = UTP	19.0	1		ML: SILT with some sand: grey. Low plasticity; sand, fine. (Whangamarino Formation)	M			HA	8	
												9	
												9	
												10	
												11	
												10	
												13	
												9	
												12	
												14	
					2							15	
												11	
												13	
												14	
												14	
							Borehole terminated at 2.5 m						
					3								
					4								
					5								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 32/33

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 31/01/2019
 Borehole Location: Stage 1 - Lot 32/33 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 21.00m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				21.0			SP: Fine to medium SAND with minor silt: light grey. Poorly graded. (Whangamarino Formation)					11, 18, 22	0.3m: DCP Refusal.
		0.9	Peak = >200kPa Residual = 65kPa	20.2			... at 0.80m, becoming brownish grey, contains some silt. MH: Clayey SILT: grey. High plasticity, moderately sensitive. (Whangamarino Formation)						
		1.1	Peak = UTP	19.9			ML: SILT with some sand and trace clay: grey. Low plasticity; sand, fine. (Whangamarino Formation)					7, 8, 12, 8, 7, 8, 7, 9, 10, 12, 11, 13, 11, 10	
							Borehole terminated at 2.5 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 34/35

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 23/05/2019
 Borehole Location: Stage 1 - Lot 34/35 Boundary



1:25 Sheet 1 of 1

Logged by: LYK/RP		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm										
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°										
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks	
		Depth	Type & Results									5	10	15		
		0.3	Peak = >200kPa	8.0			CH: CLAY with some sand: reddish brown. High plasticity; sand, fine to medium. (Fill)	M	H							
		0.6	Peak = >200kPa													
		0.9	Peak = UTP													
		1.2	Peak = >200kPa									HA				
		1.6	Peak = 129kPa	6.4				MH: Clayey SILT with some sand: grey, mottled orange. High plasticity; sand, fine. (Whangamarino Formation)								
		2.0	Peak = 150kPa Residual = 19kPa	6.3		CH: Silty CLAY: light greyish white. High plasticity, sensitive. (Whangamarino Formation)										
		2.5	Peak = 191kPa Residual = 22kPa	5.9		ML: SILT with some clay: grey, mottled brown. Low plasticity, extra sensitive. (Whangamarino Formation)		W	VSt							
							Borehole terminated at 2.5 m									

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560 & 2532.

BOREHOLE LOG - PCHA 37/38

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/02/2019
 Borehole Location: Stage 1 - Lot 37/38 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 21.50m		Hole Diameter: 50mm						
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				21.5		CH: CLAY with minor silt and trace sand: Brown, mottled grey and yellow. High plasticity; sand, fine to coarse. (Fill)	D					
		0.3	Peak = >200kPa Residual = 114kPa	21.2		ML: SILT with some sand: Grey, mottled orange. Non-plastic; sand, fine. (Fill)	D to M					
		0.6	Peak = UTP	21.0		CH: CLAY with minor silt: Brown, mottled grey and orange, High plasticity. (Fill)	M					
		0.9	Peak = UTP	20.9		ML: Clayey SILT: Dark brown. Low plasticity. (Fill)	D					
		1.2	Peak = UTP	20.8		ML: Clayey SILT: Light yellowish brown, mottled pinkish brown. Low plasticity. (Fill)	H					
		1.5	Peak = >200kPa Residual = 132kPa			CH: CLAY with minor silt: Brown, mottled black. High plasticity. (Fill)				HA		
		1.8	Peak = 123kPa Residual = 80kPa			... at 1.10m, becoming brown mottled pink and light brown.						
		2.1	Peak = 108kPa Residual = 74kPa			... at 1.30m, becoming brown.						
		2.5	Peak = 160kPa Residual = 111kPa			... at 1.70m, becoming yellowish brown	M					
						... at 2.00m, becoming brown	VSt					
						... from 2.30m to 2.40m, becoming mottled pink and dark brown						
						Borehole terminated at 2.5 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1911

BOREHOLE LOG - PCHA 39

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/02/2019
 Borehole Location: Stage 1 - Lot 39



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 20.50m		Hole Diameter: 50mm								
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°								
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results								RL (m)	5	10	
				20.5										
		0.3	Peak = UTP	20.4	[Cross-hatched pattern]	CL: CLAY with some silt and sand: Brown, mottled white. Low plasticity; sand, fine. (Fill)	D							
		0.6	Peak = >200kPa Residual = 142kPa	20.0		CH: CLAY with minor silt: Brown. High plasticity. (Fill)	H							
		0.9	Peak = 163kPa Residual = 80kPa	19.8		... from 0.40m to 0.45m, contains minor subangular to angular medium gravel.; CH: CLAY with minor silt trace rootlets: Yellowish brown mottled dark brown. High plasticity. insensitive. (Fill)								
		1.2	Peak = 154kPa Residual = 92kPa	1		CH: CLAY with minor silt: Brown. High plasticity. (Fill)	M			HA				
		1.5	Peak = 163kPa Residual = 92kPa											
		2.0	Peak = >200kPa Residual = 95kPa	2		Borehole terminated at 2.0 m	VSt							
				3										
				4										
				5										

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1911.

BOREHOLE LOG - PCHA 40

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/02/2019
 Borehole Location: Stage 1 - Lot 40



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 20.00m		Hole Diameter: 50mm									
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				20.0			CH: CLAY with minor silt and sand: Brown, mottled grey, pink and dark brown. High plasticity; sand, fine. (Fill)								
		0.3	Peak = UTP	19.8			CH: CLAY with some silt and minor gravel: Dark brown mottled brown. High plasticity; gravel, medium, angular. (Fill)	D to M							
		0.6	Peak = >200kPa Residual = 129kPa	19.5			CH: CLAY with minor silt: Yellowish brown. High plasticity. (Fill)								
		0.9	Peak = 135kPa Residual = 80kPa				... from 0.70m to 0.80m, becoming mottled pink.								
		1.2	Peak = 169kPa Residual = 89kPa				... from 0.80m to 0.85m, becoming mottled dark brown.								
		1.5	Peak = 145kPa Residual = 74kPa					M	VSt		HA				
		2.0	Peak = 126kPa Residual = 71kPa				... from 1.80m to 2.00m, becoming mottled grey.								
							Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1911.

BOREHOLE LOG - PCHA 41/42

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 01/03/2019
 Borehole Location: Stage 1 - Lot 41/42 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 19.50m		Hole Diameter: 50mm						
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				19.5								
		0.3	Peak = UTP	19.4	[Cross-hatched pattern]	CL: CLAY with some silt and fine sand: white, mottled brown and pink. Low plasticity; sand, fine. (Fill)	D	H				
						CH: CLAY with minor silt: brown, mottled pink, dark brown and yellowish brown. High plasticity. (Fill)						
		0.6	Peak = >200kPa Residual = 142kPa	19.0	[Cross-hatched pattern]	CH: CLAY with minor silt: dark brown. High plasticity. (Fill)						
				19.0		CH: CLAY with minor silt: brown, streaked dark brown. High plasticity. (Fill)						
		0.9	Peak = UTP	18.7	[Cross-hatched pattern]	CH: CLAY with minor silt: brown. High plasticity. (Fill)						
						CH: CLAY with minor silt: brown. High plasticity. (Fill)						
		1.2	Peak = 185kPa Residual = 105kPa	1	[Cross-hatched pattern]	... from 1.30m to 1.45m, becoming light brown.	M					
		1.5	Peak = 182kPa Residual = 102kPa		[Cross-hatched pattern]							
		1.8	Peak = 145kPa Residual = 74kPa		[Cross-hatched pattern]							
		2.2	Peak = 108kPa Residual = 77kPa	17.5	[Cross-hatched pattern]	MH: SILT with minor clay and sand: white. High plasticity; sand, fine. (Whangamarino Formation)						
						Borehole terminated at 2.2 m						
				3								
				4								
				5								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1911.

BOREHOLE LOG - PCHA 43/44

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 01/03/2019
 Borehole Location: Stage 1 - Lot 43/44 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 19.00m		Hole Diameter: 50mm								
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°								
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks	
		Depth	Type & Results											5
		0.3	Peak = 86kPa Residual = 42kPa	19.0			CH: CLAY with minor silt and trace rootlets: grey, streaked brown and yellow. High plasticity, moderately sensitive. (Whangamarino Formation)	D to M	St					
		0.6	Peak = 126kPa Residual = 25kPa	18.4			... from 0.40m to 0.80m, contains some silt. CH: CLAY with some silt and sand: grey, streaked brown. High plasticity, sensitive; sand, fine to medium. (Whangamarino Formation)	M to W	VSt		HA			
		0.9	Peak = 92kPa Residual = 15kPa	18.2			ML: SILT with some sand and minor clay: grey, mottled yellow. Low plasticity, sensitive; sand, fine to medium. (Whangamarino Formation)	W	St					
		1.2	Peak = 92kPa Residual = 22kPa	17.9			MH: SILT with some sand and trace clay: grey. Low plasticity, sensitive; sand, fine to medium. (Whangamarino Formation)	W to S						
				17.7			ML: Sandy SILT: white. Non plastic; sand, fine. (Whangamarino Formation)	M	H			20		1.4m: DCP Refusal
							Borehole terminated at 1.4 m							

Termination reason: Hand Auger Refusal in dense sandy silt.

Remarks: Groundwater not encountered. Shear vane no. 1911

BOREHOLE LOG - PCHA 45/46

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 01/03/2019
 Borehole Location: Stage 1 - Lot 45/46 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 18.00m		Hole Diameter: 50mm								
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°								
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks	
		Depth	Type & Results											
				18.0			ML: Sandy SILT: white, mottled yellow. Non plastic; sand, fine (Whangamarino Formation)	D to M						
		0.3	Peak = UTP	17.7			ML: SILT with some clay and minor sand: grey. Low plasticity; sand, fine. (Whangamarino Formation)	H						
		0.6	Peak = UTP	17.4			ML: Sandy SILT: grey, mottled yellow. Non plastic; sand, fine. (Whangamarino Formation)							
		0.9	Peak = UTP				... from 0.90m to 1.10m, contains a lens of SILT with some fine sand and minor clay.	M						
		1.2	Peak = UTP								HA			
		1.5	Peak = 166kPa Residual = 31kPa	16.4			MH: SILT with some clay: grey, mottled yellow. High plasticity, sensitive. (Whangamarino Formation)	VSt						
							SW: Fine to medium SAND with minor silt: grey. Well graded. (Whangamarino Formation)	M to W				8		
							... from 1.85m to 2.40m, becoming mottled orange.							
													16	
													15	
												15		
												16		
												14		
												13		
												14		
												14		

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1911

BOREHOLE LOG - PCHA 47/48

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 12/03/2019
 Borehole Location: Stage 1 - Lot 47/48 Boundary



1:25 Sheet 1 of 1

Logged by: DMM		Position:		Elevation: RL 17.00m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				17.0			CH: Silty CLAY: light brown, mottled dark orange. High plasticity. (Fill)	D					
		0.3	Peak = UTP										
		0.5	Peak = UTP	16.5			CH: CLAY: grey, streaked red. High plasticity. (Fill)	M					
		0.7	Peak = UTP	16.4			CH: CLAY with some silt: brown, streaked black. High plasticity. (Fill)	D					
		0.9	Peak = UTP	16.1			CH: Silty CLAY: brown, streaked orange. High plasticity. (Fill)						
		1.2	Peak = UTP								HA		
		1.4	Peak = 151kPa Residual = 79kPa										
		1.7	Peak = 189kPa Residual = 73kPa					M	VSt to H				
		2.0	Peak = 177kPa Residual = 102kPa										
		2.4	Peak = 186kPa Residual = 116kPa										
		Borehole terminated at 2.4 m											

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349

BOREHOLE LOG - PCHA 49

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 12/03/2019
 Borehole Location: Stage 1 - Lot 49



1:25 Sheet 1 of 1

Logged by: DMM		Position:		Elevation: RL 16.00m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				16.0			CH: Silty CLAY: reddish brown. High plasticity. (Fill)						
		0.3	Peak = UTP				... from 0.30m to 1.00m, becoming brown.						
		0.6	Peak = UTP					D to M	H				
		0.9	Peak = >200kPa										
				15.0	1		CH: Silty CLAY: light brown. High plasticity. (Volcanic Ash)				HA		
		1.2	Peak = UTP										
				14.7			CH: Silty CLAY: grey, streaked orange. High plasticity, sensitive. (Whangamarino Formation)						
		1.5	Peak = 177kPa Residual = 44kPa					M	VSt to H				
		1.8	Peak = 189kPa Residual = 32kPa										
		2.0	Peak = >200kPa										
					2		Borehole terminated at 2.0 m						
					3								
					4								
					5								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 50

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 12/03/2019
 Borehole Location: Stage 1 - Lot 50



1:25 Sheet 1 of 1

Logged by: DMM		Position:		Elevation: RL 15.00m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
		0.3	Peak = UTP	15.0			CH: Silty CLAY: brown, streaked orange. High plasticity, moderately sensitive. (Fill) ... from 0.30m to 1.00m, becoming dark brown.	D	H				
		0.6	Peak = >200kPa Residual = 81kPa										
		0.9	Peak = >200kPa Residual = 87kPa										
		1.2	Peak = 137kPa Residual = 41kPa	14.0	1		CH: Silty CLAY: grey, mottled dark brown. High plasticity, moderately sensitive to sensitive. (Volcanic Ash)	M	VSt		HA		
		1.5	Peak = 148kPa Residual = 26kPa										
		1.8	Peak = 137kPa Residual = 26kPa										
		2.0	Peak = 131kPa Residual = 26kPa		2		Borehole terminated at 2.0 m						
					3								
					4								
					5								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 51

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 12/03/2019
 Borehole Location: Stage 1 - Lot 51



1:25 Sheet 1 of 1

Logged by: ES		Position:		Elevation: RL 14.00m		Hole Diameter: 50mm						
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
		0.3	Peak = 152kPa Residual = 34kPa	14.0	[Graphic Log]	CH: CLAY with trace silt: Yellowish brown, mottled. High plasticity, sensitive. (Whangamarino Formation)						
		0.7	Peak = 133kPa Residual = 46kPa	13.6	[Graphic Log]	CH: CLAY with trace sand: Yellowish brown, mottled grey and black. High plasticity, moderately sensitive. (Whangamarino Formation)	D to M					
		0.9	Peak = 173kPa Residual = 46kPa	13.2	[Graphic Log]	CH: CLAY with trace sand: Yellowish grey. High plasticity, moderately sensitive. (Whangamarino Formation)		VSt				
		1.2	Peak = 115kPa Residual = 15kPa	13.0	[Graphic Log]	ML: Clayey SILT with trace sand: Yellowish black mottled with grey. Low plasticity. (Whangamarino Formation)				HA		
		1.4	Peak = UTP	12.9	[Graphic Log]	CH: Sandy CLAY: Yellowish brown mottled grey. High plasticity, sensitive. (Whangamarino Formation)						
		1.9	Peak = UTP	12.6	[Graphic Log]	CH: Silty CLAY with trace sand: Black mottled yellow. High plasticity. (Whangamarino Formation)	M to W		H			
				12.3	[Graphic Log]	LIGNITE: Black. (Whangamarino Formation)						
				12.3	[Graphic Log]	SM: Silty fine SAND: Grey. Poorly graded, sub rounded; tightly packed. (Whangamarino Formation)						
				12.1	[Graphic Log]	LIGNITE: Black. (Whangamarino Formation)	W		H			
				2.0	[Graphic Log]	Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2087.

BOREHOLE LOG - PCHA 52

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 12/03/2019
 Borehole Location: Stage 1 - Lot 52



1:25 Sheet 1 of 1

Logged by: ES		Position:		Elevation: RL 13.00m		Hole Diameter: 50mm						
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				13.0		CH: CLAY with trace silt: Yellowish brown, mottled grey. High plasticity. (Whangamarino Formation)						
		0.3	Peak = >200kPa Residual = 80kPa	12.7		CH: CLAY with trace silt: Grey, mottled yellowish brown. High plasticity, moderately sensitive. (Whangamarino Formation)	D to M					
		0.6	Peak = 139kPa Residual = 25kPa	12.6		CH: CLAY with trace silt: Yellowish grey. High plasticity, sensitive. (Whangamarino Formation)						
		0.9	Peak = 186kPa Residual = 19kPa	12.2		CH: CLAY: Yellowish brown, mottled grey and brown. High plasticity, extra sensitive. (Whangamarino Formation)						
		1.2	Peak = 68kPa Residual = 22kPa	12.0	1	CL: CLAY with trace sand: Brownish yellow. Low plasticity; sand, fine. (Whangamarino Formation)	M			HA		
				11.9		ML: Clayey SILT with sand: Dark grey mottled black. Low plasticity, moderately sensitive. (Whangamarino Formation)	M to W					
				11.7		SP: Clayey fine to medium SAND trace silt: Dark grey mottled light grey. Poorly graded. (Whangamarino Formation)						
				11.5		LIGNITE: Black. (Whangamarino Formation)	W					
		1.8	Peak = >200kPa Residual = 31kPa	11.2		MH: Sandy SILT with trace clay: Dark grey. High plasticity, sensitive; sand, fine to medium. (Whangamarino Formation)	S					
				11.0		Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater encountered at 1.7m. Shear vane no. 2087

BOREHOLE LOG - PCHA 53/54

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 12/03/2019
 Borehole Location: Stage 1 - Lot 53/54 Boundary



1:25 Sheet 1 of 1

Logged by: ES		Position:		Elevation: RL 12.50m		Hole Diameter: 50mm									
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
		0.3	Peak = 90kPa Residual = 31kPa	12.5			CH: Silty CLAY: Yellowish brown, mottled grey. High plasticity, moderately sensitive to sensitive. (Whangamarino Formation)								
		0.6	Peak = 152kPa Residual = 19kPa				... at 0.40m, contains minor fine sand.	D to M							
		0.9	Peak = 183kPa Residual = 31kPa				... at 0.60m, becoming mottled orange.								
		1.8	Peak = 146kPa Residual = 40kPa	11.5	1		SM: Silty SAND with clay: dark grey. Poorly graded. (Whangamarino Formation)	M			HA				
				11.3			LIGNITE: Black. (Whangamarino Formation)	D to M							
				10.7			CH: CLAY: blueish grey. High plasticity, moderately sensitive. (Whangamarino Formation)	M to W							
					2		Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2087.

BOREHOLE LOG - PCHA 58

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 24/04/2019
 Borehole Location: Stage 2 - Lot 58



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 14.50m		Hole Diameter: 50mm							
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
		0.3	Peak = UTP	14.5			ML: Clayey SILT with minor fine to coarse sand: Light grey, mottled brown, grey. Low plasticity. (Fill)	M	H				
		0.6	Peak = UTP										
		0.9	Peak = UTP										
		1.2	Peak = UTP	13.5	1		CL: CLAY: Brown, mottled grey. Low plasticity. (Fill)				HA		
		1.6	Peak = 87kPa Residual = 40kPa	13.1			ML: Clayey SILT with minor sand: Brown. Low plasticity, moderately sensitive; sand, fine. (Volcanic Ash)			St			
		2.0	Peak = 155kPa Residual = 53kPa	12.7	2		CH: Silty CLAY: Grey, mottled orange. High plasticity, moderately sensitive. (Whangamarino Formation)	W		VSt			
		2.4	Peak = 198kPa Residual = 62kPa				Borehole terminated at 2.4 m						
					3								
					4								
					5								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2087.

BOREHOLE LOG - PCHA 59/60

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 21/03/2019
 Borehole Location: Stage 2 - Lot 59/60 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 16.00m		Hole Diameter: 50mm						
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				16.0		CH: CLAY with minor silt: Yellow streaked white. High plasticity. (Whangamarino Formation)					9	
		0.3	Peak = UTP								7	
				15.4		SP: Fine to medium SAND with some silt and minor clay: Grey, mottled yellow. Poorly graded. (Whangamarino Formation)	D to M				6	
		0.6	Peak = UTP	15.3		MH: Clayey SILT with trace fine sand: Grey, streaked yellow. High plasticity. (Whangamarino Formation)		H			7	
				15.0		SP: Fine to medium SAND with some silt minor clay: Grey. Poorly graded. (Whangamarino Formation)				HA	7	
		0.9	Peak = UTP	14.9		CH: CLAY with minor silt: Light whitish grey, mottled yellow. High plasticity. (Whangamarino Formation)					9	
				14.4		ML: Sandy SILT: Light grey, mottled yellow. Low plasticity, sensitive; sand, fine. (Whangamarino Formation)	M				5	
		1.2	Peak = UTP	14.4							5	
				14.4							8	
		1.5	Peak = 170kPa Residual = 41kPa	14.4							6	
				14.2		ML: SILT with minor clay and trace sand: Grey, mottled greenish yellow. Low plasticity; sand, fine. (Whangamarino Formation)					7	
		1.8	Peak = UTP	14.2				VSt			9	
				14.2							12	
				14.2				H			11	
				14.2							14	
				14.2		Borehole terminated at 2.0 m					10	
				14.2							9	
				14.2							9	
				14.2							9	

Termination reason: Hand Auger Refusal on hard silt.

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 61/62

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 21/03/2019
 Borehole Location: Stage 2 - Lot 61/62 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 17.00m		Hole Diameter: 50mm						
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				17.0		SW: Fine to coarse SAND with minor silt: Brown. Well graded; silt, yellow, non plastic (Whangamarino Formation)	M	L			2	
		0.3	Peak = 55kPa Residual = 14kPa	16.8		ML: SILT with trace to minor sand: Greenish yellow. Non plastic; sand, fine to medium. (Whangamarino Formation)	M to W	St			2	
		0.6	Peak = UTP	16.6		ML: SILT with minor clay: Light greyish white. Non plastic, moderately sensitive. (Whangamarino Formation)					5	
		0.9	Peak = UTP			SM: Silty fine SAND: Whitish light grey, streaked greenish yellow. Poorly graded. (Whangamarino Formation) ... from 0.65m to 0.80m, contains a lens of light grey silt.		MD to D		HA	9	
											8	
											5	
											8	
				1							17	
											18	
											20	
											18	
											24	
						Borehole terminated at 1.5 m						1.5m: DCP bouncing
				2								
				3								
				4								
				5								

Termination reason: Hand Auger Refusal on dense sands

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 63/64

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 21/03/2019
 Borehole Location: Stage 2 - Lot 63/64 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 18.00m		Hole Diameter: 50mm						
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				18.0		SW: Fine to medium SAND with minor silt: Light grey. Well graded. (Whangamarino Formation)	D to...				2	
				17.9							3	
				17.8		SW: Fine to coarse SAND with some silt and minor clay: Light greyish yellow. Well graded. (Whangamarino Formation)					2	
				17.6		SP: Fine SAND with some silt: Light grey. Poorly graded. (Whangamarino Formation)	M to W				1	
						SM: Silty fine to medium SAND: Light greyish white. Poorly graded. (Whangamarino Formation)					3	
						... at 0.60m, contains fine to coarse SAND	VL to L				3	
							W				2	
											2	
											2	
						... at 1.00m, contains light brown SILT with minor clay					2	
				16.9		ML: SILT with minor clay: Light greenish brown. Low plasticity. (Whangamarino Formation)	M to W			HA	2	
				16.8		OL: Organic SILT with trace roots: Non plastic, organic odor. (Whangamarino Formation)	W		S			
		1.5	Peak = 104kPa Residual = 14kPa	16.6		ML: SILT with minor clay: Brown. Low plasticity, sensitive. (Whangamarino Formation)						
		1.8	Peak = UTP									
		2.1	Peak = UTP									
		2.3	Peak = UTP				M to W	VSt to H				
Borehole terminated at 2.3 m												
1.2m: Shear vane fell through												

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 63A

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 10/04/2019
 Borehole Location: Stage 1 - Lot 63



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 17.50m		Hole Diameter: 50mm							
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
		0.3	Peak = 123kPa Residual = 9kPa	17.5	0.3	[X pattern]	ML: Sandy SILT: light grey. Low plasticity, extra sensitive; sand, fine to coarse. (Whangamarino Formation)	W	VSt to H		HA		
		0.6	Peak = UTP	17.0	0.6	[Dotted pattern]	SW: Fine to coarse SAND with some silt: grey. Well graded; tightly packed. (Whangamarino Formation)						
		0.9	Peak = 41kPa Residual = 6kPa	16.7	0.9	[X pattern]	ML: Clayey SILT: grey. Low plasticity, sensitive. (Whangamarino Formation)	W to S	F				
		1.2	Peak = 178kPa Residual = 20kPa	16.3	1.2	[X pattern]	ML: SILT with trace sand: grey, mottled brown. Low plasticity. (Whangamarino Formation)	M	VSt to H				
		1.4	Peak = UTP		1.4	[X pattern]							
		1.6	Peak = UTP		1.6	[X pattern]							
		2.0	Peak = UTP		2.0	[X pattern]	Borehole terminated at 2.0 m						
					3	[Scale]							
					4	[Scale]							
					5	[Scale]							

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 63B

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 10/05/2019
 Borehole Location: Stage 1 - Lot 63



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 17.50m		Hole Diameter: 50mm							
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				17.5			SW: Fine to coarse SAND with some silt: white. Well graded. (Whangamarino Formation)					4	
		0.6	Peak = UTP	17.1			ML: Clayey SILT with some gravel: grey. Low plasticity; gravel, fine. (Whangamarino Formation)	W				7 8 8	
		0.9	Peak = UTP	16.7			GP: Fine GRAVEL with some silt and minor sand: grey. Poorly graded; sub angular; sand, fine. (Whangamarino Formation)				HA	4 3 5 7 8	
				16.3			SP: Fine SAND with some silt: brown. Poorly graded. (Whangamarino Formation)	W to S				3 4 5	
				16.2			ML: SILT: grey, mottled brown. Low plasticity. (Whangamarino Formation)					7 8	
							Borehole terminated at 1.4 m					16	

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 64A

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 10/04/2019
 Borehole Location: Stage 1 - Lot 64



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 18.00m		Hole Diameter: 50mm							
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
		0.3	Peak = UTP	18.0		[Symbol]	SM: Silty fine SAND: white. Poorly graded. (Whangamarino Formation)					4	
				17.5		[Symbol]	SP: Fine to medium SAND with minor silt and trace gravel: grey, mottled white. Poorly graded; gravel, fine. (Whangamarino Formation)		MD		HA	6	
				1		[Symbol]	... at 1.00m, becoming mottled brown.					7	
				16.8		[Symbol]	ML: Clayey SILT: grey. Low plasticity. (Whangamarino Formation)					6	
		1.6	Peak = UTP	16.6		[Symbol]	ML: SILT: grey. Low plasticity. (Whangamarino Formation)		H			4	
							Borehole terminated at 1.6 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349

BOREHOLE LOG - PCHA 84

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/03/2019
 Borehole Location: Stage 2 - Lot 84



1:25 Sheet 1 of 1

Logged by: ES		Position:		Elevation: RL 17.00m		Hole Diameter: 50mm									
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				17.0			ML: Clayey SILT with trace sand: Light brown, mottled orange, grey. Low plasticity; sand, fine to coarse. (Fill)	D							
		0.4	Peak = 186kPa Residual = 31kPa												
		0.8	Peak = 167kPa Residual = 28kPa	16.3			ML: SILT with some sand: Light brown, mottled black, grey. Low plasticity; sand, fine to medium. (Fill)								
		1.1	Peak = 158kPa Residual = 40kPa		1			D to M	VSt		HA				
		1.4	Peak = 130kPa Residual = 31kPa												
		1.8	Peak = 133kPa Residual = 37kPa	15.4			MH: Clayey SILT with trace fine sand: Light yellowish brown, mottled brown and yellow. High plasticity. (Fill)	M							
					2		Borehole terminated at 2.0 m								
					3										
					4										
					5										

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2087.

BOREHOLE LOG - PCHA 86/87

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 24/04/2019
 Borehole Location: Stage 2 - Lot 86/87 Boundary



1:25 Sheet 1 of 1

Logged by: AS		Position:		Elevation: RL 16.00m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				16.0			ML: SILT with trace clay : Greyish brown. Low plasticity, sensitive. (Fill)	D					
		0.3	Peak = >200kPa Residual = 46kPa				... at 0.40m, contains minor clay and trace fine sand. Becoming brown, mottled grey.	D to...					
		0.6	Peak = UTP	15.5			ML: SILT with some sand and trace clay: Grey. Low plasticity, sensitive; sand, medium to coarse. (Fill)						
		0.9	Peak = >200kPa Residual = 56kPa	15.4			CL: Silty CLAY with trace sand: Grey mottled brown. Low plasticity; sand, medium to coarse. (Fill)	H					
		1.2	Peak = UTP				... at 0.60m, becoming silty CLAY with trace sand: brown, grey ... at 0.85m, contains minor sand.						
		1.5	Peak = >200kPa Residual = 83kPa	14.8			ML: Sandy SILT: Grey. Low plasticity; sand, fine to coarse. (Fill)	M			HA		
		1.8	Peak = 152kPa Residual = 50kPa	14.6			CH: Silty CLAY: Light brown, mottled dark brown. High plasticity. (Fill)						
		2.1	Peak = >200kPa Residual = 112kPa	14.5			ML: SILT with minor sand and clay: Grey, mottled light brown. Low plasticity, moderately sensitive; sand, fine to coarse. (Fill)	VSt					
		2.4	Peak = UTP	14.3			CL: CLAY with minor sand: Brown, mottled grey. Low plasticity, moderately sensitive; sand, fine to coarse. (Fill)						
				14.0			ML: Sandy SILT: Grey. Low plasticity, moderately sensitive; sand, fine (Fill)	H					
							... at 2.20m, contains trace inclusions of brown clay.						
							Borehole terminated at 2.4 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785.

BOREHOLE LOG - PCHA 88/89

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 01/05/2019
 Borehole Location: Stage 2 - Lot 88/89 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 16.50m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				16.5			CL: CLAY : Brown, mottled orange. Low plasticity. (Fill)								
		0.3	Peak = 192kPa	16.3			ML: Clayey SILT with minor sand: Grey, mottled white and orange. Low plasticity; sand, fine to coarse. (Fill)								
		0.6	Peak = UTP												
		0.9	Peak = UTP												
		1.2	Peak = UTP					M		VSt to H					
		1.6	Peak = UTP	15.1			CL: CLAY : Brown, mottled orange, white and dark brown. Low plasticity. (Fill)								
		2.0	Peak = 164kPa				... at 1.80m, becoming light brown, mottled white								
							Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2087

BOREHOLE LOG - PCHA 90

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 01/05/2019
 Borehole Location: Stage 2 - Lot 90



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 16.50m		Hole Diameter: 50mm										
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°										
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks	
		Depth	Type & Results									5	10	15		
				16.5			CL: CLAY: Brown, mottled grey. Low plasticity. (Fill)									
		0.3	Peak = UTP	16.2			ML: Clayey SILT with minor sand: Grey, mottled white and brown. Low plasticity; sand, fine to coarse. (Fill) ... from 1.30m to 1.50m, becoming mottled dark brown and grey	M	H	HA						
		0.4	Peak = 140kPa													
		0.6	Peak = UTP													
		0.9	Peak = UTP													
		1.2	Peak = UTP													
		1.6	Peak = UTP													
		2.0	Peak = UTP	2			Borehole terminated at 2.0 m									
					3											
					4											
					5											

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2087.

BOREHOLE LOG - PCHA 91

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 01/05/2019
 Borehole Location: Stage 2 - Lot 91



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 17.00m		Hole Diameter: 50mm									
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				17.0			CL: CLAY: Brown, mottled white and orange. Low plasticity. (Fill)								
		0.3	Peak = 139kPa	16.8			ML: Clayey SILT with minor sand: Grey, mottled brown. Low plasticity; sand, fine to coarse. (Fill)								
		0.6	Peak = UTP												
		0.9	Peak = UTP												
		1.2	Peak = UTP												
		1.6	Peak = UTP				... from 1.60m to 1.90m, contains a 300mm thick lens of white fine to coarse SAND with some silt								
		2.0	Peak = UTP				Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2087.

BOREHOLE LOG - PCHA 92/93

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 24/05/2019
 Borehole Location: Stage 2 - Lot 92/93 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 17.50m		Hole Diameter: 50mm							
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				17.5			CH: Silty CLAY: light greyish brown. High plasticity. (Whangamarino Formation)	M					
		0.3	Peak = 191kPa										
		0.6	Peak = 186kPa Residual = 36kPa	16.9			MH: Clayey SILT: light brown, mottled grey. High plasticity, sensitive. (Whangamarino Formation)						
		0.9	Peak = 191kPa Residual = 36kPa	16.6			ML: Clayey SILT with minor sand: light brown, mottled green. Low plasticity, sensitive; sand, fine to coarse. (Whangamarino Formation)		VSt to H		HA		
		1.2	Peak = 191kPa										
		1.6	Peak = 191kPa				... from 1.50m to 1.60m, contains a lens of brown SILT with some sand.						
		2.0	Peak = UTP	15.8			ML: SILT with minor sand: light grey. Non plastic; sand, fine. (Whangamarino Formation)			H			
							Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 96/97

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 24/05/2019
 Borehole Location: Stage 2 - Lot 96/97 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 17.50m		Hole Diameter: 50mm							
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				17.5			SP: Fine SAND with some silt: light grey. Poorly graded (Whangamarino Formation)						
							... from 0.50m to 0.60m, contains a lens of silty sand.		M	D to VD			
							... at 0.60m, contains minor silt.						
				16.4			ML: SILT with some sand: light grey. Low plasticity; sand, fine. (Whangamarino Formation)		W				
		1.4	Peak = UTP	16.1			SP: Fine SAND with some silt: light grey. Poorly graded. (Whangamarino Formation)		M	D			
		1.5	Peak = UTP	15.7			SM: Silty fine SAND: light grey. Poorly graded. (Whangamarino Formation)		W				
							Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 116

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 06/05/2019
 Borehole Location: Stage 2 - Lot 116



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 13.50m		Hole Diameter: 50mm										
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°										
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks	
		Depth	Type & Results									5	10	15		
				13.5			CL: CLAY: Brown, mottled pink and grey. Low plasticity. (Fill)	D								
		0.3	Peak = UTP						H							
		0.6	Peak = UTP				... at 0.50m, becoming dark brown	M								
		1.0	Peak = UTP	12.8			ML: Clayey SILT with minor sand: Greyish brown. Low plasticity; sand; fine; contains trace 0 - 100mm lenses of fine sand. (Fill)				HA					
		1.2	Peak = UTP													
		1.6	Peak = 152kPa						W	VSt to H						
		2.0	Peak = UTP													
Borehole terminated at 2.0 m																

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 117

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 06/05/2019
 Borehole Location: Stage 2 - Lot 117



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 13.50m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				13.5			CL: CLAY: Dark brown, mottled grey. Low plasticity. (Fill)	D							
		0.3	Peak = UTP				... from 0.40m to 0.60m, contains a 200mm thick lens of fine sand	H							
		0.6	Peak = UTP												
		0.9	Peak = UTP	12.8				ML: Clayey SILT with minor sand: Greyish brown, mottled grey and brown. Low plasticity; sand, fine; contains trace 0 - 100mm thick lenses of sand. (Fill)	M			HA			
		1.2	Peak = UTP												
		1.6	Peak = >200kPa						VSt to H						
		2.0	Peak = 169kPa						W						
Borehole terminated at 2.0 m															

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 118

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 06/05/2019
 Borehole Location: Stage 2 - Lot 118



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 13.00m		Hole Diameter: 50mm							
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				13.0			CL: CLAY: Brown, mottled orange. Low plasticity. (Fill)	D					
		0.3	Peak = UTP						H				
		0.6	Peak = UTP				... from 0.50m to 0.60m, contains a 100 mm thick lens of fine sand	M					
		0.9	Peak = 181kPa	12.2			CL: Silty CLAY: Brown, mottled grey. Low plasticity. (Fill)				HA		
		1.2	Peak = UTP										
		1.6	Peak = UTP	11.6			ML: Clayey SILT with minor fine sand: Greyish brown. Low plasticity. (Fill)	W	VSt to H				
		2.0	Peak = 131kPa				Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 267

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 01/05/2019
 Borehole Location: Stage 1 - Lot 267



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				9.0			CL: CLAY: brown, mottled orange and white. Low plasticity. (Fill)								
		0.3	Peak = >200kPa												
		0.6	Peak = UTP												
		0.9	Peak = UTP												
		1.2	Peak = UTP												
		1.6	Peak = UTP												
		2.0	Peak = UTP												
		Borehole terminated at 2.0 m													

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2087.

BOREHOLE LOG - PCHA 268

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 03/05/2019
 Borehole Location: Stage 1 - Lot 268



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				9.0			CL: CLAY: brown, mottled orange and white. Low plasticity. (Fill)								
		0.3	Peak = 146kPa							VSt					
		0.6	Peak = 160kPa												
		0.9	Peak = >200kPa					M			HA				
		1.2	Peak = UTP							H					
		1.6	Peak = UTP												
		2.0	Peak = UTP												
							Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785 & 2349.

BOREHOLE LOG - PCHA 270

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 03/05/2019
 Borehole Location: Stage 1 - Lot 270



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				9.0		CL: CLAY: brown, mottled orange and grey. Low plasticity. (Fill) ... at 0.90m, becoming brown mottled pink and white.									
		0.3	Peak = >200kPa					M							
		0.6	Peak = UTP												
		1.0	Peak = 175kPa		1			W	VSt to H		HA				
		1.2	Peak = UTP												
		1.6	Peak = UTP					M							
		2.0	Peak = UTP		2	Borehole terminated at 2.0 m									
					3										
					4										
					5										

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785 & 2349.

BOREHOLE LOG - PCHA 274

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 06/05/2019
 Borehole Location: Stage 2 - Lot 274



1:25 Sheet 1 of 1

Logged by: AS		Position:		Elevation: RL 12.50m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				12.5			CH: CLAY: light brown, mottled reddish brown to white. High plasticity. (Fill)								
		0.3	Peak = UTP					D							
		0.6	Peak = UTP				... at 0.60m, becoming brown.		H						
		0.9	Peak = UTP												
		1.2	Peak = 137kPa				... at 1.20m, becoming light pinkish brown mottled brown.								
		1.5	Peak = 152kPa					D to M							
		1.8	Peak = 140kPa	10.7			CH: CLAY with minor silt: light grey, mottled light brown. High plasticity. (Fill)								
		2.0	Peak = UTP	10.6			CH: CLAY with trace silt: light brown, mottled grey. High plasticity. (Fill)		VSt						
							Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785.

BOREHOLE LOG - PCHA 275

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 06/05/2019
 Borehole Location: Stage 2 - Lot 275



1:25 Sheet 1 of 1

Logged by: AS		Position:		Elevation: RL 12.00m		Hole Diameter: 50mm											
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°											
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks		
		Depth	Type & Results									5	10	15			
				12.0			CH: CLAY: dark brown, mottled light yellowish brown. High plasticity. (Fill)										
		0.3	Peak = UTP						D								
		0.6	Peak = 142kPa														
		0.9	Peak = >200kPa														
		1.2	Peak = UTP					... from 1.10m to 1.15m, lens of grey silty CLAY.									
		1.5	Peak = UTP					... from 1.30m to 1.35m, lens of dark brown SILT.									
		1.8	Peak = UTP	10.5				CH: CLAY with trace silt: light brown mottled yellow. High plasticity. (Fill)									
		2.0	Peak = >200kPa					... at 1.90m, becoming mottled light grey									
								Borehole terminated at 2.0 m									

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785.

BOREHOLE LOG - PCHA 276

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 06/05/2019
 Borehole Location: Stage 2 - Lot 276



1:25 Sheet 1 of 1

Logged by: AS		Position:		Elevation: RL 12.00m		Hole Diameter: 50mm									
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				12.0			CH: CLAY: dark brown, mottled light brown. High plasticity. (Fill)								
		0.3	Peak = 129kPa					D							
		0.6	Peak = >200kPa					D to M							
		0.9	Peak = 195kPa				... from 0.85m to 0.90m, lens of brown SILT.	D		VSt to H					
		1.2	Peak = >200kPa				... at 1.20m, becoming mottled pink. ... at 1.25m, becoming mottled dark brown.				HA				
		1.5	Peak = >200kPa	10.5			CH: CLAY with trace silt: brown, mottled light grey. High plasticity. (Fill)	D to M							
		1.8	Peak = UTP				... at 1.60m, becoming mottled white and dark grey.			H					
		2.0	Peak = 182kPa		2		Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785.

BOREHOLE LOG - PCHA 277

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 06/05/2019
 Borehole Location: Stage 2 - Lot 277



1:25 Sheet 1 of 1

Logged by: AS		Position:		Elevation: RL 12.00m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				12.0			CH: CLAY: light brown, mottled light yellowish brown. High plasticity. (Fill)						
		0.3	Peak = UTP				... from 0.30m to 0.40m, becoming mottled reddish brown.						
		0.6	Peak = UTP										
		0.9	Peak = UTP				... from 0.85m to 0.90m, contains lens of light grey, mottled brown clayey SILT.						
		1.2	Peak = UTP				... from 1.00m to 1.15m, contains lens of light brown to dark brown CLAY/SILT.	D	H		HA		
		1.5	Peak = UTP										
		1.8	Peak = UTP										
		2.0	Peak = UTP										
							Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785.

BOREHOLE LOG - PCHA 279

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 06/05/2019
 Borehole Location: Stage 2 - Lot 279



1:25 Sheet 1 of 1

Logged by: AS		Position:		Elevation: RL 11.50m		Hole Diameter: 50mm										
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°										
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks	
		Depth	Type & Results									5	10	15		
				11.5			CH: CLAY: light brown, mottled yellowish brown. High plasticity. (Fill)									
		0.3	Peak = UTP													
		0.6	Peak = UTP													
		0.9	Peak = UTP													
		1.2	Peak = UTP													
		1.5	Peak = UTP													
				10.2			ML: Clayey SILT: light grey. Low plasticity. (Fill)									
		1.8	Peak = UTP				... at 1.40m, contains some clay.									
				9.6			CH: CLAY with minor silt: brown. High plasticity. (Fill)									
		2.0	Peak = UTP				Borehole terminated at 2.0 m									

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785.

BOREHOLE LOG - PCHA 281

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 09/05/2019
 Borehole Location: Stage 1 - Lot 281



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 10.00m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				10.0			CL: CLAY: brown, mottled orange and grey. Low plasticity. (Fill)								
		0.3	Peak = UTP					M							
		0.6	Peak = 191kPa												
		0.9	Peak = UTP	9.1			ML: Clayey SILT with minor sand: grey, mottled brown. Low plasticity; sand, fine. (Fill)		H		HA				
		1.3	Peak = UTP				... from 1.10m to 1.30m, contains a lens of fine to coarse sand.	D							
		1.6	Peak = UTP	8.6			CH: Silty CLAY with trace sand: grey, mottled orange. High plasticity; sand, fine. (Whangamarino Formation)	M							
		2.0	Peak = UTP					D							
								M							
							Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 282

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 03/05/2019
 Borehole Location: Stage 1 - Lot 282



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				9.0			CL: CLAY: dark brown, mottled pink and orange. Low plasticity. (Fill)								
		0.3	Peak = >200kPa												
		0.6	Peak = >200kPa	8.4			CL: CLAY: grey, mottled orange. Low plasticity. (Fill)		M						
		0.9	Peak = UTP				... from 0.80m to 1.00m, contains a 200mm thick lens of fine to coarse sand.								
		1.2	Peak = UTP	8.0	1		ML: Clayey SILT with minor sand: grey, mottled brown. Low plasticity; sand, fine. (Fill)		H		HA				
		1.6	Peak = UTP	7.5			CH: Silty CLAY with minor sand: grey, mottled orange. High plasticity; sand, fine. (Whangamarino Formation)		M to W						
		2.0	Peak = UTP		2		Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785.

BOREHOLE LOG - PCHA 283/284

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 21/03/2019
 Borehole Location: Stage 1 - Lot 283/284 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 12.00m		Hole Diameter: 50mm						
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				12.0		OL: SILT with some organics: Dark brown. Non plastic. (Topsoil)	D to M					
		0.3	Peak = 191kPa Residual = 90kPa	11.8		CH: CLAY with minor silt: Light yellow, streaked white. High plasticity. (Whangamarino Formation)						
		0.6	Peak = 180kPa Residual = 52kPa	11.6		CH: CLAY with some silt: Yellow, streaked light yellow and white. High plasticity, moderately sensitive. (Whangamarino Formation)		VSt				
		0.9	Peak = 134kPa Residual = 44kPa	11.5		... from 0.35m to 0.40m, becoming greenish yellow.	M					
		1.2	Peak = 77kPa Residual = 27kPa	11.0		CH: CLAY with minor silt: Dark brown, streaked black. High plasticity. (Whangamarino Formation)						
		1.5	Peak = 104kPa Residual = 38kPa	10.9		CH: CLAY with minor silt: White, mottled yellow. High plasticity, moderately sensitive. (Whangamarino Formation)						
		1.8	Peak = 96kPa Residual = 33kPa	1.0		... from 0.65m to 0.70m, becoming mottled dark brown.						
		2.1	Peak = 101kPa Residual = 33kPa	1.0		... from 0.70m to 0.80m, contains some silt.						
		2.3	Peak = 96kPa Residual = 27kPa	1.0		... from 0.90m to 0.95m, becomes light brown.						
				1.2		CH: CLAY with some silt: White. High plasticity, moderately sensitive. (Whangamarino Formation)			HA			
				2.3		CH: Silty CLAY: white. High plasticity, moderately sensitive. (Whangamarino Formation)	M to W	St to VSt				1.4m: little to no recovery
				2.3		Borehole terminated at 2.3 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear Vane no. 2560.

BOREHOLE LOG - PCHA 285/286

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 21/03/2019
 Borehole Location: Stage 1- Lot 285/286 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 11.00m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
		0.3	Peak = 191kPa Residual = 98kPa	11.0			CH: CLAY with trace silt: Light yellowish brown. High plasticity, moderately sensitive. (Whangamarino Formation) ... at 0.20m, becoming moist ... at 0.30m, becoming yellowish brown	D to M					
		0.6	Peak = 191kPa Residual = 41kPa	10.6			MH: Clayey SILT: Grey, mottled yellow. High plasticity, sensitive. (Whangamarino Formation)	M					
		0.9	Peak = 150kPa Residual = 27kPa	10.4			CH: Silty CLAY: light greyish white. High plasticity, sensitive. (Whangamarino Formation)	M					
		1.2	Peak = 126kPa Residual = 19kPa	10.0		1	MH: SILT with some clay: White, mottled yellow. High plasticity, sensitive. (Whangamarino Formation)	VSt		HA			
		1.5	Peak = 112kPa Residual = 38kPa	9.8			ML: Sandy SILT with minor clay: Grey. Non plastic; sand, fine to medium. (Whangamarino Formation)						
		1.8	Peak = 164kPa Residual = 27kPa	9.6			ML: SILT with some clay and trace sand: light greyish white. Low plasticity, moderately sensitive to sensitive; sand, fine. (Whangamarino Formation)	M to W					
		2.1	Peak = 191kPa Residual = 41kPa			2							1.5-2.2m: little to no recovery.
Borehole terminated at 2.2 m													
						3							
						4							
						5							

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear Vane no. 2560

BOREHOLE LOG - PCHA 289/290

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 09/04/2019
 Borehole Location: Stage 1 - Lot 289/290 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm										
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°										
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks	
		Depth	Type & Results									5	10	15		
		0.3	Peak = >200kPa Residual = 59kPa	9.0			CH: CLAY with some silt: Light grey, mottled orange and light yellow. High plasticity, moderately sensitive. (Whangamarino Formation)									
		0.6	Peak = >200kPa Residual = 56kPa													
		0.9	Peak = 162kPa Residual = 40kPa	8.3			CH: Silty CLAY: Light yellow. High plasticity; sensitive. (Whangamarino Formation)									
		1.2	Peak = 135kPa Residual = 30kPa	8.0			LIGNITE: Black. (Whangamarino Formation) ... from 1.00m to 1.05m, light greyish white silty clay									
		1.5	Peak = UTP				... from 1.25m to 1.50m, contains a lens of light grey to brown fine SAND with minor silt and trace clay									
		2.0	Peak = UTP				Borehole terminated at 2.0 m									

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785

BOREHOLE LOG - PCHA 290/358

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 09/04/2019
 Borehole Location: Stage 1 - Lot 290/358 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm									
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
		0.3	Peak = 102kPa Residual = 26kPa	9.0	0.3	X X	ML: SILT with some clay: Light yellowish brown, mottled yellow. Low plasticity, moderately sensitive. (Whangamarino Formation)			VSt					
		0.6	Peak = UTP	8.4	0.6	█	LIGNITE: Black. (Whangamarino Formation)			M					
		0.9	Peak = UTP		0.9										
		1.2	Peak = UTP		1.2		... from 1.10m to 1.30m, contains a lens of light grey fine to medium SAND with some silt			H					
		1.5	Peak = UTP		1.5		... at 1.70m, becoming reddish brown, trace roots			W to S					
		2.0	Peak = UTP		2.0		Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785.

BOREHOLE LOG - PCHA 291/358

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 09/04/2019
 Borehole Location: Stage 1 - Lot 291/358 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm									
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
		0.3	Peak = 155kPa Residual = 50kPa	9.0	0.3		CH: Silty CLAY: Light greyish white, mottled yellow. High plasticity, moderately sensitive. (Whangamarino Formation)			VSt					
		0.6	Peak = 162kPa Residual = 20kPa	8.5	0.6		LIGNITE: Black. (Whangamarino Formation) ... from 0.65m to 0.70m, contains a lens of light grey fine SAND			M					
		0.9	Peak = UTP	1.0	0.9		... from 1.20m to 1.40m, contains a lens of light grey fine SAND			H		HA			
				2.0	2.0		... at 1.50m, becoming reddish black, trace roots			W					
				2.0	2.0		Borehole terminated at 2.0 m			D to M					

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785.

BOREHOLE LOG - PCHA 292/293

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 09/04/2019
 Borehole Location: Stage 1 - Lot 292/293 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 9.50m		Hole Diameter: 50mm										
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°										
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks	
		Depth	Type & Results									5	10	15		
		0.3	Peak = UTP	9.5		[X marks]	CH: Silty CLAY: Light grey, mottled yellow. High plasticity, moderately sensitive. (Whangamarino Formation) ... at 0.20m, becoming light brown	D								
		0.6	Peak = UTP			[X marks]	... at 0.45m, becoming light grey, mottled yellow	H								
		0.8	Peak = >200kPa Residual = 63kPa			[X marks]	... at 0.70m, no mottling, becoming moist	D to M								
		1.2	Peak = 56kPa Residual = 13kPa Peak = UTP			[X marks]	... at 0.85m, becoming light yellowish brown									
		1.3	Peak = UTP			[X marks]	ML: SILT with minor clay: Brown, dark brown to black. Low plasticity. (Whangamarino Formation)	M to W	St		HA					
		1.5	Peak = UTP			[X marks]	ML: SILT: Black. Low plasticity. (Whangamarino Formation)									
		1.8	Peak = UTP			[X marks]	SP: Fine SAND with minor to some silt: light grey, mottled brown. Poorly graded; tightly packed. (Whangamarino Formation)	W to S								
		2.0	Peak = UTP			[X marks]	LIGNITE: Black. (Whangamarino Formation)	M	H							
							Borehole terminated at 2.0 m									

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785.

BOREHOLE LOG - PCHA 294/295

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 09/04/2019
 Borehole Location: Stage 1 - Lot 294/295 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 9.50m		Hole Diameter: 50mm									
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				9.5		X	CH: Silty CLAY: Light greyish brown, mottled yellow. High plasticity. (Whangamarino Formation)	D							
		0.3	Peak = >200kPa Residual = 122kPa			X	... at 0.30m, becoming light grey, mottled yellow		H						
		0.6	Peak = 66kPa Residual = 20kPa			X	... at 0.60m, becoming white, no mottling		M						
		0.9	Peak = 76kPa Residual = 20kPa			X			St						
		1.2	Peak = UTP	8.3		X	ML: SILT with some sand: Light brown. Non plastic; sand, fine to medium. (Whangamarino Formation)								
		1.5	Peak = UTP	8.2		X	LIGNITE: Black. (Whangamarino Formation) ... from 1.40m to 1.50m, contains a lens of light brown fine SAND	D to M	H						
		2.0	Peak = UTP		2	X	Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785.

BOREHOLE LOG - PCHA 296

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 14/05/2019
 Borehole Location: Stage 1 - Lot 296



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 9.50m		Hole Diameter: 50mm						
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				9.5		CL: CLAY: brown, mottled white. Low plasticity. (Fill)	M					
		0.3	Peak = UTP	9.2		ML: Clayey SILT with minor sand: light greyish brown. Low plasticity; sand, fine. (Whangamarino Formation)	D	H				
		0.6	Peak = UTP									
		0.9	Peak = UTP									
		1.2	Peak = UTP	8.5		CH: Silty CLAY with trace sand: grey. High plasticity, moderately sensitive; sand, fine. (Whangamarino Formation)	M	VSt to H		HA		
		1.6	Peak = UTP									
		2.0	Peak = 189kPa Residual = 82kPa	2		Borehole terminated at 2.0 m						
				3								
				4								
				5								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 297

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 25/03/2019
 Borehole Location: Stage 1 - Lot 297



1:25 Sheet 1 of 1

Logged by: ES		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm									
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
25-05-2019	Groundwater	0.3	Peak = 163kPa Residual = 44kPa	8.0	0.3	ML: Sandy SILT: Light grey, mottled orange. Low plasticity, moderately sensitive; sand, fine. (Whangamarino Formation)	D	VSt	HA						
		0.6	Peak = 163kPa Residual = 41kPa	7.3	MH: Sandy SILT: Orange, mottled light grey. High plasticity, sensitive. (Whangamarino Formation)										D to M
		0.9	Peak = >200kPa Residual = 38kPa	7.0	MH: Sandy clayey SILT: Light grey, mottled bluish grey, orange. High plasticity; sand, fine. (Whangamarino Formation)	M to W									
		1.6	Peak = >200kPa Residual = 64kPa	6.5	MH: Sandy SILT: Light brownish grey. High plasticity, moderately sensitive; sand, fine. (Whangamarino Formation)		W to S								
		1.9	Peak = >200kPa Residual = 61kPa	6.3	LIGNITE: Black. (Whangamarino Formation)										
						2	Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater encountered at 1.1m. Shear vane no. 2349.

BOREHOLE LOG - PCHA 298

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 25/03/2019
 Borehole Location: Stage 1 - Lot 298



1:25 Sheet 1 of 1

Logged by: ES		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm									
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
25-03-2019		0.3	Peak = >200kPa Residual = 41kPa	8.0		ML: Sandy SILT: light grey, mottled orange. Low plasticity, moderately sensitive to sensitive; sand, medium, subrounded. (Whangamarino Formation)	D	VSt to H							
		0.6	Peak = 146kPa Residual = 44kPa												
		0.9	Peak = 108kPa Residual = 20kPa	7.1		MH: Clayey SILT with trace sand: light brown, mottled orangish grey. High plasticity, sensitive; sand, fine. (Whangamarino Formation) LIGNITE: black. Non plastic. (Whangamarino Formation)	D to... W	VSt							
		1.2	Peak = UTP	7.0											
		1.4	Peak = UTP												
		1.7	Peak = UTP												
		2.0	Peak = UTP												
						Borehole terminated at 2.0 m									

Termination reason: Target Depth Reached

Remarks: Groundwater encountered at 1m. Shear vane no. 2349.

BOREHOLE LOG - PCHA 299

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 29/05/2019
 Borehole Location: Stage 1 - Lot 299



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				8.0			OL: Organic SILT: black. Low plasticity. (Topsoil)								
		0.4	Peak = >200kPa	7.8			SW: Fine to coarse SAND with some silt: white. Well graded; pumiceous. (Whangamarino Formation)	W				5			
		0.6	Peak = >200kPa	7.4			SW: Fine to coarse SAND with some silt: white. Well graded; pumiceous. (Whangamarino Formation)					5			
		0.9	Peak = 149kPa Residual = 38kPa	7.4			ML: Sandy SILT: white. Low plasticity, moderately sensitive; sand, fine, pumiceous. (Whangamarino Formation)					4			
				1								4			
				6.8								4			
		1.5	Peak = UTP				SW: Fine to coarse SAND with some silt: white. Well graded; pumiceous. (Whangamarino Formation)	W to S				2			
												2			
		2.0	Peak = UTP									3			
												4			
												4			
												5			
												5			
												6			
							Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 300/301

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 19/03/2019
 Borehole Location: Stage 1 - 300/301 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.50m		Hole Diameter: 50mm							
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				8.5			SP: Fine to medium SAND with some silt: white. Poorly graded; pumiceous. (Whangamarino Formation)	W				5, 10, 15	
				7.5	1		SM: Silty fine SAND: white. Poorly graded; pumiceous. (Whangamarino Formation)	W to S			HA	8, 9, 8, 9, 8, 5, 10, 11, 25	
				7.2			SW: Fine to coarse SAND with minor silt: grey, mottled orange. Well graded; pumiceous. (Whangamarino Formation)						
				6.9			SM: Silty fine SAND: grey. Poorly graded; pumiceous. (Whangamarino Formation)	W					
				6.4	2		SM: Silty fine SAND: dark grey. Poorly graded (Whangamarino Formation) Borehole terminated at 2.2 m			VD			
					3								
					4								
					5								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 217.

BOREHOLE LOG - PCHA 302/303

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 29/05/2019
 Borehole Location: Stage 1 - Lot 302/303 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.50m		Hole Diameter: 50mm										
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°										
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks	
		Depth	Type & Results									5	10	15		
				8.5			OL: Organic SILT: black. Low plasticity. (Topsoil)	M								
		0.3	Peak = >200kPa	8.3			ML: SILT with trace sand: white. Low plasticity, extra sensitive; sand, fine. (Whangamarino Formation)	W	VSt to H							
		0.5	Peak = 140kPa Residual = 12kPa													
		0.6	Peak = 102kPa Residual = 15kPa	7.9			ML: SILT with trace clay: brown, mottled orange. Low plasticity; sensitive. (Whangamarino Formation)	W to S	VSt							
		0.9	Peak = UTP	7.6			LIGNITE: black. (Whangamarino Formation)				HA					
		1.5	Peak = UTP					M	H							
							... from 1.80m to 1.90m, contains a lens of fine sand.	W...								
		2.0	Peak = UTP	2			Borehole terminated at 2.0 m	M								

Termination reason: Target Depth Reached

Remarks: Groundwater encountered at 1.9m. Shear vane no. 2349.

BOREHOLE LOG - PCHA 303A

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 29/05/2019
 Borehole Location: Stage 1 - Lot 303



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.50m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				8.5			OL: Organic SILT: black. Low plasticity. (Topsoil)	M							
		0.2	Peak = UTP	8.4			MH: Clayey SILT: white, mottled orange. High plasticity. (Whangamarino Formation)	M	H						
		0.3	Peak = 67kPa	8.2			ML: SILT, with minor clay and trace sand: orange, mottled white. Low plasticity, moderately sensitive to sensitive; sand, fine. (Whangamarino Formation)	W to S							
		0.4	Residual = 20kPa Peak = 70kPa Residual = 18kPa												
		0.6	Peak = 111kPa Residual = 18kPa								HA				
		0.9	Peak = 120kPa Residual = 9kPa	7.7			ML: SILT with minor sand: dark grey, mottled black. Low plasticity, extra sensitive; sand, fine. (Whangamarino Formation)	W							
		1.2	Peak = UTP	7.4			LIGNITE: black. Friable. (Whangamarino Formation)	M	H						
							Borehole terminated at 1.2 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349

BOREHOLE LOG - PCHA 304/305

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 19/03/2019
 Borehole Location: Stage 1 - 304/305 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.50m		Hole Diameter: 50mm							
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
19-03-2019				8.5			CH: Silty CLAY: light grey, mottled orange. High plasticity, sensitive. (Whangamarino Formation)	M					
		0.3	Peak = UTP				... at 0.30m, becoming whitish grey.						
		0.6	Peak = >200kPa Residual = 38kPa					VSt to H					
		0.9	Peak = UTP				... at 0.90m, contains minor fine sand.						
		1.2	Peak = 104kPa Residual = 9kPa				... at 1.10m, becoming yellowish grey.	W					
		1.6	Peak = 117kPa Residual = 3kPa				ML: SILT: black. Low plasticity, extra sensitive; interbedded with grey silt. (Whangamarino Formation) SP: Fine to medium SAND: grey. Poorly graded. (Whangamarino Formation)	VSt					
		1.8	Peak = UTP				LIGNITE: black. Friable. (Whangamarino Formation)	H					
		2.0	Peak = UTP				Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater encountered at 1.6m. Shear vane no. 217.

BOREHOLE LOG - PCHA 306/307

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 15/04/2019
 Borehole Location: Stage 1 - Lot 306/307 Boundary



1:25 Sheet 1 of 1

Logged by: CZM		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm								
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°								
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks	
		Depth	Type & Results											5
				9.0			ML: Clayey SILT: light brown. Low plasticity (Fill)							
		0.3	Peak = UTP				... at 0.20m, becoming mottled grey and black.							
		0.6	Peak = UTP											
		0.9	Peak = UTP											
		1.2	Peak = UTP											
		1.6	Peak = UTP				... at 1.50m, contains some fine sand.							
		2.0	Peak = UTP	7.1			ML: Clayey SILT: light grey, mottled black. Low plasticity (Fill)		D	H	HA			
							Borehole terminated at 2.0 m							

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785.

BOREHOLE LOG - PCHA 308

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 15/05/2019
 Borehole Location: Stage 1 - Lot 308



1:25 Sheet 1 of 1

Logged by: RP		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm									
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				9.0			CL: Silty CLAY: brown, mottled orange and white. Low plasticity. (Fill)								
		0.3	Peak = UTP					D to M							
		0.6	Peak = 191kPa				... at 0.70m, becoming mottled light brown.								
		0.9	Peak = 191kPa				... from 0.90m to 1.05m, lens of grey sandy sil with some clay.	VSt to St			HA				
		1.2	Peak = 120kPa				... from 1.40m to 1.50m, lens of white clayey silt.	M							
		1.6	Peak = UTP												
		2.0	Peak = 191kPa				Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 309

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 15/05/2019
 Borehole Location: Stage 1 - Lot 309



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm											
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°											
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks		
		Depth	Type & Results									5	10	15			
				9.0			CL: CLAY: brown, mottled grey and orange. Low plasticity. (Fill)										
		0.3	Peak = >200kPa														
		0.6	Peak = 178kPa							VSt to H							
		0.9	Peak = UTP					... from 0.80m to 0.90m, contains a lens of fine sand. ... at 0.90m, becoming pink mottled white.		M		HA					
		1.2	Peak = UTP	7.8				ML: Clayey SILT with minor sand: greyish brown, mottled white. Low plasticity; sand, fine to coarse. (Fill) ... from 1.30m to 1.50m, contains a lens of grey fine sand.									
		1.6	Peak = UTP							H							
		2.0	Peak = UTP		2		Borehole terminated at 2.0 m										

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2532.

BOREHOLE LOG - PCHA 310

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 15/05/2019
 Borehole Location: Stage 1 - Lot 310



1:25 Sheet 1 of 1

Logged by: RP		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm										
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°										
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks	
		Depth	Type & Results									5	10	15		
				9.0			CH: Silty CLAY: brown. High plasticity. (Fill)									
		0.3	Peak = 186kPa													
		0.6	Peak = 167kPa													
		0.9	Peak = 191kPa													
		1.2	Peak = UTP	8.0	1			ML: Sandy SILT with some clay: grey. Low plasticity; sand, fine to coarse. (Fill)	M			HA				
		1.6	Peak = UTP	7.8	7.8		CH: Silty CLAY: brown. High plasticity. (Fill)									
		2.0	Peak = 191kPa	7.1			ML: SILT with some sand and clay: grey. Low plasticity. (Fill)									
							ML: Clayey SILT: white, mottled orange. Low plasticity. (Fill)									
Borehole terminated at 2.0 m																

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 311/312

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 15/04/2019
 Borehole Location: Stage 1 - Lot 311/312 Boundary



1:25 Sheet 1 of 1

Logged by: CZM		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm									
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				9.0			CH: Silty CLAY: light brown. High plasticity. (Fill)								
		0.3	Peak = UTP				... at 0.40m, becoming mottled grey and black.	M							
		0.6	Peak = UTP												
		0.9	Peak = UTP	8.1			CL: Silty CLAY: brown. Low plasticity. (Fill)		H		HA				
		1.2	Peak = UTP	7.9			ML: Clayey SILT: dark brown, mottled brown. Low plasticity. (Fill)		D						
		1.6	Peak = UTP												
		2.0	Peak = UTP				Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785

BOREHOLE LOG - PCHA 312/313

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 29/05/2019
 Borehole Location: Stage 1 - Lot 312/313 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm						
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				9.0		OL: Organic SILT: black. Low plasticity. (Topsoil)						
		0.3	Peak = 131kPa Residual = 41kPa	8.7		CL: Silty CLAY: grey, mottled orange. Low plasticity, moderately sensitive. (Whangamarino Formation) ... at 0.50m, contains minor fine to coarse sand.	M					
		0.6	Peak = 125kPa Residual = 20kPa	8.4		ML: Clayey SILT with minor sand: grey, mottled orange. Low plasticity, sensitive; sand, fine to coarse. (Whangamarino Formation)	VSt					
		0.9	Peak = 146kPa Residual = 32kPa	8.1		ML: Sandy SILT: white. Low plasticity, sensitive; sand, fine to coarse. (Whangamarino Formation)	W			HA		
		1.2	Peak = UTP	7.8		SW: Fine to coarse SAND with some silt: white. Well graded; pumiceous. (Whangamarino Formation)	D				10 11 10 8 7 7 8	
		2.0	Peak = UTP	2		Borehole terminated at 2.0 m	W to S					

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 314/315

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 29/05/2019
 Borehole Location: Stage 1 - 314/315 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.50m		Hole Diameter: 50mm						
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				8.5		OL: Organic SILT: black. Low plasticity. (Topsoil)	M				4	
		0.3	Peak = UTP	8.3		SW: Fine to coarse SAND with some silt: white. Well graded; pumiceous. (Whangamarino Formation)	W				4	
		0.6	Peak = UTP								14	
											11	
		0.9	Peak = UTP								10	
											9	
											9	
											10	
											11	
											8	
											10	
											12	
											12	
											11	
											10	
											11	
											11	
											11	
		2.0	Peak = UTP	6.9		SM: Silty fine to coarse SAND: white. Well graded; pumiceous. (Whangamarino Formation)					11	
				2		Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 315/316

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 15/04/2019
 Borehole Location: Stage 1 - Lot 315/316 Boundary



1:25 Sheet 1 of 1

Logged by: CZM		Position:		Elevation: RL 8.50m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				8.5			SP: Fine to medium SAND with some silt: Light grey. Poorly graded. (Whangamarino Formation)	D to M				4 4 3 5 4 5 4 3 5 5 5 7 5 8 10 10 10	
							Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane # 1785 DCP # 06

BOREHOLE LOG - PCHA 316/317

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 29/05/2019
 Borehole Location: Stage 1 - Lot 316/317 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.50m		Hole Diameter: 50mm						
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				8.5		OL: Organic SILT: black. Low plasticity. (Topsoil)	M				3	
		0.3	Peak = UTP	8.3		SW: Fine to coarse SAND with some silt: white. Well graded; pumiceous. (Whangamarino Formation)	W	MD to D			4	
		0.6	Peak = 149kPa Residual = 26kPa	8.0		ML: Silty SAND: white. Low plasticity, sensitive; sand, fine to coarse, pumiceous. (Whangamarino Formation)		VSt			8	
		0.9	Peak = UTP	7.7		SW: Fine to coarse SAND with some silt: white. Well graded; pumiceous. (Whangamarino Formation)					6	
		1.2	Peak = UTP	7.0		SW: Fine to coarse SAND with some silt: white. Well graded; pumiceous. (Whangamarino Formation)					5	
				7.0		SM: Silty fine to coarse SAND: white. Well graded; pumiceous. (Whangamarino Formation)					5	
		2.0	Peak = UTP	6.7		SW: Fine to coarse SAND with some silt: white. Well graded; pumiceous. (Whangamarino Formation)	S	MD			3	
						Borehole terminated at 2.0 m					5	
											7	

Termination reason: Target Depth Reached

Remarks: Groundwater encountered at 1.8m. Shear vane no. 2349.

BOREHOLE LOG - PCHA 319

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 19/03/2019
 Borehole Location: Stage 1 - Lot 319



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm							
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				8.0		XXXX	ML: Sandy SILT: grey. Low plasticity; sand, fine. (Whangamarino Formation)						
		0.3	Peak = 142kPa Residual = 19kPa	7.8		XXXX	ML: SILT with minor sand: grey. Low plasticity, sensitive; sand, fine. (Whangamarino Formation) ... at 0.40m, contains trace fine sand.						
		0.6	Peak = >200kPa Residual = 9kPa	7.3		XXXX	... at 0.60m, becoming brownish grey.	W					
		0.9	Peak = 101kPa Residual = 13kPa	7.2		XXXX	ML: SILT: brown. Low plasticity. (Whangamarino Formation)		VSt to H				
		1.2	Peak = UTP	6.8		XXXX	ML: SILT: grey mottled dark grey. Low plasticity, sensitive to extra sensitive. (Whangamarino Formation) ... at 1.10m, contains medium gravel; subrounded, pumiceous.				HA		
		1.6	Peak = >200kPa Residual = 38kPa	6.5		XXXX	ML: SILT: grey. Low plasticity. (Whangamarino Formation)	M		H			
		2.0	Peak = 161kPa Residual = 9kPa	6.3		XXXX	SM: Sandy SILT: dark brown. Low plasticity, extra sensitive; sand, fine. (Whangamarino Formation)	W		VSt			
							Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 217.

BOREHOLE LOG - PCHA 320

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/03/2019
 Borehole Location: Stage 1 - Lot 320



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm									
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
27-03-2019		0.3	Peak = 128kPa Residual = 18kPa	8.0	0.3	MH: Clayey SILT: greyish white, mottled orange. High plasticity, sensitive. (Whangamarino Formation)	M	VSt	HA						
		0.6	Peak = 79kPa Residual = 12kPa	7.5	0.6										MH: Clayey SILT: white to light grey. High plasticity, sensitive. (Whangamarino Formation) ... at 0.70m, becoming mottled yellow
		0.9	Peak = 70kPa Residual = 9kPa	7.2	0.9	MH: SILT with some sand and minor clay: grey. Low plasticity, sensitive; sand, fine. (Whangamarino Formation)	W to S	St							
		1.2	Peak = 44kPa Residual = 18kPa	6.9	1.2	ML: SILT: black. Non plastic; interbedded with light grey sandy silt. (Whangamarino Formation)	F								
		1.5	Peak = 144kPa Residual = 35kPa	6.7	1.5	LIGNITE: black. Friable. (Whangamarino Formation)	H								
		2.0	Peak = UTP	2	2.0	Borehole terminated at 2.0 m									

Termination reason: Target Depth Reached

Remarks: Groundwater encountered at 1.5m. Shear vane no. 2349.

BOREHOLE LOG - PCHA 321

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/03/2019
 Borehole Location: Stage 1 - Lot 321



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm						
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				8.0		SP: Fine SAND with some silt: light grey, mottled yellow. Poorly graded. (Whangamarino Formation)		MD			4	
				7.7		ML: Sandy SILT: Light grey, mottled yellow. Low plasticity, sensitive; sand, fine, pumiceous. (Whangamarino Formation)	M	VSt			4	
		0.5	Peak = 164kPa Residual = 23kPa Peak = UTP	7.4		LIGNITE: Black (Whangamarino Formation)					3	
		0.6	Peak = UTP								3	
		0.9	Peak = UTP								2	
		1.2	Peak = UTP								2	
		1.5	Peak = UTP								1	
		1.8	Peak = UTP	6.5		ML: SILT with some fine sand: Reddish brown. Poorly graded. (Whangamarino Formation)						
		2.0	Peak = UTP	6.4		LIGNITE: Black (Whangamarino Formation)						
				6.3		LIGNITE: Black (Whangamarino Formation)						
				6.2		ML: SILT with some fine sand: Reddish brown. Poorly graded. (Whangamarino Formation)						
				2		LIGNITE: Black (Whangamarino Formation)						
					Borehole terminated at 2.0 m							

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349

BOREHOLE LOG - PCHA 322

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/03/2019
 Borehole Location: Stage 1 - Lot 322



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
		0.3	Peak = UTP	8.0			SP: Fine SAND: Light yellowish grey, mottled yellow. Poorly sorted. (Whangamarino Formation) ... at 0.15m, contains minor clay.	D to M	MD to D			4 5 6 10 10	
		0.6	Peak = UTP	7.5 7.4 7.4			SP: Silty fine SAND: Light grey. Poorly graded. (Whangamarino Formation) SP: Fine to medium SAND with some silt: Yellow. Poorly graded. (Whangamarino Formation) LIGNITE: Black. (Whangamarino Formation)	M	L			2	
				1			SP: Silty fine SAND: Light grey to white. Poorly graded. (Whangamarino Formation)	D to M	H		HA		
				6.4			SP: Silty fine SAND: Light grey to white. Poorly graded. (Whangamarino Formation)	M	MD to D			4 11	
				6.2			LIGNITE: Black. (Whangamarino Formation)	M to W	H			2	
				2		Borehole terminated at 2.0 m							

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349

BOREHOLE LOG - PCHA 323

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/03/2019
 Borehole Location: Stage 1 - Lot 323



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
		0.3	Peak = UTP	8.0			MH: Clayey SILT with trace sand : Light grey, mottled yellow. High plasticity; sand, fine. (Whangamarino Formation)		H			2	
				7.5			SP: Silty fine SAND: Light grey. Poorly graded. (Whangamarino Formation)		MD to D			3, 4, 5, 7	
		0.9	Peak = UTP	7.2			ML: Sandy SILT with minor clay: Light grey, mottled yellow. Low plasticity; sand, fine. (Whangamarino Formation)		M			5, 8, 11	
		1.2	Peak = UTP	6.8			SP: Silty fine SAND: Light grey, trace mottled yellow. Poorly graded. (Whangamarino Formation)		H		HA	7	
		1.5	Peak = UTP	6.3			... at 1.40m, contains minor clay. ... from 1.55m to 1.65m, contains a lens of fine to medium SAND		D to VD			16	1.5m: DCP bouncing
		1.8	Peak = UTP	6.3			SP: Silty fine SAND: Light grey. Poorly graded. (Whangamarino Formation)		M to W				
		2.0	Peak = UTP	2.0			Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349

BOREHOLE LOG - PCHA 325

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/03/2019
 Borehole Location: Stage 1 - Lot 325



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				8.0			SM: Silty fine SAND: white. Poorly graded; contains inclusions of brown clay. (Fill)						
		0.3	Peak = UTP	7.8			SP: Fine to medium SAND with some silt and trace clay: light grey, mottled orange. Poorly graded. (Whangamarino Formation)	D					
		0.6	Peak = UTP	7.6			SM: Sandy SILT with minor clay.: light grey, mottled orange. Low plasticity; sand, fine. (Whangamarino Formation)						
		0.9	Peak = UTP	7.5			ML: Sandy SILT with some clay: white, mottled orange and grey. Low plasticity; sand, fine. (Whangamarino Formation)	M	H				
		1.2	Peak = 190kPa Residual = 23kPa	7.2			MH: Clayey SILT with minor sand: white. High plasticity; sand, fine. (Whangamarino Formation)				HA		
		1.5	Peak = 125kPa Residual = 23kPa	7.0			ML: SILT with some clay and minor sand: white, mottled yellow. Low plasticity; sand, fine. (Whangamarino Formation)						
		2.0	Peak = 120kPa Residual = 32kPa	6.6			ML: Sandy SILT with minor clay: white. Non plastic, sensitive; sand, fine. (Whangamarino Formation)	M to W	VSt				
							Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 326

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 15/04/2019
 Borehole Location: Stage 1 - Lot 326



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm								
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°								
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results								5	10	15	
				8.0	[Cross-hatched pattern]	CL: CLAY with minor sand: brown mottled grey. Low plasticity; sand, fine to coarse. (Fill)								
		0.3	Peak = >200kPa				... from 0.40m to 0.50m, contains a lens of fine sand.		H					
				7.5	[Cross-hatched pattern]	ML: Sandy SILT: grey mottled orange. Low plasticity; sand, fine to medium. (Fill)								
		0.6	Peak = >200kPa						W					
				0.9	[Cross-hatched pattern]									
		0.9	Peak = 184kPa								HA			
				1.2	[Cross-hatched pattern]	ML: Clayey SILT with minor sand: grey mottled orange. Low plasticity, moderately sensitive; sand, fine. (Whangamarino Formation)								
		1.2	Peak = UTP						M		VSt to H			
				1.6	[Cross-hatched pattern]									
		1.6	Peak = 137kPa Residual = 53kPa						W					
				1.8	[Cross-hatched pattern]									
		1.8	Peak = UTP											
				2.0	Borehole terminated at 1.8 m									
				3.0										
				4.0										
				5.0										

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 336/337

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 15/05/2019
 Borehole Location: Stage 1 - Lot 336/337 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				8.0			OL: Organic SILT: black. Non plastic. (Topsoil)	W							
		0.3	Peak = >200kPa	7.8			ML: Clayey SILT with some sand: brown mottled white and orange. Low plasticity; sand, fine to coarse, pumiceous; contains minor 50-100mm thick lenses of sand. (Fill)	M							
		0.6	Peak = UTP					D							
		0.9	Peak = UTP												
		1.2	Peak = UTP	7.0			ML: Clayey SILT with minor sand: brown mottled white and light brown. Low plasticity; sand, fine. (Fill)	H		HA					
		1.6	Peak = >200kPa					M							
		2.0	Peak = UTP	6.1			CH: Silty CLAY: grey mottled orange. High plasticity. (Whangamarino Formation) Borehole terminated at 2.0 m								
					3										
					4										
					5										

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2532.

BOREHOLE LOG - PCHA 338/339

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/03/2019
 Borehole Location: Stage - Lot 338/339 Boundary



1:25 Sheet 1 of 1

Logged by: YSL		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm						
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
		0.3	Peak = UTP	8.0		CH: CLAY with minor silt: yellowish brown, mottled white and red. High plasticity. (Fill) ... from 0.15m to 0.35m, contains trace inclusions of silty sand.	M					
		0.6	Peak = UTP	7.6		CL: CLAY with minor silt: yellowish brown, mottled brown, white. Low plasticity. (Fill)	D	H				
		0.9	Peak = UTP	7.4		CH: CLAY with some silt: light grey, mottled yellow. High plasticity. (Whangamarino Formation)						
		1.2	Peak = 111kPa Residual = 35kPa	7.1		CH: CLAY with some silt: yellowish brown. High plasticity, moderately sensitive. (Whangamarino Formation)	D to M		HA			
		1.5	Peak = 105kPa Residual = 29kPa	6.7		MH: Clayey SILT: light brown. High plasticity, moderately sensitive. (Whangamarino Formation) ... at 1.50m, contains minor fine sand.		VSt				
		1.8	Peak = 108kPa Residual = 32kPa	6.2			M					
		2.0	Peak = >200kPa Residual = 58kPa	6.0		SM: Sandy SILT: greyish brown, mottled yellow. High plasticity, moderately sensitive; sand, fine. (Whangamarino Formation) LIGNITE: black. (Whangamarino Formation) Borehole terminated at 2.0 m		H				

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear Vane no. 2349.

BOREHOLE LOG - PCHA 340/341

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 29/05/2019
 Borehole Location: Stage 1 - Lot 340/341 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm						
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				8.0		OL: Organic SILT: black. Low plasticity. (Topsoil)	M					
				7.9		SP: Fine to medium SAND with minor silt: light brown, mottled orange. Well graded, thinly bedded; sub rounded, pumiceous; contains minor 40-70mm thick lenses of silt. (Whangamarino Formation)	W	MD to D			6	
		0.5	Peak = UTP	7.5		ML: SILT with minor gravel and trace sand: light brown, mottled orange. Low plasticity; gravel, medium, sub angular; sand, coarse. (Whangamarino Formation)	W to S	H			9	
		0.6	Peak = UTP	0.6			W					6
		0.9	Peak = UTP	7.1		LIGNITE: black. (Whangamarino Formation)	W...				4	
				1		Borehole terminated at 1.0 m	M					
				2								
				3								
				4								
				5								

Termination reason: Hand Auger Refusal on hard lignite.

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 340

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 29/05/2019
 Borehole Location: Stage 1 - Lot 340



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm						
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				8.0		SP: Fine to medium SAND with some silt: grey. Poorly graded. (Whangamarino Formation)	W	MD			3	
		0.6	Peak = 134kPa Residual = 15kPa	7.6		ML: Sandy SILT: grey. Low plasticity, extra sensitive; sand, fine to medium, pumiceous. (Whangamarino Formation)	W to S	VSt		HA	4	
		0.9	Peak = UTP	7.3		ML: SILT with minor clay and trace sand: grey, mottled yellow and orange. Low plasticity; sand, fine. (Whangamarino Formation)	W				3	
		1.2	Peak = UTP	7.2		LIGNITE: black. (Whangamarino Formation)	M	H			2	
				1	Borehole terminated at 1.2 m							
				2								
				3								
				4								
				5								

Termination reason: Hand Auger Refusal on hard lignite.

Remarks: Groundwater not encountered. Shear vane no. 2349

BOREHOLE LOG - PCHA 342/343

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 19/03/2019
 Borehole Location: Stage 1 - 342/343 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.00m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
19-03-2019		0.3	Peak = 101kPa Residual = 9kPa	8.0	0.3	[X pattern]	ML: Clayey SILT with minor sand: grey, mottled orange. Low plasticity, extra sensitive; sand, fine. (Whangamarino Formation)	D							
		0.6	Peak = 63kPa Residual = 9kPa	7.6	0.6	[X pattern]	ML: SILT with trace clay: light brown, mottled orange. Low plasticity, sensitive. (Whangamarino Formation)	W							
		0.7	Peak = 57kPa Residual = 28kPa	7.3	0.7	[X pattern]	... at 0.60m, contains trace fine gravel.								
		0.8	Peak = UTP	7.2	0.8	[X pattern]	ML: SILT: black. Low plasticity; interbedded with fine sand. (Whangamarino Formation)								
		1.1	Peak = UTP	1	1.1	[Solid black]	LIGNITE: black. (Whangamarino Formation) ... from 0.90m to 0.95m, contains a 50mm thick lens of fine sand.	D	H	HA					
		6.5		6.5	6.5	[Dotted pattern]	SP: Fine SAND: grey. Poorly graded. (Whangamarino Formation)		D		7				
		6.3		6.3		[Solid black]	LIGNITE: black. (Whangamarino Formation)	S	H		7				
				2			Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater encountered at 1.5m. Shear vane no. 217.

BOREHOLE LOG - PCHA 344

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 15/04/2019
 Borehole Location: Stage 1 - Lot 344



1:25 Sheet 1 of 1

Logged by: CM		Position:		Elevation: RL 8.50m		Hole Diameter: 50mm						
Checked by: LYK		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°						
Well	Groundwater	Samples & Insitu Tests		Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									
				8.5	[Cross-hatch pattern]	CH: Silty CLAY: brown, mottled grey. High plasticity. (Fill)						
		0.3	Peak = >200kPa	8.3	[Cross-hatch pattern]	CH: Silty CLAY: light grey. High plasticity. (Fill)		H				
		0.6	Peak = UTP	8.0	[Dotted pattern]	SP: Fine SAND with some silt: light grey. Poorly graded; pumiceous. (Whangamarino Formation)	D to M	MD to D			9 9 10 10	
				7.5	[Dotted pattern]	ML: SILT with some sand: grey. Low plasticity; sand, fine. (Whangamarino Formation)			HA		6 5 4 2	
				7.2	[Dotted pattern]	... at 1.20m, contains some clay. ML: Sandy SILT: grey. Low plasticity, sensitive; sand, fine to medium. (Whangamarino Formation)						
		1.6	Peak = 132kPa Residual = 23kPa	6.6	[Cross-hatch pattern]	SP: Silty fine SAND: light grey. Poorly graded; pumiceous; tightly packed. (Whangamarino Formation)	W to S	VSt				
				2.0		Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1785.

BOREHOLE LOG - PCHA 345

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/03/2019
 Borehole Location: Stage 1 - Lot 345



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.50m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				8.5			ML: Sandy SILT: light grey mottled brown, orange and grey. Low plasticity; sand, fine. (Fill)								
		0.3	Peak = UTP												
		0.6	Peak = UTP												
				7.8			CH: Silty CLAY: grey mottled orange. High plasticity. (Whangamarino Formation)								
		0.9	Peak = UTP												
				7.3			ML: Clayey SILT with some sand: grey. Low plasticity, sensitive; sand, fine. (Whangamarino Formation)								
		1.2	Peak = 131kPa Residual = 33kPa												
				7.0			SP: Fine to medium SAND with some silt: light grey. Poorly graded; pumiceous. (Whangamarino Formation)								
		1.6	Peak = UTP										9 8 7		
							Borehole terminated at 2.0 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 346

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 27/03/2019
 Borehole Location: Stage 1 - Lot 346



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.50m		Hole Diameter: 50mm							
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				8.5			ML: SILT with some sand: light grey, mottled brownish grey. Low plasticity; sand, fine. (Fill)						
		0.3	Peak = UTP				... from 0.40m to 0.60m, contains a 200mm thick lens of fine to coarse sand.						
		0.6	Peak = UTP	7.9			ML: Clayey SILT with minor sand: greyish brown mottled grey, white and orange. Low plasticity; sand, fine. (Fill)						
		0.9	Peak = UTP										
		1.2	Peak = UTP										
		1.6	Peak = UTP	7.0			CH: Silty CLAY: grey, mottled orange. High plasticity. (Whangamarino Formation)		D	H	HA		
		2.0	Peak = UTP										
							Borehole terminated at 2.0 m						

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2560.

BOREHOLE LOG - PCHA 347/348

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 10/05/2019
 Borehole Location: Stage 1 - Lot 347/348 Boundary



1:25 Sheet 1 of 1

Logged by: AS		Position:		Elevation: RL 8.50m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
				8.5			CH: CLAY with trace silt: brown, mottled yellowish brown. High plasticity. (Fill)						
		0.3	Peak = UTP					D to M					
		0.6	Peak = UTP					H					
		0.9	Peak = UTP				... at 0.80m, becoming mottled grey.						
		1.1	Peak = UTP	7.5	1		ML: Sandy SILT: light grey. Non plastic; sand, fine. (Fill)				HA		
				7.4			SM: Silty fine SAND: light grey. Poorly graded. (Fill)					22	
								D to VD				14	
								D				12	
												10	
		1.5	Peak = UTP	7.0			ML: Sandy SILT: light grey. Non plastic. (Fill)				H		10
				7.0			SM: Silty fine SAND: light grey. Poorly graded. (Fill)						20
													14
								D to VD					14
													21
					2		Borehole terminated at 2.0 m						
					3								
					4								
					5								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1911.

BOREHOLE LOG - PCHA 349/350

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 15/04/2019
 Borehole Location: Stage 1 - Lot 349/350 Boundary



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm											
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°											
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks		
		Depth	Type & Results									5	10	15			
				9.0			CL: CLAY: brown, mottled orange and white. Low plasticity. (Fill)										
		0.3	Peak = UTP														
		0.6	Peak = >200kPa														
		0.9	Peak = >200kPa					... from 0.70m to 0.90m, becoming mottled pink.									
		1.2	Peak = UTP	7.8				ML: Clayey SILT with trace sand: greyish brown. Low plasticity; sand, fine. (Fill)	M	H		HA					
		1.6	Peak = UTP														
		2.0	Peak = UTP		2		Borehole terminated at 2.0 m										
					3												
					4												
					5												

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no 2532.

BOREHOLE LOG - PCHA 353

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 15/05/2019
 Borehole Location: Stage 1 - Lot 353



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
				9.0			CL: CLAY: brown, mottled orange, pink and grey. Low plasticity. (Fill)								
		0.3	Peak = 181kPa												
		0.6	Peak = 198kPa												
		0.9	Peak = UTP												
		1.2	Peak = 181kPa					M	VSt to H		HA				
		1.6	Peak = 155kPa												
		2.0	Peak = 144kPa												
Borehole terminated at 2.0 m															

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2532

BOREHOLE LOG - PCHA 354/355

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 10/05/2019
 Borehole Location: Stage 1 - Lot 354/355 Boundary



1:25 Sheet 1 of 1

Logged by: AS		Position:		Elevation: RL 9.00m		Hole Diameter: 50mm											
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°											
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks		
		Depth	Type & Results									5	10	15			
				9.0			CH: CLAY: brown, mottled yellowish brown. High plasticity. (Fill)										
		0.3	Peak = UTP														
		0.6	Peak = UTP														
		0.9	Peak = UTP					... at 0.80m, becoming mottled grey.									
		1.2	Peak = UTP	7.8				MH: Clayey SILT with minor sand: light grey, mottled brown. High plasticity; sand, fine. (Fill)									
		1.5	Peak = UTP				... from 1.30m to 1.40m, contains minor fine to medium pumiceous sand.										
		1.8	Peak = 166kPa	7.4			CH: Silty CLAY: light greyish brown. High plasticity. (Fill)	M									
		2.0	Peak = >200kPa		2		Borehole terminated at 2.0 m										

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 1911.

BOREHOLE LOG - PCHA 357

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 15/04/2019
 Borehole Location: Stage 1 - Lot 357



1:25 Sheet 1 of 1

Logged by: LYK		Position:		Elevation: RL 8.50m		Hole Diameter: 50mm									
Checked by: YSL		Survey Source:		Datum: Mount Eden		Angle from horizontal: 90°									
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)			Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results									5	10	15	
		0.1	Peak = 137kPa	8.5		[Cross-hatch pattern]	ML: Clayey SILT: light brown, mottled grey. Low plasticity. (Fill)	W	VSt						
				8.3		[Cross-hatch pattern]	SP: Fine to medium SAND with minor silt: white. Poorly graded; pumiceous; contains trace 50mm thick lenses of silt. (Fill)		MD to D			6	10		
		0.6	Peak = UTP	8.0		[Cross-hatch pattern]	ML: SILT: light grey. Non plastic. (Fill)					8			
		0.9	Peak = UTP	7.8		[Cross-hatch pattern]	ML: Clayey SILT: brown, mottled grey and orange. Low plasticity. (Fill)	M	H						
		1.2	Peak = 95kPa Residual = 35kPa	7.4		[Cross-hatch pattern]	ML: Clayey SILT with trace sand: grey, mottled orange. Low plasticity, moderately sensitive; sand, fine. (Whangamarino Formation)	W	St to VSt						
		1.6	Peak = 85kPa Residual = 29kPa			[Cross-hatch pattern]									
		1.9	Peak = 117kPa Residual = 18kPa			[Cross-hatch pattern]		W to S							
							Borehole terminated at 1.9 m								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear vane no. 2349.

BOREHOLE LOG - PCHA 359

Client: Lakeside Developments (2017) Limited
 Project: Lakeside Developments
 Site Location: 98 Scott Road, Te Kauwhata
 Project No.: HAM2018-0106
 Date: 12/03/2019
 Borehole Location: Stage 1 - Lot 359



1:25 Sheet 1 of 1

Logged by: DMM		Position:		Elevation: RL 14.50m		Hole Diameter: 50mm							
Checked by: LYK		Survey Source: Site Plan		Datum: Mount Eden		Angle from horizontal: 90°							
Well	Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Recovery	Drilling Method/Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		Depth	Type & Results										
		0.3	Peak = UTP	14.5		[Cross-hatched pattern]	CH: Silty CLAY: grey, mottled brown. High plasticity, insensative. (Fill)	D	H				
		0.6	Peak = >200kPa Residual = 119kPa			[Cross-hatched pattern]							
		0.9	Peak = >200kPa Residual = 143kPa			[Cross-hatched pattern]							
		1.2	Peak = 160kPa Residual = 49kPa	13.5	1	[Cross-hatched pattern]	CH: Silty CLAY: light brownish grey. High plasticity, moderately sensitive. (Whangamarino Formation)	M	VSt to H		HA		
		1.5	Peak = >200kPa Residual = 79kPa			[Cross-hatched pattern]							
		1.8	Peak = >200kPa Residual = 41kPa	12.7		[Cross-hatched pattern]	... from 1.70m to 2.00m, becoming yellowish brown.						
		2.0	Peak = 160kPa Residual = 35kPa	12.6	2	[Cross-hatched pattern]	MH: Clayey SILT: grey, mottled black. High plasticity, sensitive. (Whangamarino Formation) CH: Silty CLAY: grey, mottled black. High plasticity, sensitive. (Whangamarino Formation) Borehole terminated at 2.0 m	W					
					3								
					4								
					5								

Termination reason: Target Depth Reached

Remarks: Groundwater not encountered. Shear Vane no. 2349