28 August 2020

LAKESIDE DEVELOPMENT

STAGES 4 & 5

GEOTECHNICAL COMPLETION REPORT No.4

Lakeside Developments 2017 Limited

Ref. HAM2019-0062AK Rev 0

HAM2019-0062AK		
Date	**Revision**	**Comments**
22 July 2020	A	Issued for internal review
19 August 2020	B	Issued for internal review
28 August 2020	0	Report Issued to client for review.

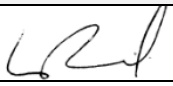
	Name	**Signature**	**Position**
Prepared by	Lance Knauf		Engineering Geologist
Reviewed by	Ken Read		Principal Geotechnical Engineer
Authorised by	Dave Morton		Principal Geotechnical Engineer

Table of Contents

Tables

Drawings

Appendices

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, (***Drawing 45)***:

Stage 4: Lot 182 to 197, 221 to 233, 259 to 265;

Stage 5: 172 to 181, 198 to 220, 234 to 258.

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 Candor[3] 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 and are 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 (Moturiki Datum) at the western boundary to RL5m along the north-eastern boundary where a low-lying floodplain exists adjacent to Lake Waikare.

Stage 4 is mostly situated on the elevated rolling topography with the north-eastern margin encroaching over the low-lying floodplain/alluvial flats.

Stage 5 is generally situated over rolling hills with the south-eastern margin encroaching over the low-lying floodplain/alluvial flats.

The contours of the original landform are shown on ***Drawings 46 to 48.***

The earthworks operations generally consisted of the excavation of the elevated hill topography in Stages 1, 2, 2A, 3, 3A and 4 and the placement of engineer certified fill in the low-lying areas of Stages 1, 1A, 4, 5 and 6.

As can be seen from the Cut-Fill Contour Plans (***Drawings 49 to 51***), ground levels within the subject areas have been extensively modified by subdivision earthworks incorporating cut and fill depths of up to 4.0m and 5.0m respectively (including undercut).

The as-built landform (***Drawings 52 to 54***) comprises a series of near level benched building platforms that generally step down towards the east, with each step separated by a gently graded bench.

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;
- CMW Stage 5 Construction Recommendations Technical Memo (ref HAM2018-0106AQ Rev 0) dated 16 August 2019;
- CMW Earthworks Specification (ref HAM2018-0106AB Rev 1) dated 17 October 2018;

- CMW Geotechnical Completion Report No.1, (ref HAM2018-0106AM Rev 5) dated 05 August 2019;
- CMW Geotechnical Completion Report No.2 (ref HAM2019-0062AF Rev 1) dated 21 February 2020.
- CMW Geotechnical Completion Report No.3 (ref HAM2019-0062AJ Rev 1) dated 06 May 2020.

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 August 2019. These investigations comprised a combination of machine and hand auger boreholes, trial pits, and Cone Penetration Tests (CPTs). Copies of the relevant site investigation plans, cross sections and test data are attached to this report ***(Appendix B)***.

A summary of the main geological units anticipated 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 Stage 4 & 5: Road 101		
Upper Holocene	Very soft to firm PEAT, SILT and CLAY, loose Silty Sand	0.0m to 1.5m
Lower Holocene	Interbedded soft to firm SILT, CLAY and Sandy SILT; Loose to medium dense Silty SAND.	0.0m to 6.5m
Whangamarino Formation	Very stiff Clayey SILT and Sandy SILT; Medium dense Silty SAND	>14.0m
B: Rolling Hills Stage 4: Lot 182 to 197, 221 to 233, 259 to 265; Stage 5: 172 to 181, 198 to 220, 234 to 258.		
Geological Unit	**Description**	**Typical Thickness**
Brown Ash (Hamilton/Kauroa Ash)	Stiff to very stiff CLAY and Silty CLAY	0.0m to 1.0m
Whangamarino Silts and Clays	Stiff to very stiff CLAY, SILT, Silty CLAY, Clayey SILT, Sandy SILT; pumiceous.	1.0 to 2.0m
Whangamarino Lignite	Hard LIGNITE	0.5m to 2.0m
Whangamarino Sands	Medium dense to very dense pumiceous SAND and Silty SAND	>1.0m

Ground conditions encountered during earthworks on the rolling hills generally agreed with those described above.

Where the Stage 4 fill embankment encroached over the alluvial flats the upper Holocene was undercut exposing the stiff to very silty clay and clayey silt of the Whangamarino Formation.

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 across the Alluvial Flats was approximately 0.5m below the existing ground level. This is expected to rise close to ground level during winter conditions (RL5.0m).

Investigation data suggested perched groundwater conditions on top of the Whangamarino Lignite layers across the rolling hills. This was confirmed where localised seepages were observed during construction.

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
- Pad foot rollers

5.2. Construction Programme

Earthworks operations for the subject lots generally involved downcutting the more elevated hill topography of Stages 4 and 5 and placing engineer certified fill within lower-lying areas across Stages 4 & 5.

The chronology of the main earthworks operations is as follows:

- An early earthworks package was undertaken during the 2017/18 season across the Sales Precinct within Stages 2 and 3 and nearby areas.
- During the 2018/19 season, bulk earthworks were carried out across Stages 1 to 4 and 6 but were not completed at that time.
- Bulk earthworks were continued in the 2019/20 season across Stages 1A, 2, 2A, 3, 4, 5 and 6.

The main earthworks activities that were carried out are summarised as follows:

- Topsoil stripping across all bulk cut and fill earthworks surfaces;
- Bulk cut to fill earthworks were then undertaken and completed to the levels presented on ***Drawings 49 to 51*** to 03 June 2020;
- Over-excavating soft and compressible Upper Holocene Alluvium from beneath the Stage 4 fill embankment to depths of up to 2.0 metres to expose a stiff to very stiff subgrade.

- Subsoil drains were installed at the locations shown on ***Drawings 52 to 54*** to intercept perched groundwater seepages in elevated hill topography of Stages 4 and 5 and allow flow beneath the fill to discharge into the stormwater collection system at the eastern margins of the stages;
- In the over-excavated areas of Stage 4 a 0.5m thick granular starter fill layer was constructed within 2 layers of Bidim A14 geotextile to deal with abundant groundwater seepage in the base of the undercut;
- Due to the sensitive soils, high groundwater table and the size of machinery being used meant that in the low-lying areas of Stage 5 significant remoulding was observed. A 0.6m thick clay starter layer was constructed across this area with nominal compaction to provide an elevated stable working platform for the machinery.
- Over-excavation of soft and compressible material that had accumulated within the Stage 4 and 5 temporary sediment retention ponds to expose a stiff to very stiff subgrade before infilling with engineered fill.
- Where Stage 5 fill embankment was situated over the upper Holocene Alluvium, 3 settlement monitoring points were installed to monitor the settlement and provide geotechnical data to allow the back calculation of long term creep settlements.
- Lignite was encountered near foundation level in Lots 192 to 193, 221 to 226. The lignite was undercut to a maximum depth of 0.5m below finished level prior to being backfilled with suitably compacted engineered fill.
- In Lots 182, 183, 219 and 220 the near surface sensitive silt was observed to be rutting under heavy trafficking. These were undercut to a maximum depth of 0.5m prior to being backfilled with suitably compacted engineered fill.

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 and subjected to laboratory testing to determine the solid density and compaction properties of these materials.

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 cohesive soils used as 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

Shear strength was measured by hand-held shear vane calibrated using NZGS 2001 method.

During the 2018/19 and 2019/20 seasons a total of 633 compliance tests (incl 122 retests) have been carried out on a certified fill volume of 658,056m^3 placed to 03 June 2020. This equates to one fill test per 1288m^3 of fill. The specification required 1 test every 1000m^3 to 1500m^3.

The locations of the respective earthfill quality control tests are presented on the attached ***Drawings 55 to 57***.

6.3. Earthfill Suitability

Results of the earthfill quality control testing undertaken to date in Stages 4 and 5 are provided in ***Appendix E*****.** Some of these were undertaken in previous earthwork seasons and have been reported previously.

Control tests carried out on the fill showed that on some occasions the required compaction standards were not being achieved, generally due to being too wet or too dry of 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 was achieved.

No geotechnical testing was carried out on the starter layers. Through visual observation of the fill placement and shear vane testing within the post construction hand augers we are confident the starter layer has been adequately compacted on the wetter side of optimum.

Where undercut depths were less than 0.4m, in-situ shear vane testing was relied upon to determine the adequate compaction of the placed fill due to the inability to use Nuclear Density testing due to the limits of the machine.

Based on the 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 Lots mentioned above to confirm geotechnical ultimate bearing capacities for building foundations. Borehole locations are presented on ***Drawings 52 to 54***.

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

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 our 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 Earthtech Stage 1 Investigation and Design report (ref. 4036-3). The liquefaction risk within building platforms was as described as low. For the eastern margin of Road 101 the risk was considered minor to moderate in that report. That report was prepared assuming IL3 structures, included no aging factor for the Whangamarino deposits and no fill surcharge.

Re-assessment by CMW for IL2 structures, applying an aging factor of 2.05 to the Whangamarino deposits and 3m fill surcharge confirms that the risk of liquefaction induced surface deformation is low for both the residential areas and Road 101.

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 1.0m in height formed at gradients of 1 vertical (v) to 3 horizontal (h) with global gradients across the site in the order of 1(v):30(h).

At its highest and steepest point (opposite Lot 263) the eastern margin of Stage 4 comprises a 3m high fill embankment constructed at a gradient of 1(v):2(h) from very stiff to hard silt and clay fill. Copies of our slope stability analyses are provided in ***Appendix G*** and show the landform has adequate factors of safety.

Lots near the fill embankment of Stage 4 are setback 20m from the crest of the slope.

Based on these landform gradients and the scope of earthworks undertaken, including the removal of near surface soft peat and silt, underfill drainage, conditioning and compaction of engineered fills, we consider that the site provides an adequate factor of safety with regards to slope stability for residential building construction.

Where the eastern margin of Stage 5 encroached over the alluvial flats a site-specific investigation and analyses was carried out. Copies of our slope stability analyses are provided in ***Appendix G*** and show the landform has adequate factors of safety.

7.3. Fill Induced Settlement

7.3.1. Elevated Hills

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

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

7.3.2. Alluvial Flats

Where softer and compressible upper Holocene soils were encountered along the eastern margin of Stage 4 these soils were undercut and replaced structural fill being placed directly over the underlying stiff to very stiff Whangamarino silts and clays.

Along the eastern margin of Stage 5 the upper Holocene soils were filled over with three settlement monitoring points (MP07, 08 and 09) installed across the area as shown on ***Drawings 48, 51 and 54***.

Investigation and geomorphological mapping carried out prior to construction indicates the eastern edge of the lots (western edge of Road 101) is situated over firm silts of the upper Holocene (MP08 and MP09) while the eastern edge of Road 101 is situated over soft peat of the upper Holocene (MP07).

The extent of soft soils was confirmed during construction in the areas previously identified.

The settlement monitoring points were installed following the placement of 2.5m of fill. Based on the settlement response to the remaining 0.5m of fill placed subsequent post construction settlements have been calculated using parameters obtained from back-analysis of the observed settlement data.

The estimated post construction settlements are made up of the remaining consolidation settlements the additional consolidation due to subsequent building loads and secondary creep settlements.

Creep settlements (S_{creep}) were estimated in accordance with the following relationship as described in Mesri et al (1994):

$$S_{creep} = \frac{C_\alpha}{1 + e_0} . H . \log\left(\frac{t}{t_l}\right)$$

Where C_α and e_0 are as defined in ***Appendix H***, H = thickness of compressible layer, t = design life (50 years), $t_l = t_{90}$ or construction period, whichever is greatest.

Resulting creep settlement magnitudes were estimated based on the following:

- Design life of 50 years.
- 10kPa building load.

The estimated total post construction settlements of soils beneath the lots are of the order of 20mm which is within building code.

The estimated total post construction settlements due to the soft peat along the eastern side of Road 101 are of the order of 60mm. It has been confirmed by Candor3 that services proposed in this area can accommodate these estimated post construction settlements.

Copies of the monitoring data and back analysis calculations are presented in ***Appendix H***.

7.4. Post Construction Ground Profile

7.4.1. Post Construction Hand Auger Frequency

Based on anticipated ground conditions at and near design subgrade level (stiff to very stiff cohesive, medium dense granular natural soils and very stiff engineered fill materials), our post construction hand auger frequency was determined as follows:

- Where Lots sizes are less than 450m^2 one post construction hand auger was carried out for every second Lot. This was usually on a shared lot boundary.
- Where Lot sizes are greater than 450m^2 one post construction hand auger was carried out near the centre of the Lot.

Where variation to the anticipated ground conditions was encountered additional post construction hand augers were carried out to determine the extent of the variation.

7.4.2. Lignite

In the geotechnical interpretative reports prepared for the subdivision, various recommendations were made regarding undercutting lignite deposits where exposed at design subgrade level to depths of between 1.0m and 1.5m. During the earthworks consenting process, 1.5m was recommended.

These recommendations were based on the lignite being weak and compressible, thereby posing a low bearing capacity risk and unacceptable settlements for standard NZS3604 based foundations, together with possible shrinkage on drying and possible acid soil conditions.

As earthworks have progressed, the Lignite has been observed as being hard, dry and of low compressibility.

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.

For all lots considered in this report, lignite was at least 500mm below design subgrade level, except in Lots 223 to 227. For these lots a proprietary raft foundation is recommended.

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 Stages 4 and 5 cut areas have been found to be susceptible to significant shear strength loss upon repetitive vehicle and plant movements.

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.

Vibratory compaction methods should not be used over these soils.

7.5. Foundation Bearing Capacity

7.5.1. General Conditions

Post construction hand auger borehole results undertaken following earthworks, combined with the earthfill compaction test results indicate that for all lots covered by this report except those mentioned below in Sections 7.5.2 to 7.5.5, meet NZS3604 criteria and 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.

For the Lots described in Sections 7.5.2 to 7.5.5 below raft foundations have been recommended. This is because of a reduced ultimate geotechnical bearing pressures on some lots and a risk of

unacceptable differential settlements for standard footings due to highly variable ground conditions on others.

7.5.2. Lots 186 & 187

The post construction hand augers indicate a 'channel' within the underlying lignite which would be spanned by the building platform in these lots.

Proprietary raft foundations are therefore recommended for these lots on account of the highly variable underlying soils.

7.5.3. Lots 196 to 199

Variable loose to dense near surface sandy soils were encountered within close proximity to foundation level in these lots. The post construction hand auger indicates that a Geotechnical Ultimate Bearing Capacity of 200kPa should be available.

Proprietary raft foundations are therefore recommended for these lots on account of natural variability of soil strengths across these lots.

The lots have been cut, or unloaded, to a depth of 1.5m to 2.5m whereby they have been fully load compensated for 1 and 2 level domestic buildings constructed to NZS 3604 standard and subsequent settlements are expected to be acceptably low.

7.5.4. Lots 192, 193, 221 & 222

Lignite soils were encountered within close proximity to foundation level in parts of these lots. These were undercut to depths of 0.5m below finish level and backfilled in engineered fill. The building platform within these lots will span the cut fill boundary.

Proprietary raft foundations are therefore recommended for these lots on account of variability of the underlying soils across these lots.

7.5.5. Lots 223 to 227

Although we consider an ultimate geotechnical bearing capacity of 300kPa is present for these lots, as stated in Section 7.4.2 proprietary raft foundations are recommended due to the presence of lignite at shallow depth. This is intended to avoid the possibility of foundations being placed on, or in, lignite.

7.5.6. Geotechnical Strength Reduction Factor

As required by section B1/VM4 of the New Zealand Building Code Handbook, a strength reduction factor of 0.5 and 0.8 must be applied to all recommended geotechnical ultimate soil capacities in conjunction with their use in factored design load cases for static and earthquake overload conditions respectively.

7.6. Lot 3000 Road Subgrade Bulk Fill

Structural fill placed beneath roads with the area covered by this report has been placed and tested as part of the bulk earthworks in line with the project specification.

7.7. 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 with 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.

7.8. Service Excavations

In lots 192,193 and 221 to 227 lignite is expected to be encountered within service excavations. During bulk earthworks this was readily excavated by machine excavation although may locally be difficult to excavate by light construction plant.

7.9. Respread Topsoil

Topsoil has generally been placed across the lots following the post construction hand augers. Survey data provided by Candor[3] indicates that the topsoil depths across these lots range from approximately 0.1m to 0.3m.

7.10. 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***.

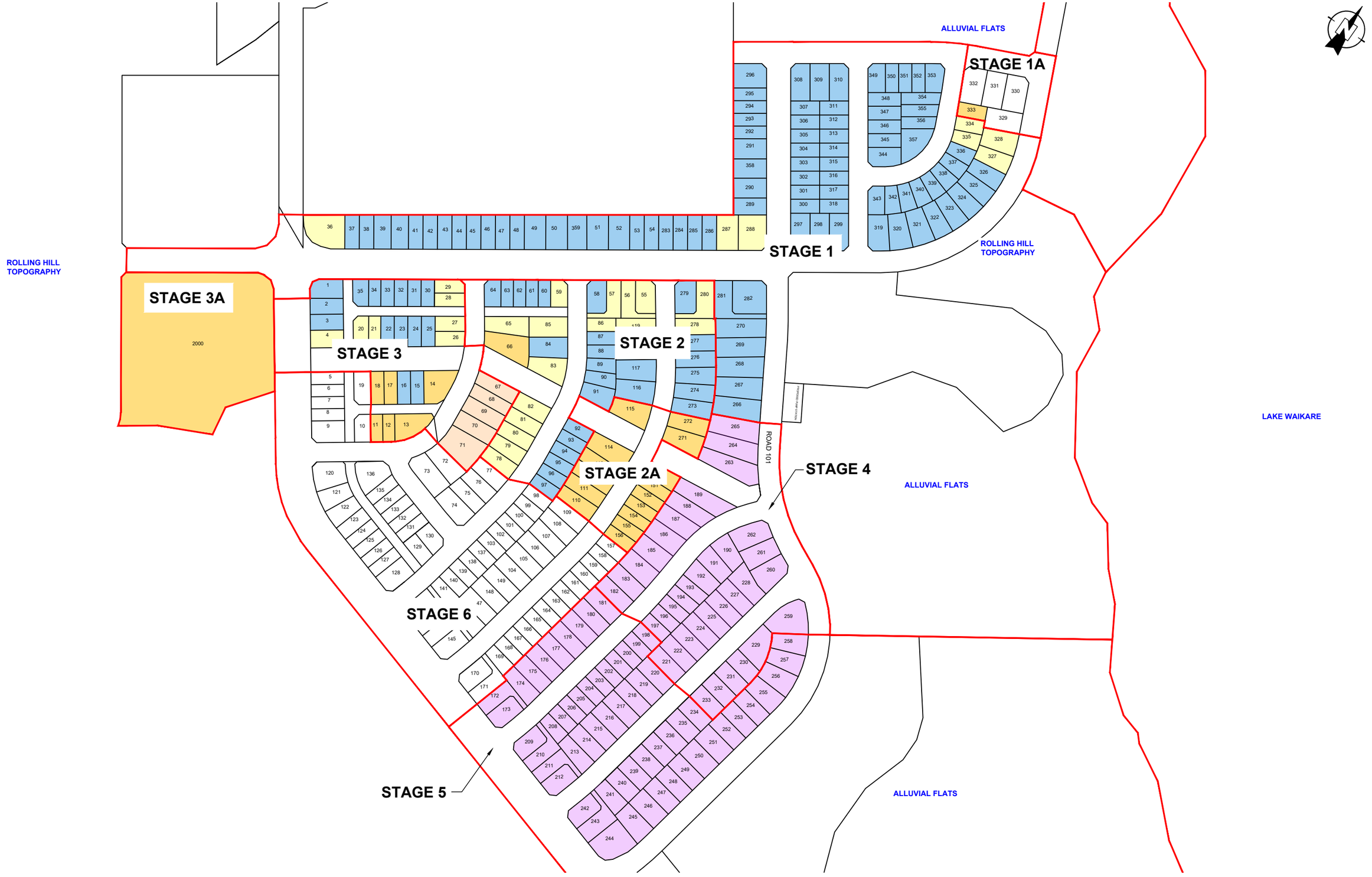
8. LIMITATION

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 purposed, 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.

Drawings



LEGEND:

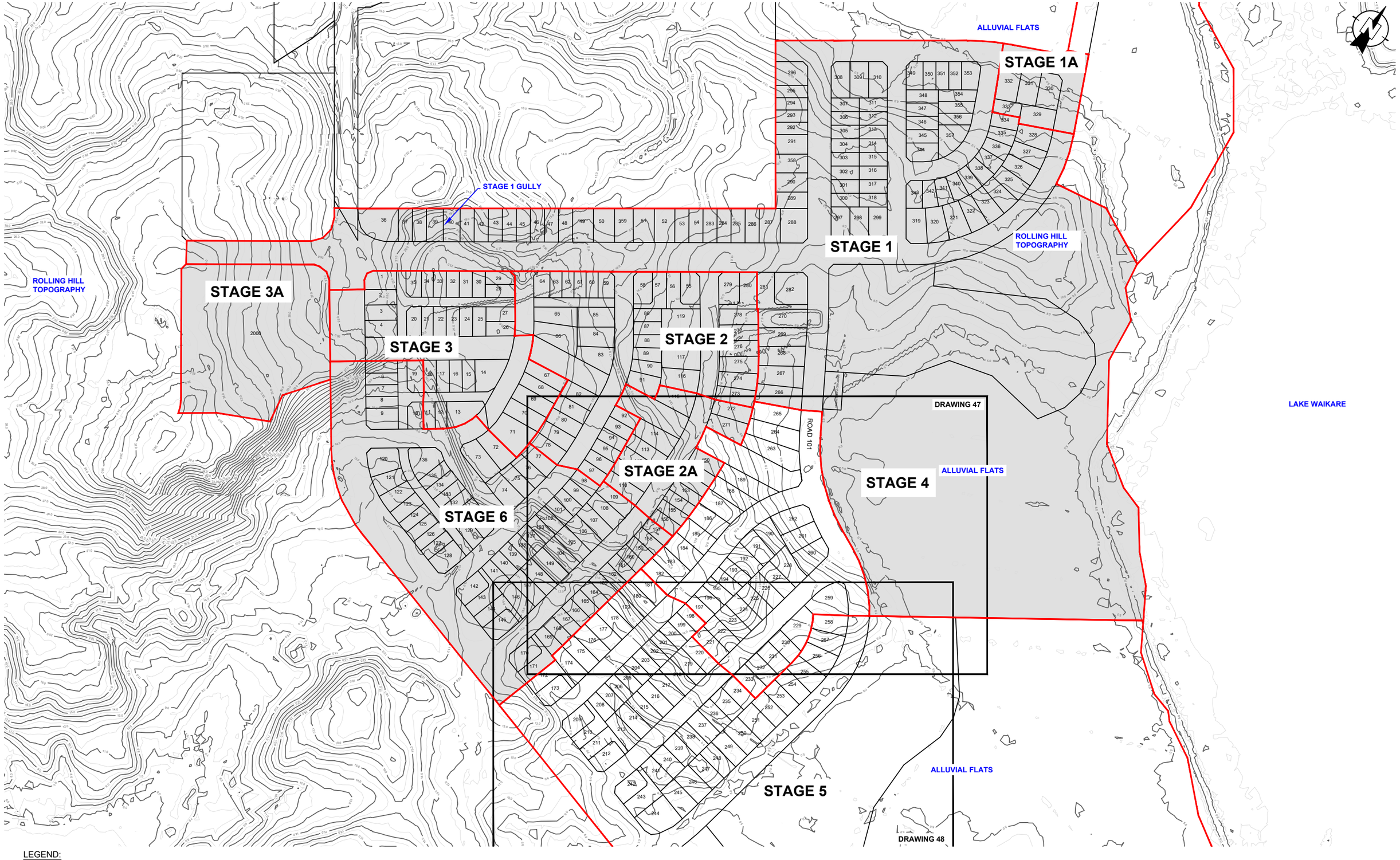
- STAGE BOUNDARY
- LOTS COVERED BY SALES PRECINCT GCR RE. HAM2017-0102
- LOTS COVERED BY GCR No.1 REPORT RE. HAM2018-106AM
- LOTS COVERED BY GCR No.2 REPORT RE. HAM2019-0062AF
- LOTS COVERED BY GCR No.3 REPORT RE. HAM2019-0062AJ
- LOTS COVERED BY GCR No.4 REPORT RE. HAM2019-0062AK

NOTES:

1. SUBDIVISION SCHEME PLAN PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 45
		REVISION: 0	SCALE: 1:3000
TITLE: GCR LOT COVERAGE INDEX PLAN		DATE: 26.08.2020	SHEET: A3 L



LEGEND:

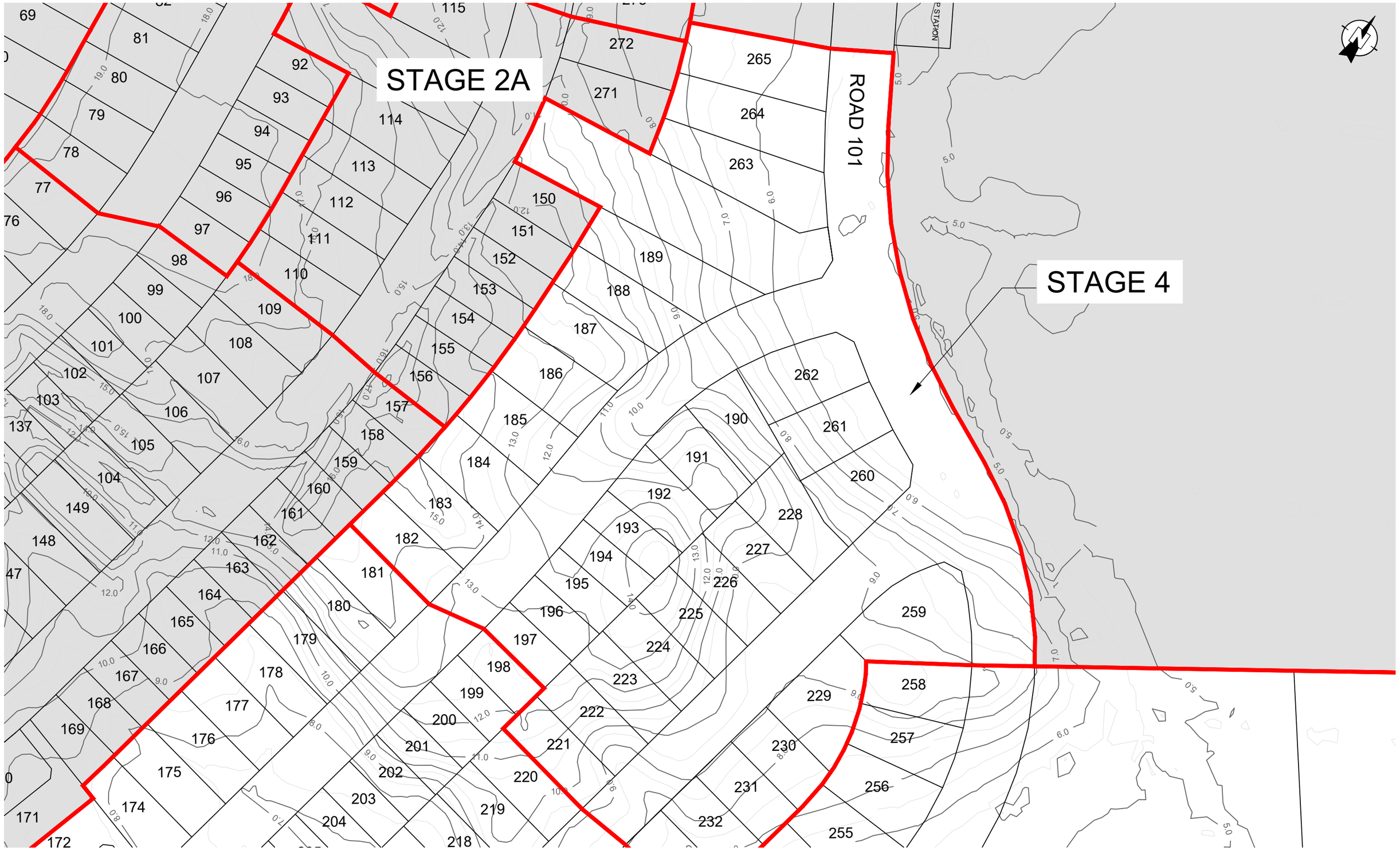
- STAGE BOUNDARY
- AREAS OUTSIDE REPORT SCOPE
- LOTS COVERED BY GCR No.4 REPORT RE. HAM2019-0062AK
- PREDEVELOPMENT CONTOURS

NOTES:

1. SUBDIVISION SCHEME PLAN & PREDEVELOPMENT CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. PREDEVELOPMENT CONTOURS RELEVANT AS OF 30.07.2018 ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOTURIKI DATUM.

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 46
		REVISION: 0	SCALE: 1:3000
TITLE: PREDEVELOPMENT CONTOUR PLAN A		DATE: 26.08.2020	SHEET: A3 L



LEGEND:

- STAGE BOUNDARY
- AREAS OUTSIDE REPORT SCOPE
- LOTS COVERED BY GCR No.4 REPORT RE. HAM2019-0062AK
- PREDEVELOPMENT CONTOURS

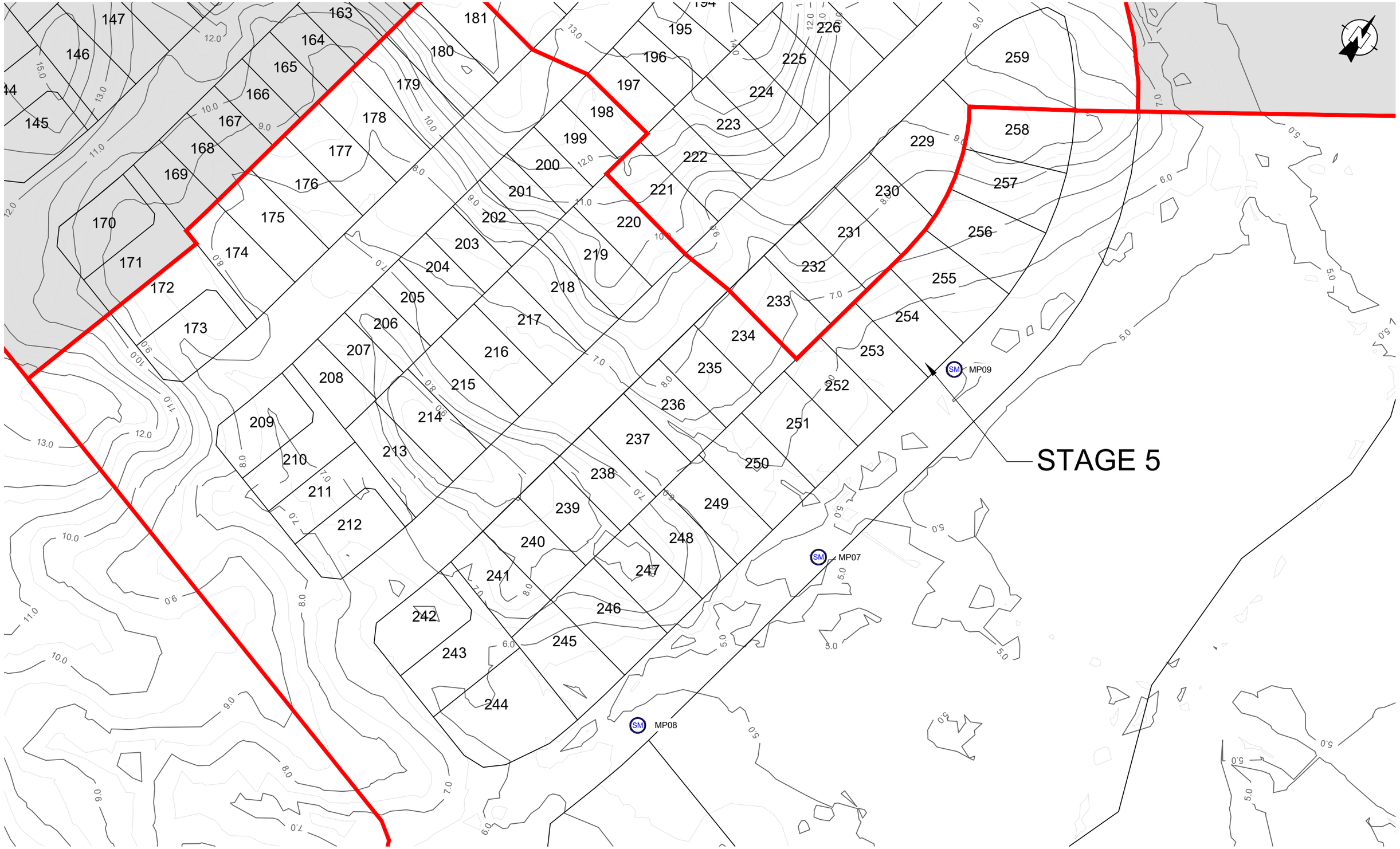
NOTES:

1. SUBDIVISION SCHEME PLAN & PREDEVELOPMENT CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. PREDEVELOPMENT CONTOURS RELEVANT AS OF 30.07.2018 ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOTURIKI DATUM.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 47
		REVISION: 0	SCALE: 1:1000
TITLE: PREDEVELOPMENT CONTOUR PLAN B		DATE: 26.08.2020	SHEET: A3 L



LEGEND:

- STAGE BOUNDARY
- AREAS OUTSIDE REPORT SCOPE
- LOTS COVERED BY GCR No.4 REPORT RE. HAM2019-0062AK
- PREDEVELOPMENT CONTOURS
- SM MP07 SETTLEMENT MONITORING LOCATION

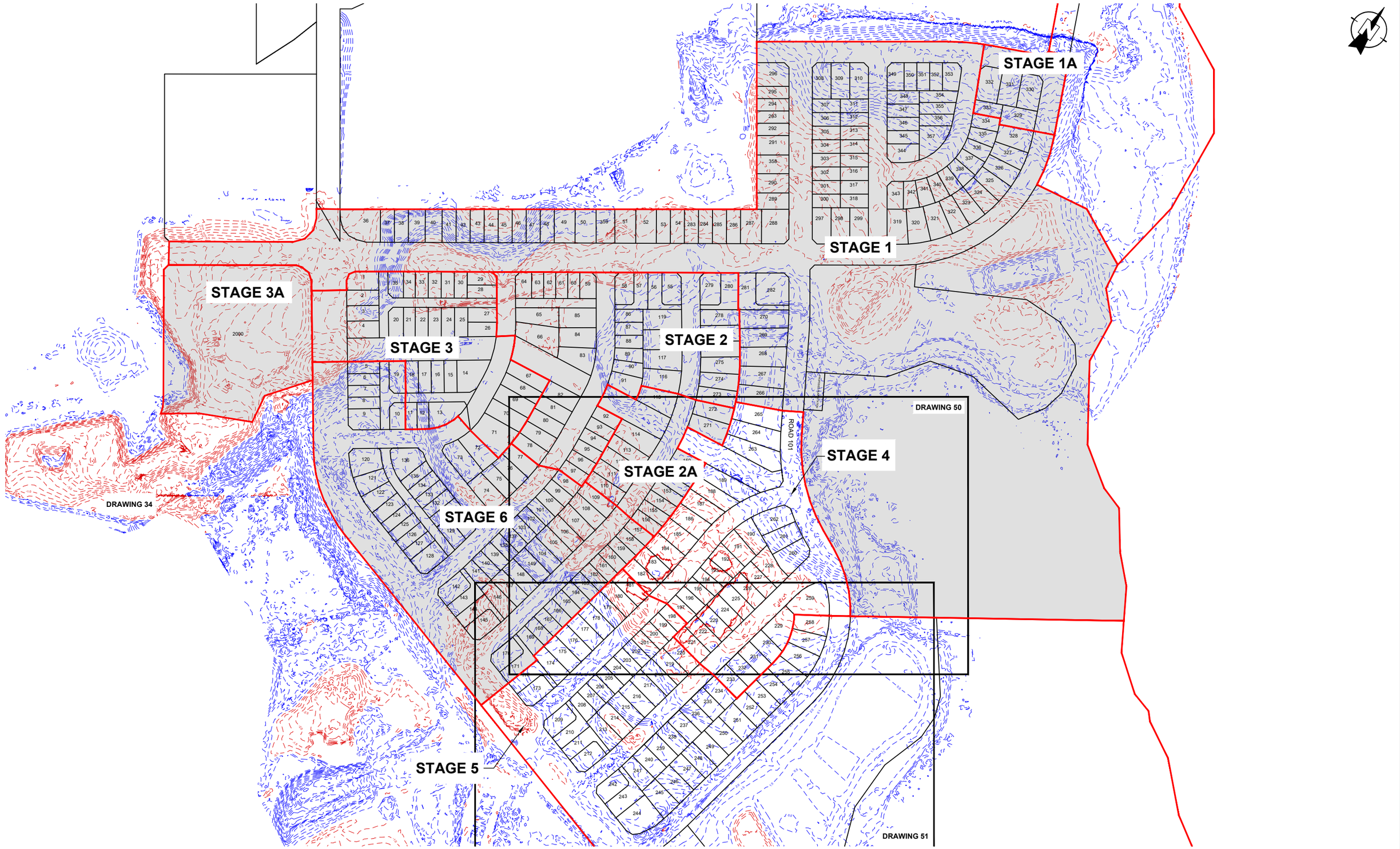
NOTES:

1. SUBDIVISION SCHEME PLAN & PREDEVELOPMENT CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. PREDEVELOPMENT CONTOURS RELEVANT AS OF 30.07.2018 ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOTURIKI DATUM.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 48
		REVISION: 0	SCALE: 1:1000
TITLE: PREDEVELOPMENT CONTOUR PLAN C		DATE: 26.08.2020	SHEET: A3 L



LEGEND:

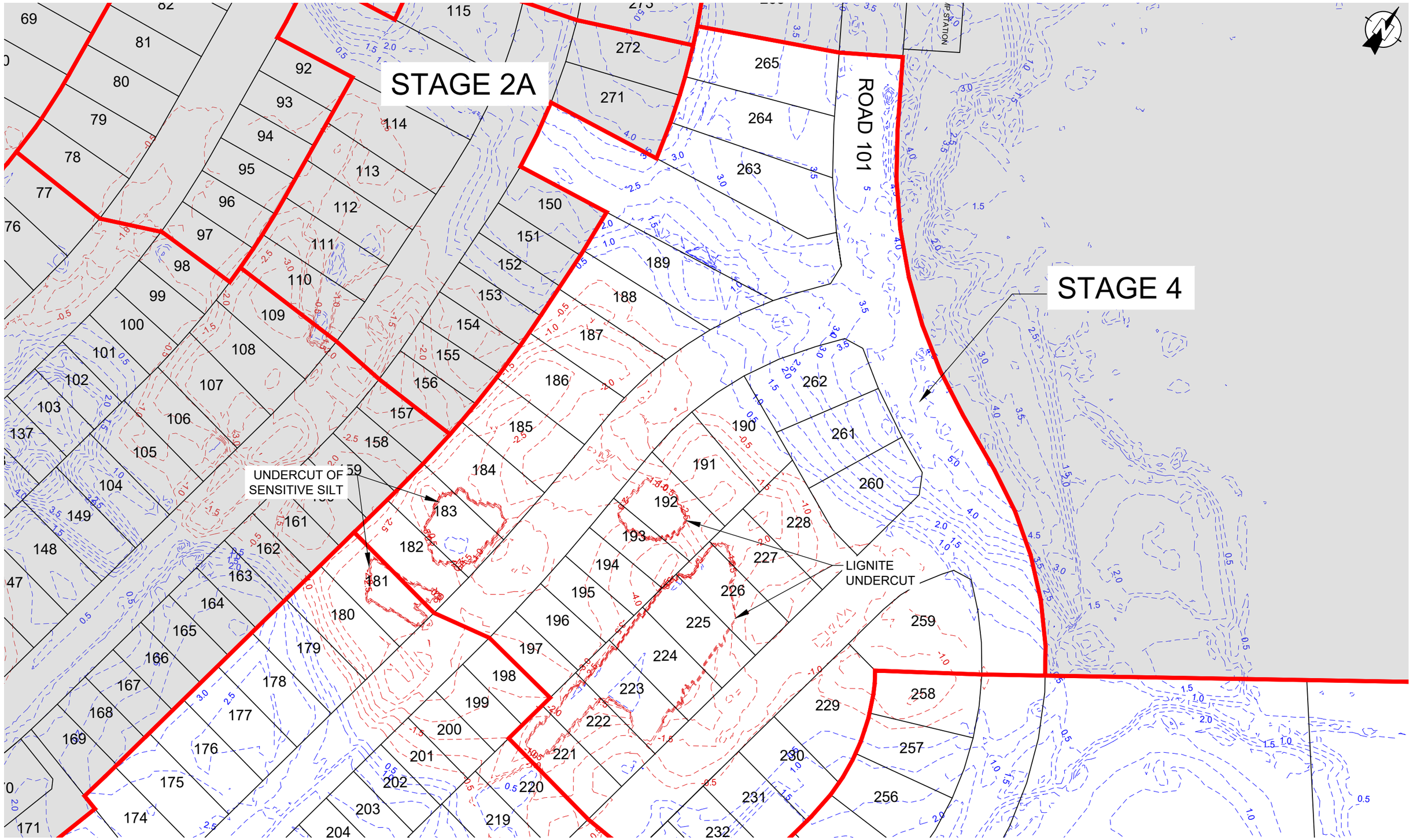
- STAGE BOUNDARY
- AREAS OUTSIDE REPORT SCOPE
- LOTS COVERED BY GCR No.4 REPORT RE. HAM2019-0062AK
- CUT CONTOURS
- FILL CONTOURS

NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND RELATIVE TO THE PREDEVELOPMENT CONTOURS DATED 30.07.2018.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 03.06.2020 PROVIDED BY CANDOR3.

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 49
		REVISION: 0	SCALE: 1:3000
TITLE: CUT / FILL CONTOUR PLAN A		DATE: 26.08.2020	SHEET: A3 L



LEGEND:

- STAGE BOUNDARY
- AREAS OUTSIDE REPORT SCOPE
- LOTS COVERED BY GCR No.4 REPORT RE. HAM2019-0062AK
- 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 DATED 28.11.2019.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND RELATIVE TO THE PREDEVELOPMENT CONTOURS DATED 30.07.2018.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 03.06.2020 PROVIDED BY CANDOR3.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 50
		REVISION: 0	SCALE: 1:1000
TITLE: CUT / FILL CONTOUR PLAN B		DATE: 26.08.2020	SHEET: A3 L

UNDERCUT OF SENSITIVE SILT

LIGNITE UNDERCUT

STAGE 5

SM MP09

SM MP07

SM MP08

LEGEND:

- STAGE BOUNDARY
- AREAS OUTSIDE REPORT SCOPE
- LOTS COVERED BY GCR No.4 REPORT RE. HAM2019-0062AK
- CUT CONTOURS
- FILL CONTOURS
- SM MP07 SETTLEMENT MONITORING LOCATION

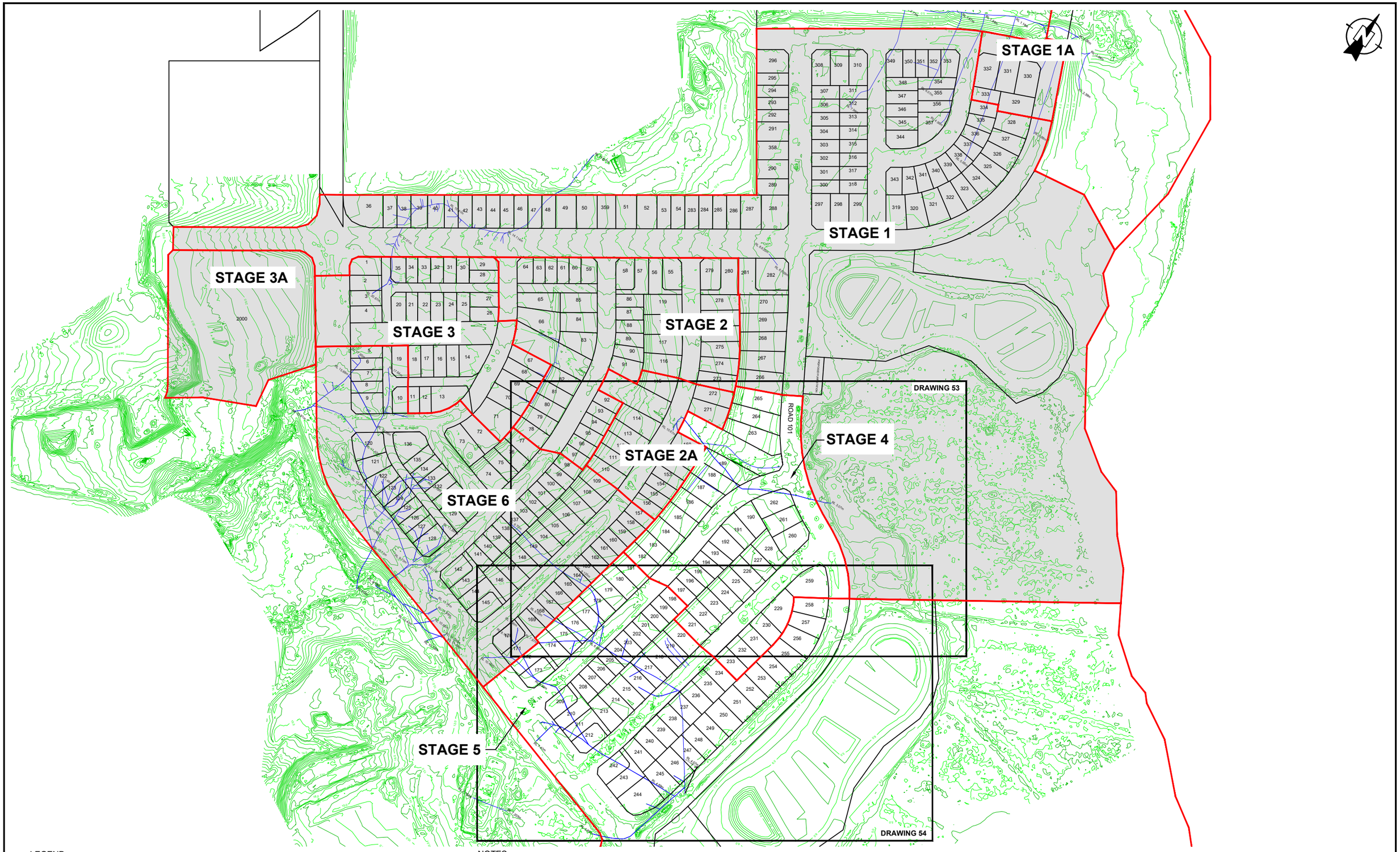
NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS AND RELATIVE TO THE PREDEVELOPMENT CONTOURS DATED 30.07.2018.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 03.06.2020 PROVIDED BY CANDOR3.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 51
		REVISION: 0	SCALE: 1:1000
TITLE: CUT / FILL CONTOUR PLAN C		DATE: 26.08.2020	SHEET: A3 L



LEGEND:

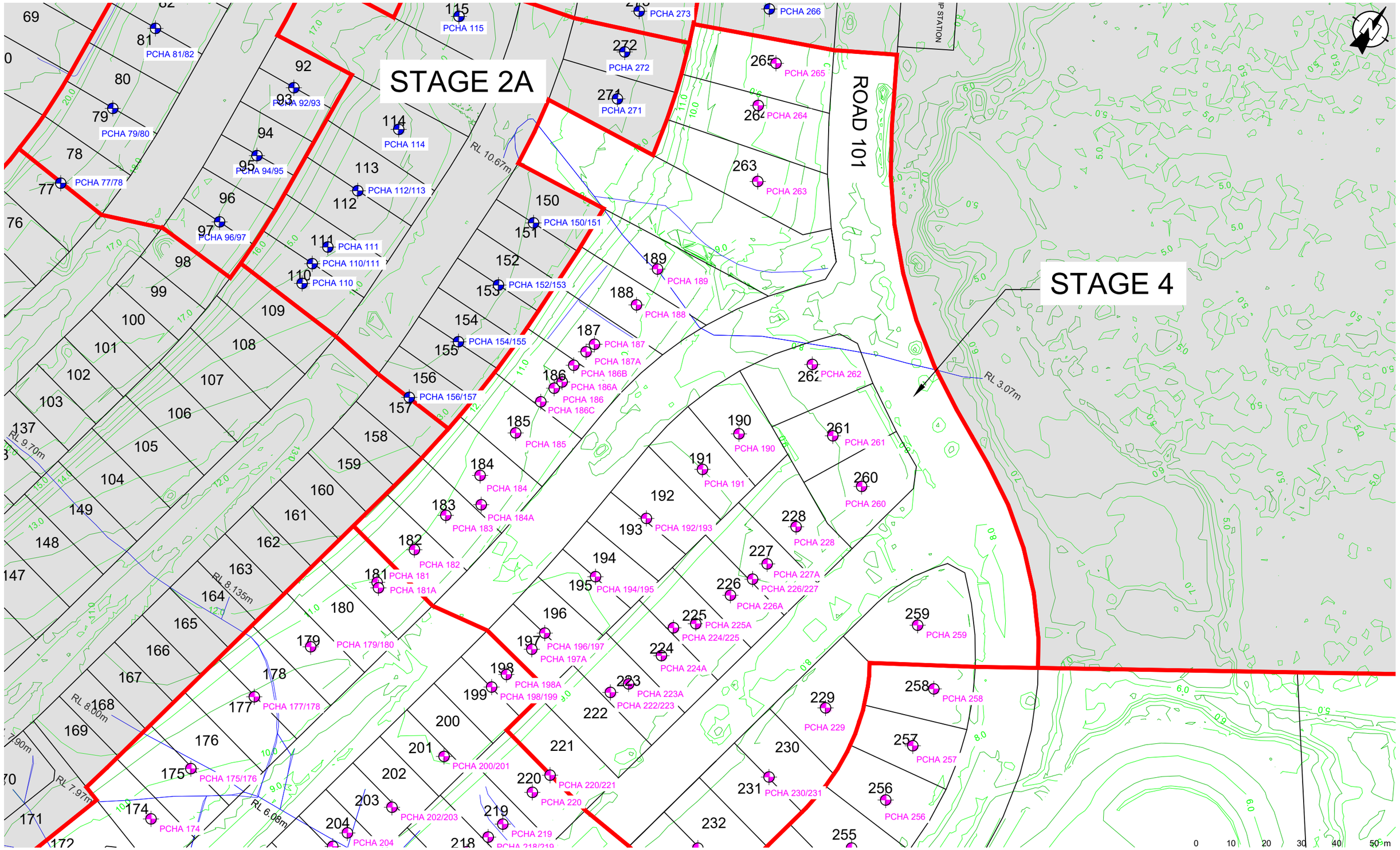
- STAGE BOUNDARY
- LOTS COVERED BY GCR No.4 REPORT RE. HAM2019-0062AK
- AREAS OUTSIDE REPORT SCOPE
- AS BUILT SURVEY CONTOURS
- AS BUILT SUBSOIL DRAIN

NOTES:

1. SUBDIVISION SCHEME PLAN & AS BUILT CONTOURS PROVIDED BY CANDOR3 03.06.2020
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2017
3. AS BUILT CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOTURIKI DATUM.
4. AS BUILT CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 03.06.2020 AND PROVIDED BY CANDOR3.

CMW Geosciences

CLIENT: **LAKESIDE DEVELOPMENTS (2017) LTD**	DRAWN: WPJ	PROJECT No: HAM2019-0062	
PROJECT: **LAKESIDE DEVELOPMENT, TE KAUWHATA**	CHECKED: LYK	DRAWING: 52	
	REVISION: 0	SCALE: 1:3000	
TITLE: **POST CONSTRUCTION HAND AUGER PLAN A**	DATE: 26.08.2020	SHEET: A3 L	



LEGEND:

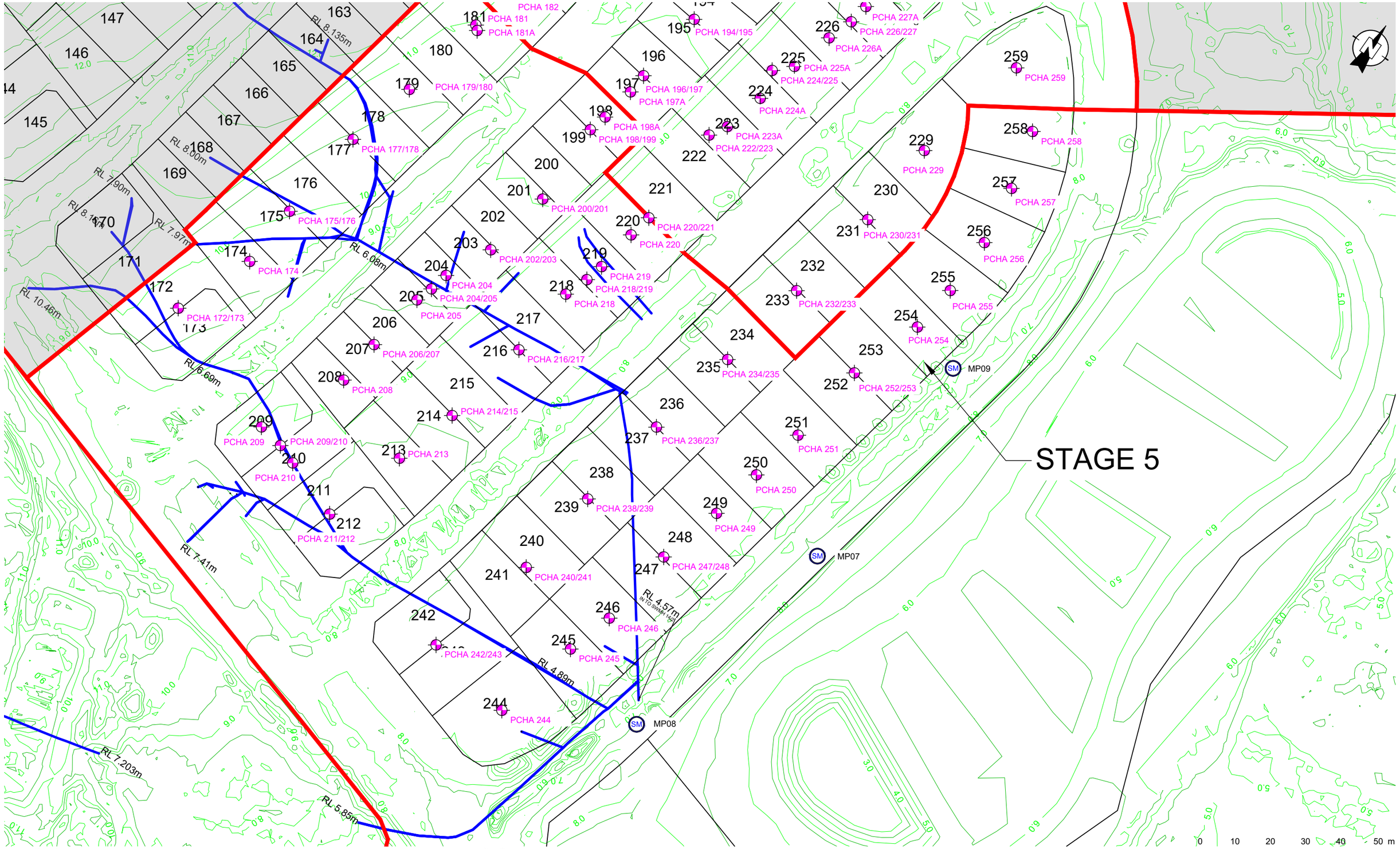
- STAGE BOUNDARY
- LOTS COVERED BY GCR No.4 REPORT RE. HAM2019-0062AK
- AREAS OUTSIDE REPORT SCOPE
- PCHA01 — POST CONSTRUCTION HAND AUGER LOCATION IN PREVIOUS GCR'S
- PCHA04 — POST CONSTRUCTION HAND AUGER LOCATION IN GCR NO.4
- AS BUILT SURVEY CONTOURS
- AS BUILT SUBSOIL DRAIN

NOTES:

1. SUBDIVISION SCHEME PLAN & AS BUILT CONTOURS PROVIDED BY CANDOR3 03.06.2020
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2017
3. AS BUILT CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOTURIKI DATUM.
4. AS BUILT CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 03.06.2020 AND PROVIDED BY CANDOR3.

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 53
		REVISION: 0	SCALE: 1:1000
TITLE: POST CONSTRUCTION HAND AUGER PLAN B		DATE: 26.08.2020	SHEET: A3 L



LEGEND:

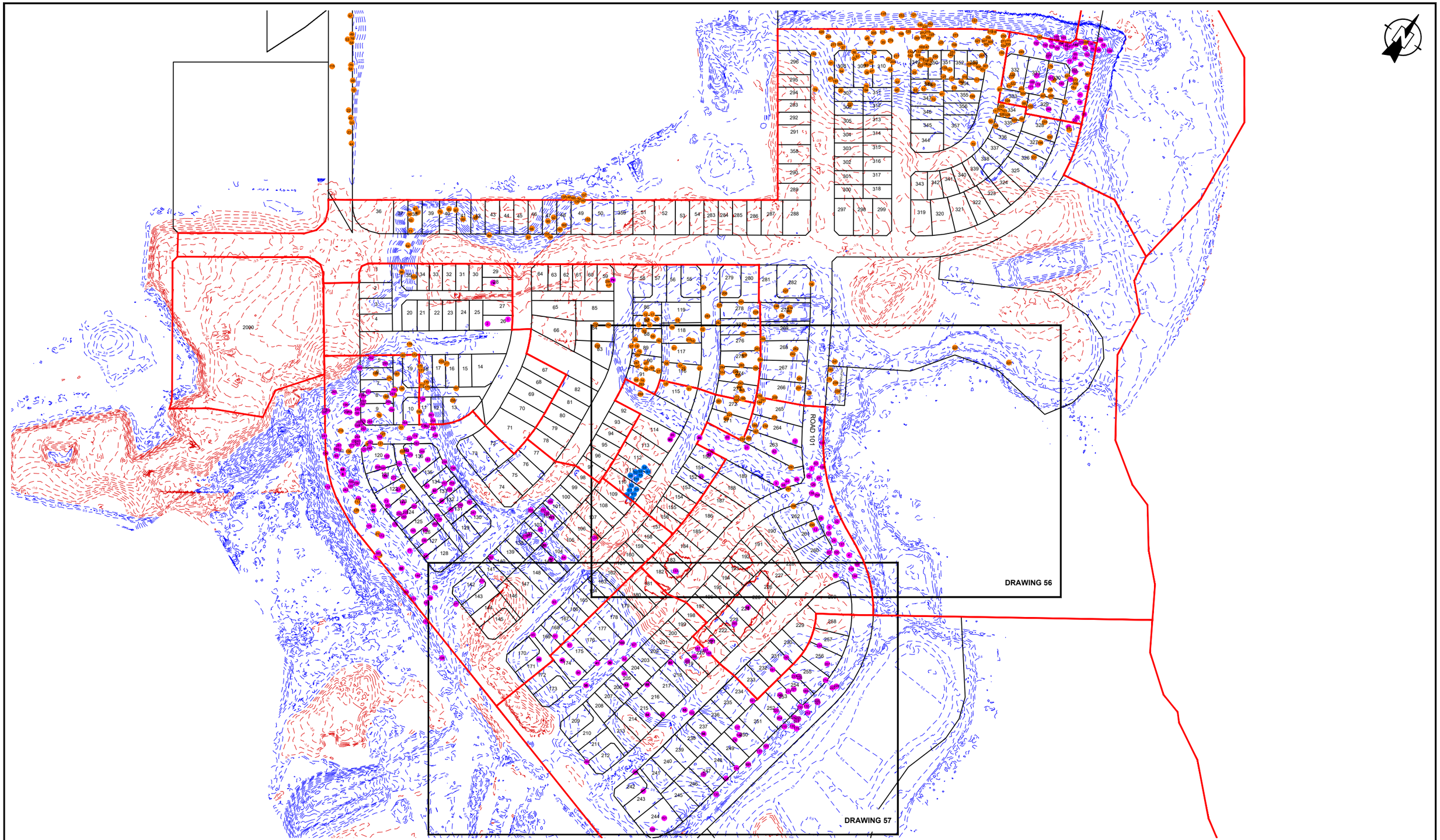
- STAGE BOUNDARY
- LOTS COVERED BY GCR No.4 REPORT RE. HAM2019-0062AK
- AREAS OUTSIDE REPORT SCOPE
- PCHA01 — POST CONSTRUCTION HAND AUGER LOCATION IN PREVIOUS GCR'S
- PCHA04 — POST CONSTRUCTION HAND AUGER LOCATION IN GCR NO.4
- AS BUILT SURVEY CONTOURS
- AS BUILT SUBSOIL DRAIN
- SM MP07 — SETTLEMENT MONITORING LOCATION

NOTES:

1. SUBDIVISION SCHEME PLAN & AS BUILT CONTOURS PROVIDED BY CANDOR3 03.06.2020
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2017
3. AS BUILT CONTOURS ARE IN 0.5m INTERVALS AND ARE WITH RESPECT TO MOTURIKI DATUM.
4. AS BUILT CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 03.06.2020 AND PROVIDED BY CANDOR3.

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 54
		REVISION: 0	SCALE: 1:1000
TITLE: POST CONSTRUCTION HAND AUGER PLAN C		DATE: 26.08.2020	SHEET: A3 L



LEGEND:

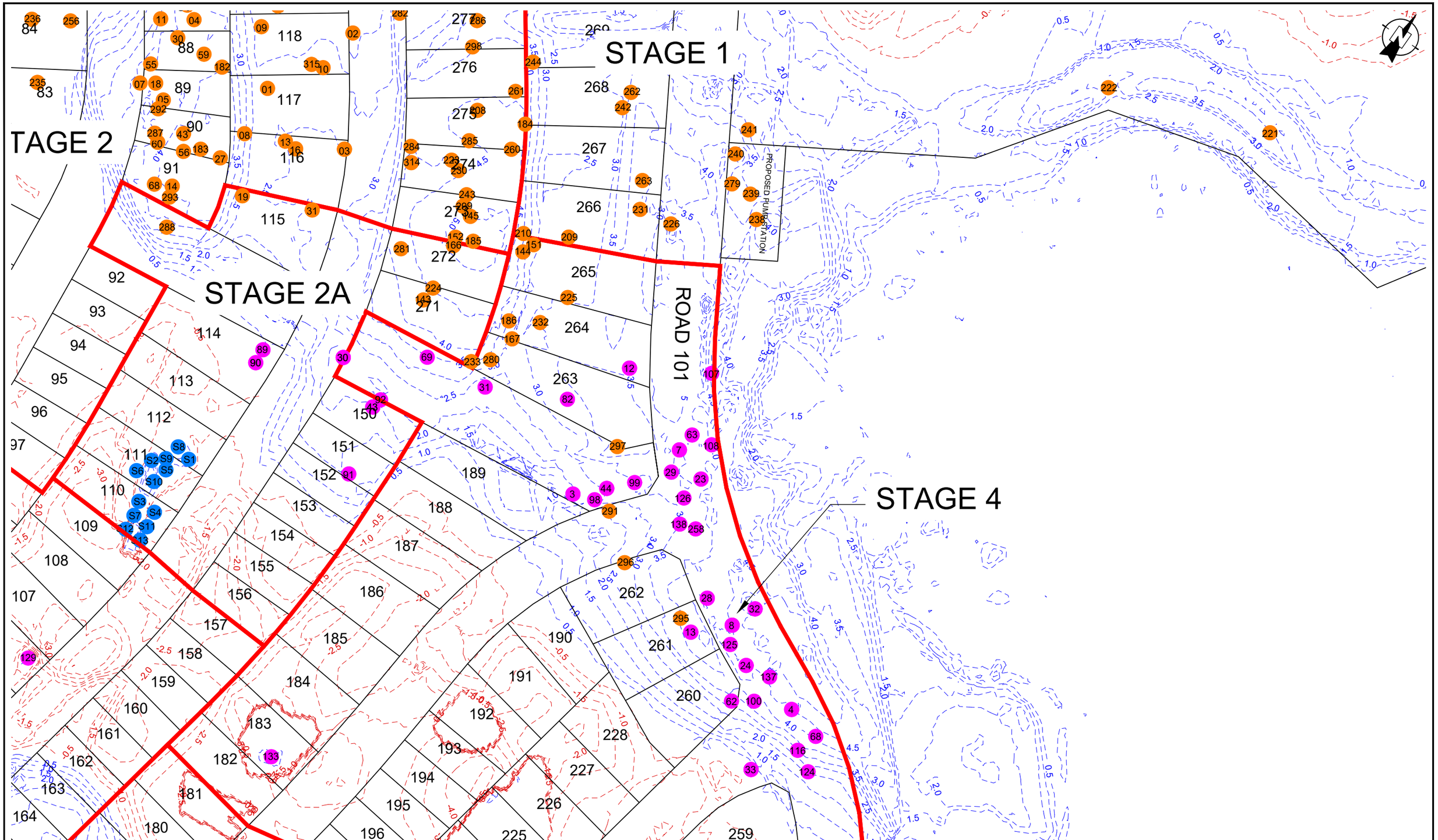
- STAGE BOUNDARY
- CUT CONTOURS
- FILL CONTOURS
- 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2018/19 SEASON)
- 1 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2019/20 SEASON)
- S1 DYNAMIC CONE PENETROMETER (DCP) TEST LOCATION (2019/20 SEASON)

NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 03.06.2020 AND PROVIDED BY CANDOR3.
5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 55
		REVISION: 0	SCALE: 1:3000
TITLE: FILL TEST LOCATION SITE PLAN A		DATE: 26.08.2020	SHEET: A3 L



LEGEND:

- STAGE BOUNDARY
- CUT CONTOURS
- FILL CONTOURS
- 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2018/19 SEASON)
- 1 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2019/20 SEASON)
- S1 DYNAMIC CONE PENETROMETER (DCP) TEST LOCATION (2019/20 SEASON)

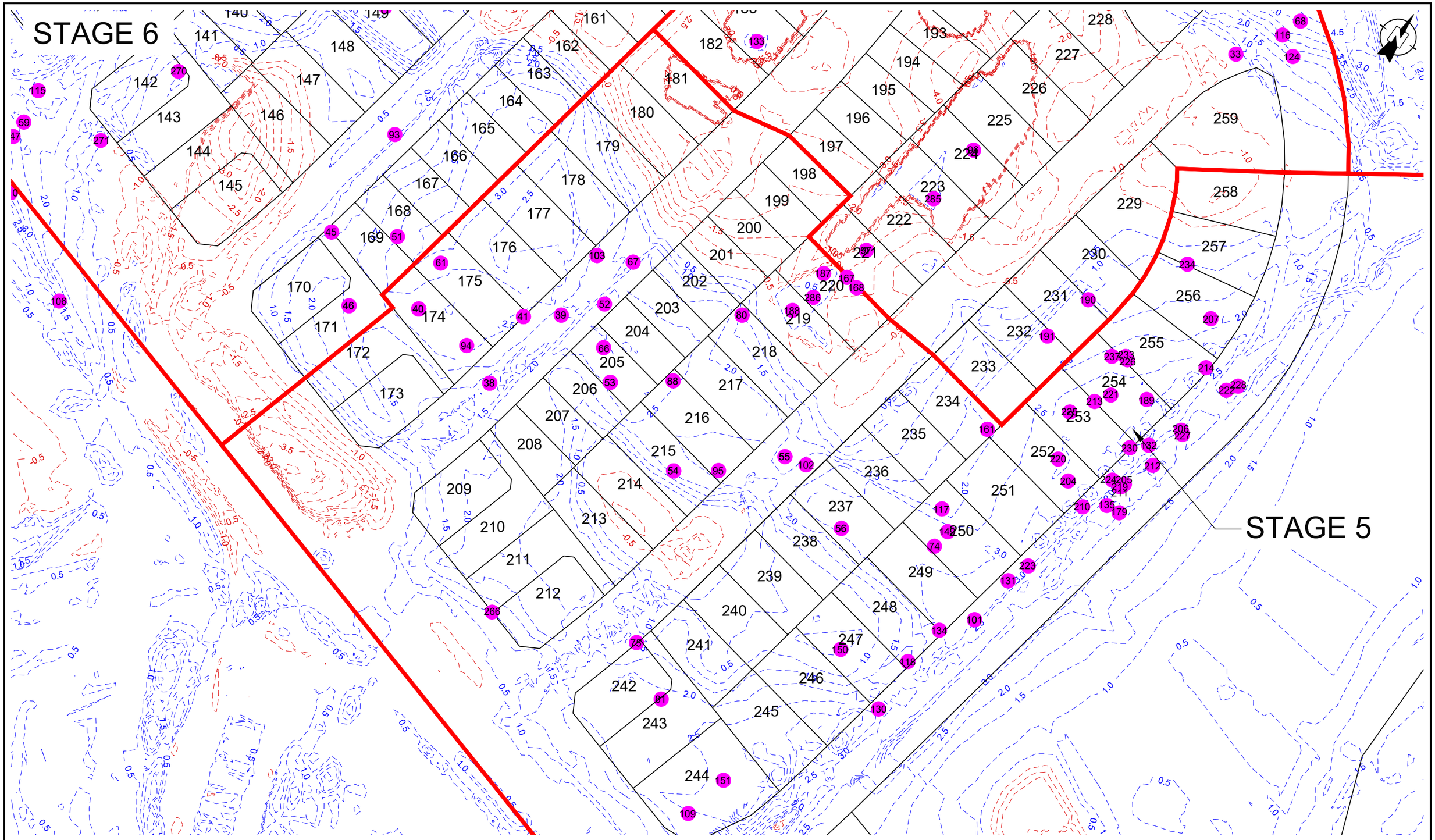
NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 03.06.2020 AND PROVIDED BY CANDOR3.
5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 56
		REVISION: 0	SCALE: 1:1000
TITLE: FILL TEST LOCATION SITE PLAN B		DATE: 26.08.2020	SHEET: A3 L



LEGEND:

- STAGE BOUNDARY
- CUT CONTOURS
- FILL CONTOURS
- 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2018/19 SEASON)
- 1 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2019/20 SEASON)
- S1 DYNAMIC CONE PENETROMETER (DCP) TEST LOCATION (2019/20 SEASON)

NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 03.06.2020 AND PROVIDED BY CANDOR3.
5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN: WPJ	PROJECT No: HAM2019-0062	
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA	CHECKED: LYK	DRAWING: 57	
	REVISION: 0	SCALE: 1:1000	
TITLE: FILL TEST LOCATION SITE PLAN C	DATE: 26.08.2020	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 4 & 5

Developer: Lakeside Developments (2017) Limited

Location: 98 Scott Street, Te Kauwhata

I, Kenneth John Read **of CMW Geosciences (NZ) Ltd Partnership, 5 Hill Street Hamilton**

(Full name)

(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 my preliminary investigations are described in the following Report(s):

Earthtech Stage 1 Geotechnical Design Report (ref: 4036-3), December 2017;
CMW Stage 5 Construction Recommendation Technical Memo (ref HAM2018-0106AQ Rev 0), dated 16 August 2019.

and the conclusions and recommendations of those documents 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: HAM2019-0062AK Rev 0 **Date: 28 August 2020**

4. In my professional opinion, not to be construed as a guarantee, I consider that

(a) The earth fills shown on the attached Drawings Nos 49 to 51 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.

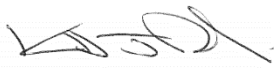
(b) The completed works take into account land slope and foundation stability considerations, subject to the appended foundation recommendations and earthworks restrictions (which should be read in conjunction with the appended final site contour plan).

(c) Subject to 4(a) and 4(b) of this Schedule, the filled ground is suitable for the erection of buildings designed according to NZS 3604 provided that:
The recommendations and procedures given in Geotechnical Completion Report No. 4, Ref HAM2019-0062AK Rev 0, dated 28 August 2020 are followed.

(d) Road subgrades have been formed with appropriate regard for slope stability and settlement risks.

(e) 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.

(f) This certificate shall be read in conjunction with my geotechnical report referred to in clause 3 above and shall not be copied or reproduced except in conjunction with the full geotechnical completion report.

Signed:  **Date:** 28/08/2020

Full name: **Kenneth John Read**

Title: **Principal Geotechnical Engineer**

Professional qualifications: BSc Geology, MSc Engineering Geology, CPEng, CMEngNZ

Copyright waived[1]

[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 (m²)	Stage	Subsurface Data						Foundations		Topsoil Thickenss (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)	Y/N/NA	Y/N/NA			
172	443	5	-	189	Y	2.0	N	-	Y	N	0.30	N	
173	435	5	-	189	Y	2.0	N	-	Y	N	0.30	N	
174	433	5	-	>200	Y	2.5	N	-	Y	N	0.30	N	
175	432	5	-	>200	Y	2.5	N	-	Y	N	0.25	N	
176	432	5	-	>200	Y	2.5	N	-	Y	N	0.25	N	
177	432	5	-	167	Y	2.5	N	-	Y	N	0.25	N	
178	432	5	-	167	Y	2.5	N	-	Y	N	0.25	N	
179	432	5	-	158	Y*	2.0	Y*	0.5	Y	N	0.25	N	See Note 2.
180	432	5	-	158	Y	0.5	Y	2.5	Y	N	0.20	N	
181	432	5	7	200	Y*	0.3	Y	2.5	Y	N	0.15	N	See Note 2.
182	430	4	13	190	Y*	0.3	Y	2.5	Y	N	0.25	N	See Note 2
183	456	4	7	89	Y*	0.5	Y	3.0	Y	N	0.20	N	See Note 2.
184	521	4	6.8	-	Y*	0.3	Y	3.0	Y	N	0.15	N	See Note 2.
185	520	4	9.8	187	N	-	Y	2.5	Y	N	0.20	N	
186	521	4	8	-	N	-	Y	2.5	N	Y	0.25	N	See Note 3.
187	521	4	-	166	N	-	Y	1.5	N	Y	0.25	N	See Note 3.
188	521	4	-	167	Y*	0.3	Y	0.5	Y	N	0.15	N	See Note 2.
189	676	4	-	198	Y	1.0	N	-	Y	N	0.20	N	
190	439	4	-	191	Y*	0.5	Y*	1.5	Y	N	0.15	N	See Note 2.
191	439	4	11	132	N	-	Y	2.0	Y	N	0.30	N	
192	440	4	-	>200	Y	0.5	Y*	2.5	N	Y	0.30	N	See Notes 2 and 3.
193	293	4	-	>200	Y	0.5	Y*	2.5	N	Y	0.30	N	See Notes 2 and 3.
194	282	4	9.5	>200	N	-	Y	4.0	Y	N	0.30	N	
195	272	4	9.5	>200	N	-	Y	3.5	Y	N	0.25	N	

Notes:

1. Topsoil thickness not determined at time of reporting. Depth to be checked by Lot purchaser.
2. Fill confined to a portion of the lot. Refer to ***Drawing 49.***
3. Foundation soils are suitable to support propreitary raft foundations for a dwelling designed in accordance with NZS 3604.

Table 2: Lot Summary Table

Lot No:	Area (m²)	Stage	Subsurface Data						Foundations		Topsoil Thickenss (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)	Y/N/NA	Y/N/NA			
196	265	4	9	-	N	-	Y	3.0	N	Y	0.30	N	See Note 3.
197	261	4	9	-	N	-	Y	3.0	N	Y	0.30	N	See Note 3.
198	259	5	8	179	N	-	Y	2.0	N	Y	0.20	N	See Note 3.
199	259	5	8	179	N	-	Y	2.0	N	Y	0.20	N	See Note 3.
200	259	5	-	146	N	-	Y	2.0	Y	N	0.20	N	
201	259	5	-	146	Y	1.0	Y	1.0	Y	N	0.25	N	See Note 2.
202	259	5	-	>200	Y	2.0	N	-	Y	N	0.20	N	
203	259	5	-	>200	Y	2.5	N	-	Y	N	0.25	N	
204	259	5	-	176	Y	3.0	N	-	Y	N	0.20	N	
205	259	5	-	166	Y	3.0	N	-	Y	N	0.25	N	
206	259	5	-	>200	Y	2.0	N	-	Y	N	0.25	N	
207	259	5	-	>200	Y	2.0	N	-	Y	N	0.25	N	
208	269	5	-	>200	Y	2.0	N	-	Y	N	0.25	N	
209	432	5	-	175	Y	2.0	N	-	Y	N	0.25	N	
210	446	5	-	191	Y	2.0	N	-	Y	N	0.25	N	
211	443	5	-	183	Y	2.0	N	-	Y	N	0.25	N	
212	429	5	-	183	Y	2.0	N	-	Y	N	0.25	N	
213	422	5	-	182	Y*	1.5	Y*	0.5	Y	N	-	N	See Notes 1 & 2.
214	423	5	-	185	Y*	0.5	Y	0.5	Y	N	0.25	N	See Note 2.
215	423	5	-	185	Y	2.0	N	-	Y	N	0.25	N	
216	423	5	-	>200	Y	2.5	N	-	Y	N	0.25	N	
217	423	5	-	>200	Y	2.0	N	-	Y	N	0.20	N	
218	423	5	-	186	Y	2.0	N	-	Y	N	0.15	N	
219	423	5	-	>200	Y*	0.5	Y	0.5	Y	N	0.30	N	See Note 2.

Notes:

1. Topsoil thickness not determined at time of reporting. Depth to be checked by Lot purchaser.
2. Fill confined to a portion of the lot. Refer to ***Drawing 49*** .
3. Foundation soils are suitable to support propreitary raft foundations for a dwelling designed in accordance with NZS 3604.

Table 3: Lot Summary Table

Lot No:	Area (m²)	Stage	Subsurface Data						Foundations		Topsoil Thickenss (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)	Y/N/NA	Y/N/NA			
220	423	5	-	157	Y*	1.2	Y	1.0	Y	N	0.20	N	See Note 2.
221	423	4	-	193	Y*	1.2	Y*	2.0	N	Y	0.20	N	See Notes 2 and 3.
222	423	4	-	193	Y*	0.5	Y*	2.0	N	Y	0.15	N	See Notes 2 and 3.
223	423	4	-	177	Y*	0.3	Y*	2.0	N	Y	0.20	N	See Notes 2 and 3.
224	423	4	-	>200	Y*	0.3	Y*	2.5	N	Y	0.20	N	See Notes 2 and 3.
225	423	4	-	>200	Y*	0.4	Y*	2.5	N	Y	0.20	N	See Notes 2 and 3.
226	423	4	-	>200	Y*	0.5	Y*	2.0	N	Y	0.20	N	See Notes 2 and 3.
227	423	4	-	>200	Y*	-	Y	2.0	N	Y	0.20	N	See Notes 2 and 3.
228	507	4	-	>200	N	-	Y	2.0	Y	N	0.15	N	
229	594	4	-	>200	Y*	0.5	Y*	1.0	Y	N	0.15	N	See Note 2.
230	379	4	-	200	Y	1.5	N	-	Y	N	0.20	N	
231	385	4	-	200	Y	2.0	Y	0.5	Y	N	0.20	N	
232	385	4	-	200	Y	2.0	N	-	Y	N	0.15	N	
233	385	4	-	200	Y	2.0	N	-	Y	N	0.15	N	
234	385	5	-	200	Y	2.0	N	-	Y	N	0.10	N	
235	385	5	-	200	Y	2.0	N	-	Y	N	0.15	N	
236	385	5	-	161	Y	2.5	N	-	Y	N	0.20	N	
237	385	5	-	161	Y	2.5	N	-	Y	N	0.15	N	
238	385	5	-	195	Y	2.0	N	-	Y	N	0.20	N	
239	385	5	-	195	Y	0.5	N	-	Y	N	0.25	N	
240	385	5	-	178	Y	0.5	N	-	Y	N	0.25	N	
241	385	5	-	178	Y	1.0	N	-	Y	N	0.20	N	
242	431	5	-	193	Y	2.0	N	-	Y	N	0.20	N	
243	540	5	-	193	Y	2.5	N	-	Y	N	0.25	N	

Notes:

1. Topsoil thickness not determined at time of reporting. Depth to be checked by Lot purchaser.
2. Fill confined to a portion of the lot. Refer to ***Drawing 49*** .
3. Foundation soils are suitable to support propreitary raft foundations for a dwelling designed in accordance with NZS 3604.

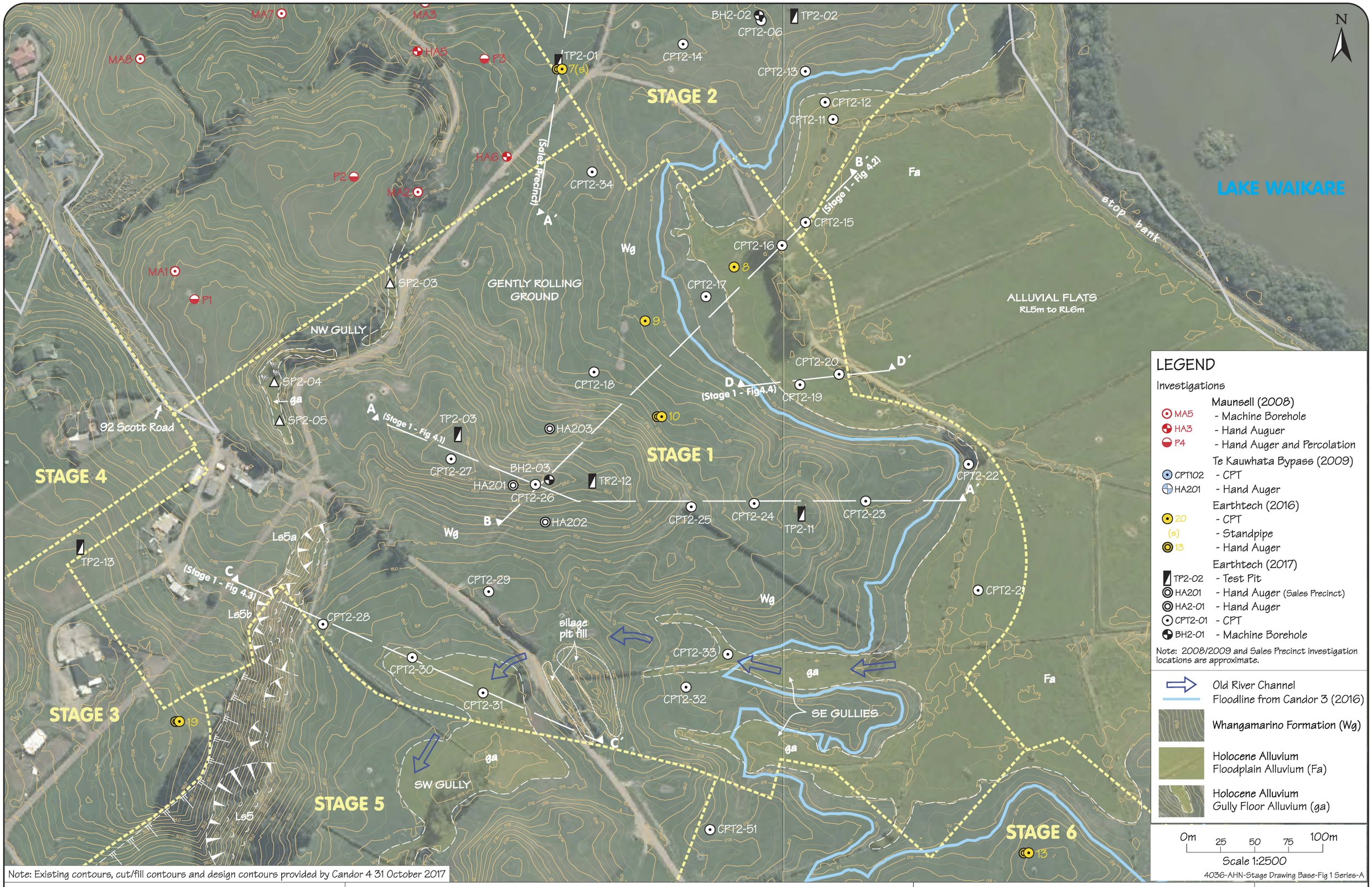
Table 4: Lot Summary Table

Lot No:	Area (m²)	Stage	Subsurface Data						Foundations		Topsoil Thickenss (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)	Y/N/NA	Y/N/NA			
244	768	5	-	200	Y	2.5	N	-	Y	N	0.10	N	
245	510	5	-	200	Y	2.5	N	-	Y	N	-	N	See Note 1.
246	510	5	-	200	Y	2.5	N	-	Y	N	-	N	See Note 1.
247	420	5	-	184	Y	1.6	N	-	Y	N	-	N	See Note 1.
248	420	5	-	184	Y	2.0	N	-	Y	N	-	N	See Note 1.
249	420	5	-	>200	Y	3.0	N	-	Y	N	-	N	See Note 1.
250	510	5	-	>200	Y	3.0	N	-	Y	N	-	N	See Note 1.
251	510	5	-	200	Y	2.5	N	-	Y	N	-	N	See Note 1.
252	420	5	-	200	Y	2.5	N	-	Y	N	-	N	See Note 1.
253	420	5	-	200	Y	2.5	N	-	Y	N	-	N	See Note 1.
254	420	5	-	200	Y	2.5	N	-	Y	N	-	N	See Note 1.
255	510	5	-	200	Y	2.5	N	-	Y	N	-	N	See Note 1.
256	508	5	-	193	Y	2.0	N	-	Y	N	-	N	See Note 1.
257	451	5	-	193	Y	1.0	N	-	Y	N	0.25	N	
258	452	5	-	156	Y	0.4	Y	1.5	Y	N	0.25	N	See Note 2.
259	768	4	-	191	Y	0.5	Y	1.5	Y	N	0.20	N	See Note 2.
260	570	4	-	>200	Y	3.5	N	-	Y	N	0.20	N	
261	512	4	-	>200	Y	3.5	N	-	Y	N	0.25	N	
262	576	4	-	>200	Y	3.5	N	-	Y	N	0.30	N	
263	772	4	-	175	Y	3.5	N	-	Y	N	0.20	N	
264	693	4	-	>200	Y	3.5	N	-	Y	N	0.20	N	
265	682	4	-	>200	Y	3.5	N	-	Y	N	0.15	N	

Notes:

1. Topsoil thickness not determined at time of reporting. Depth to be checked by Lot purchaser.
2. Fill confined to a portion of the lot. Refer to ***Drawing 49*** .
3. Foundation soils are suitable to support propreitary raft foundations for a dwelling designed in accordance with NZS 3604.

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



LEGEND

Investigations

Maunsell (2008)
- MA5 - Machine Borehole
- HA3 - Hand Auguer
- P4 - Hand Auger and Percolation

Te Kauwhata Bypass (2009)
- CPT102 - CPT
- HA201 - Hand Auger

Earthtech (2016)
- 20 - CPT
- (s) - Standpipe
- 13 - Hand Auger

Earthtech (2017)
- 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.

Old River Channel
Floodline from Candor 3 (2016)

Whangamarino Formation (Wg)

Holocene Alluvium
Floodplain Alluvium (Fa)

Holocene Alluvium
Gully Floor Alluvium (ga)

0m 25 50 75 100m
Scale 1:2500

4036-AHN-Stage Drawing Base-Fig 1 Series-A

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

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

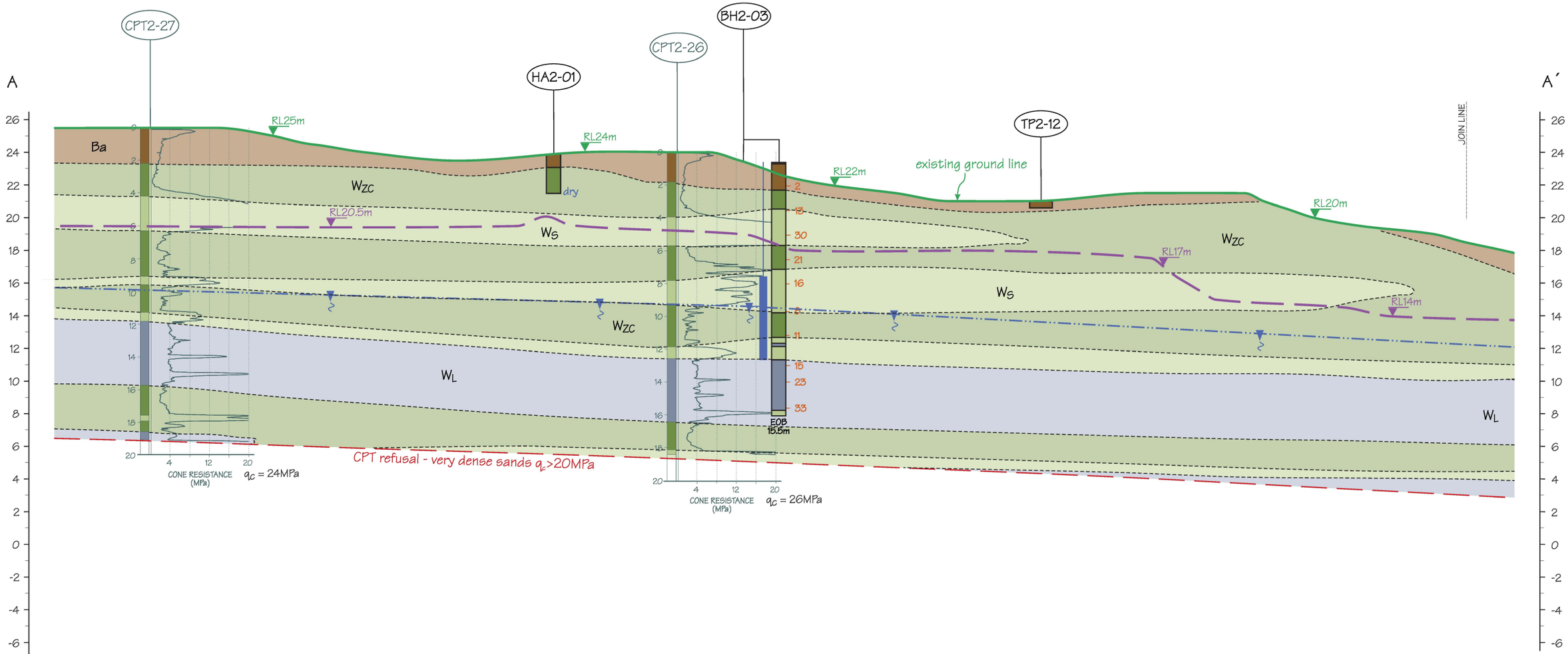
LAKESIDE DEVELOPMENTS, TE KAUWHATA

Lakeside Developments (2017) Limited

Stage 1 Site Plan

DRAWING NO.: FIG. 1.1

DRAWN:	A.N	CHECKED:	A.N	SCALE (A3):	VERSION: A
TRACED:	C.M	DATE:	21/12/17	1:2500	REF: 4036



LEGEND

Whangamarino Formation		Holocene Alluvium	
Ba	Brown Ash		Upper Holocene
WZC	Whangamarino Silts and Clays		Lower Holocene
WS	Whangamarino Sands		
WL	Lignite		

0m 5 10 15 20 25m

Scale 1:500

NOT FOR CONSTRUCTION

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

EARTHTECH

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 1 Cross Section A-A´ (Page 1)

DRAWING NO.: FIG. 4.1A

DRAWN:	P.K	CHECKED:	P.K	SCALE (A3):	VERSION: A
TRACED:	C.M/S.H	DATE:	21/12/17	1:500(h) 1:250(v)	REF: 4036

A

A´

JOIN LINE

JOIN LINE

CPT2-25

CPT2-24

TP2-11

CPT2-23

Ba

RL15m

perched

RL11m

RL14m

dry

W_{ZC}

RL10m

W_L

W_{ZC}

W_L

CPT refusal - very dense sands q_c>20MPa

CONE RESISTANCE (MPa) q_c = 32MPa

CONE RESISTANCE (MPa) q_c = 38MPa

CONE RESISTANCE (MPa) q_c = 38MPa

LEGEND

Whangamarino Formation		Holocene Alluvium	
Ba	Brown Ash		Upper Holocene
W_{ZC}	Whangamarino Silts and Clays		Lower Holocene
W_S	Whangamarino Sands		
W_L	Lignite		

0m 5 10 15 20 25m

Scale 1:500

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

NOT FOR CONSTRUCTION

EARTHTECH

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

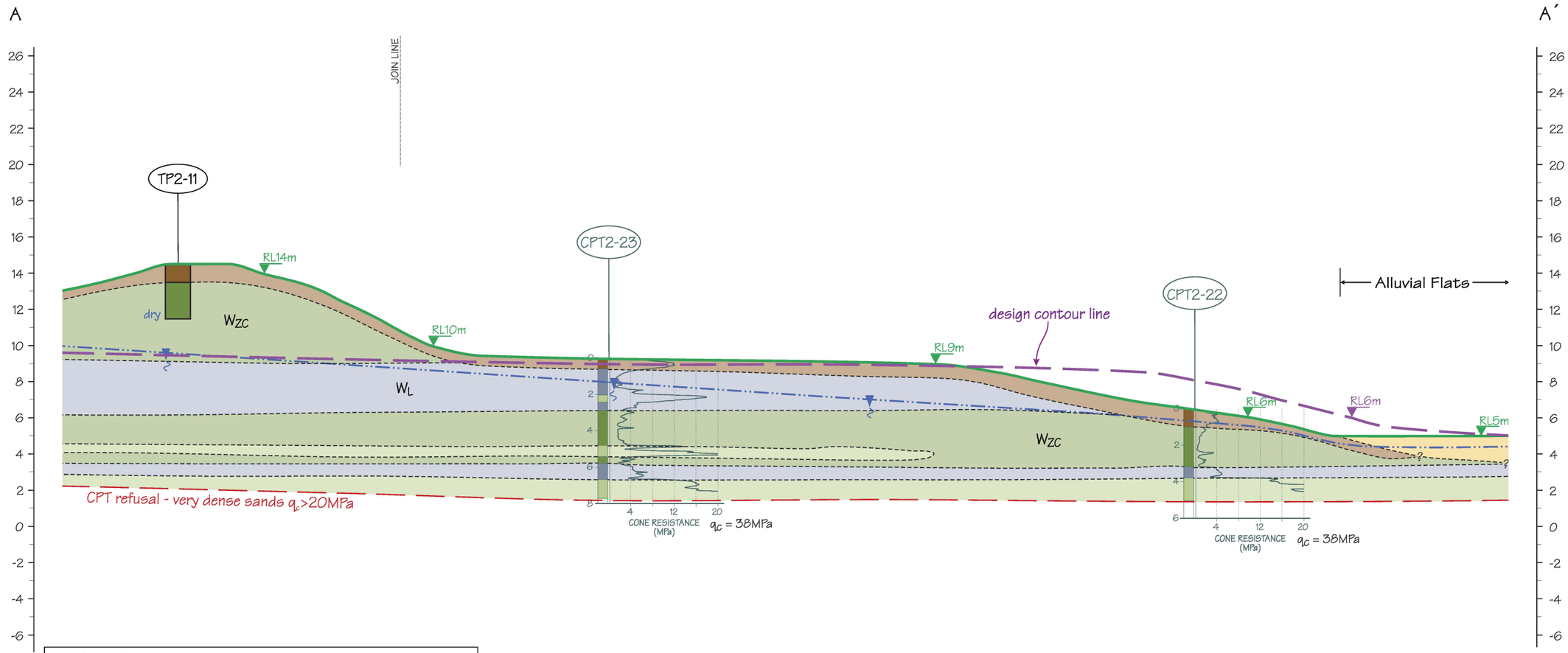
LAKESIDE DEVELOPMENTS, TE KAUWHATA

Lakeside Developments (2017) Limited

Stage 1 Cross Section A-A´ (Page 2)

DRAWING NO.: FIG. 4.1B

DRAWN:	P.K	CHECKED:	P.K	SCALE (A3):	VERSION: A
TRACED:	C.M/S.H	DATE:	21/12/17	1:500(h) 1:250(v)	REF: 4036



LEGEND

Whangamarino Formation

- Ba — Brown Ash
- Wzc — Whangamarino Silts and Clays
- Ws — Whangamarino Sands
- WL — Lignite

Holocene Alluvium

- Upper Holocene
- Lower Holocene

0m 5 10 15 20 25m

Scale 1:500

NOT FOR CONSTRUCTION

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

EARTHTECH

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

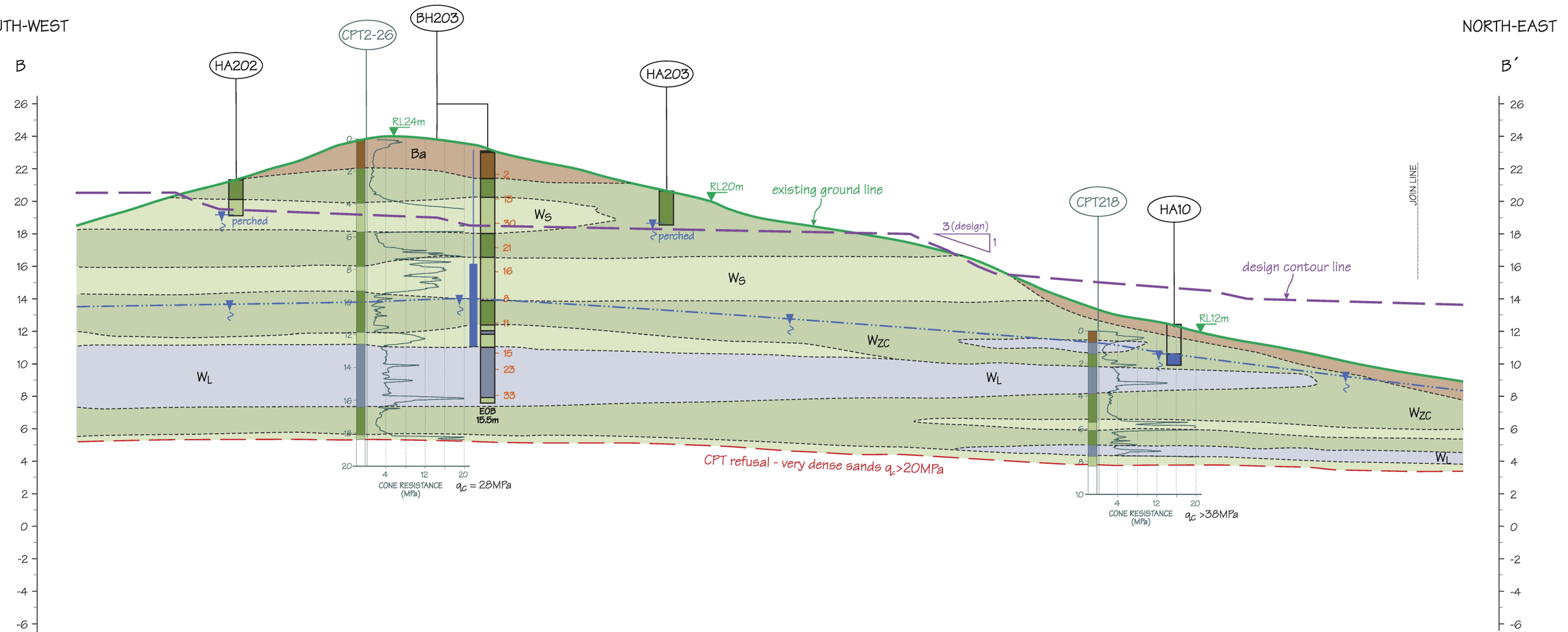
Stage 1 Cross Section A-A´ (Page 3)

DRAWING NO.: FIG. 4.1C

DRAWN:	P.K	CHECKED:	P.K	SCALE (A3):	VERSION: A
TRACED:	C.M/S.H	DATE:	21/12/17	1:500(h) 1:250(v)	REF: 4036

SOUTH-WEST

NORTH-EAST



LEGEND

Whangamarino Formation

- Ba — Brown Ash
- Wzc — Whangamarino Silts and Clays
- Ws — Whangamarino Sands
- WL — Lignite

Holocene Alluvium

- Upper Holocene
- Lower Holocene

0m 5 10 15 20 25m

Scale 1:500

NOT FOR CONSTRUCTION

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

EARTHTECH

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 1 Cross Section B-B´ (Page 1)

DRAWN:	P.K	CHECKED:	P.K	SCALE (A3):	1:500(h) 1:250(v)
TRACED:	C.M/S.H	DATE:	21/12/17		

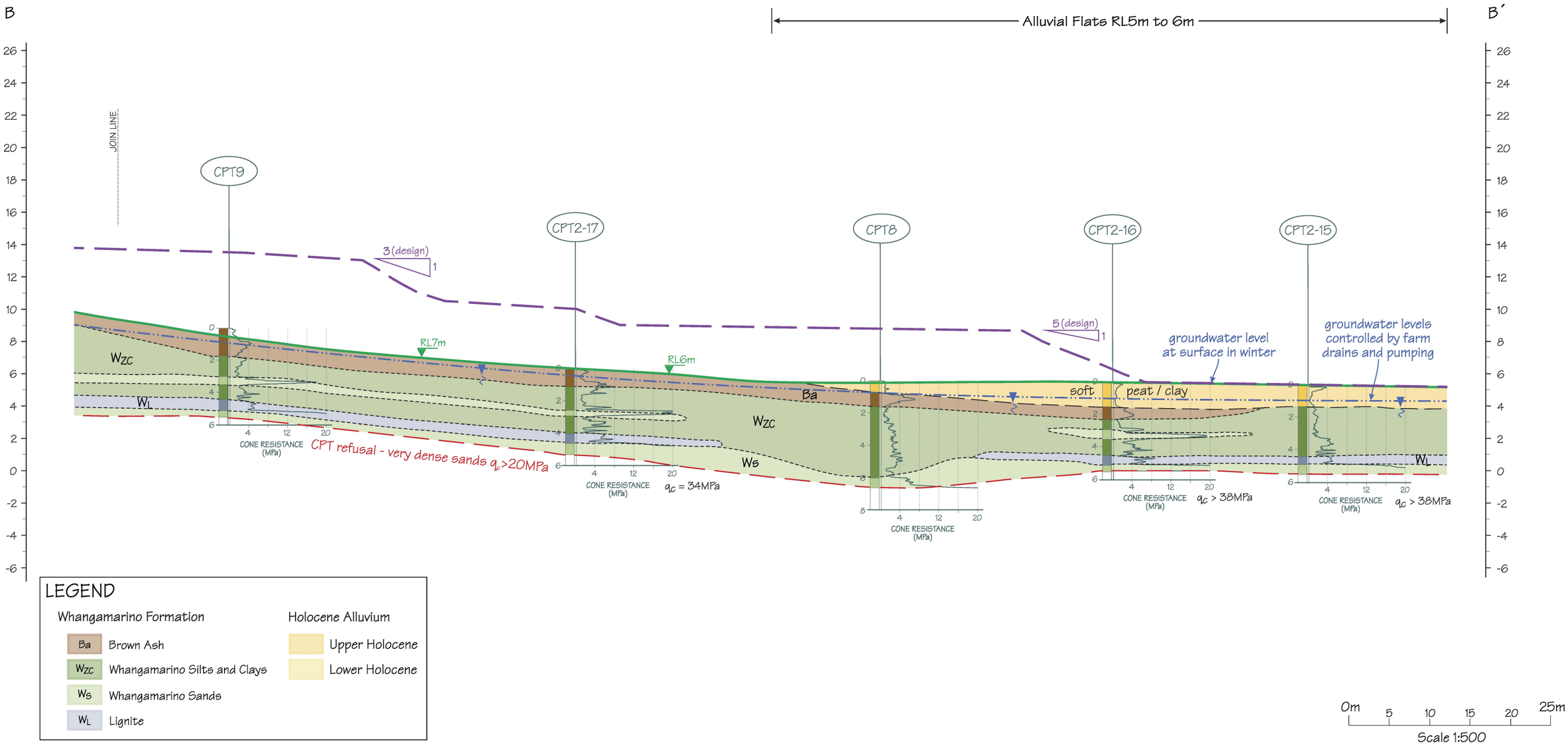
DRAWING NO.: FIG. 4.2A

VERSION: A

REF: 4036

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		

0m 5 10 15 20 25m

Scale 1:500

NOT FOR CONSTRUCTION

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

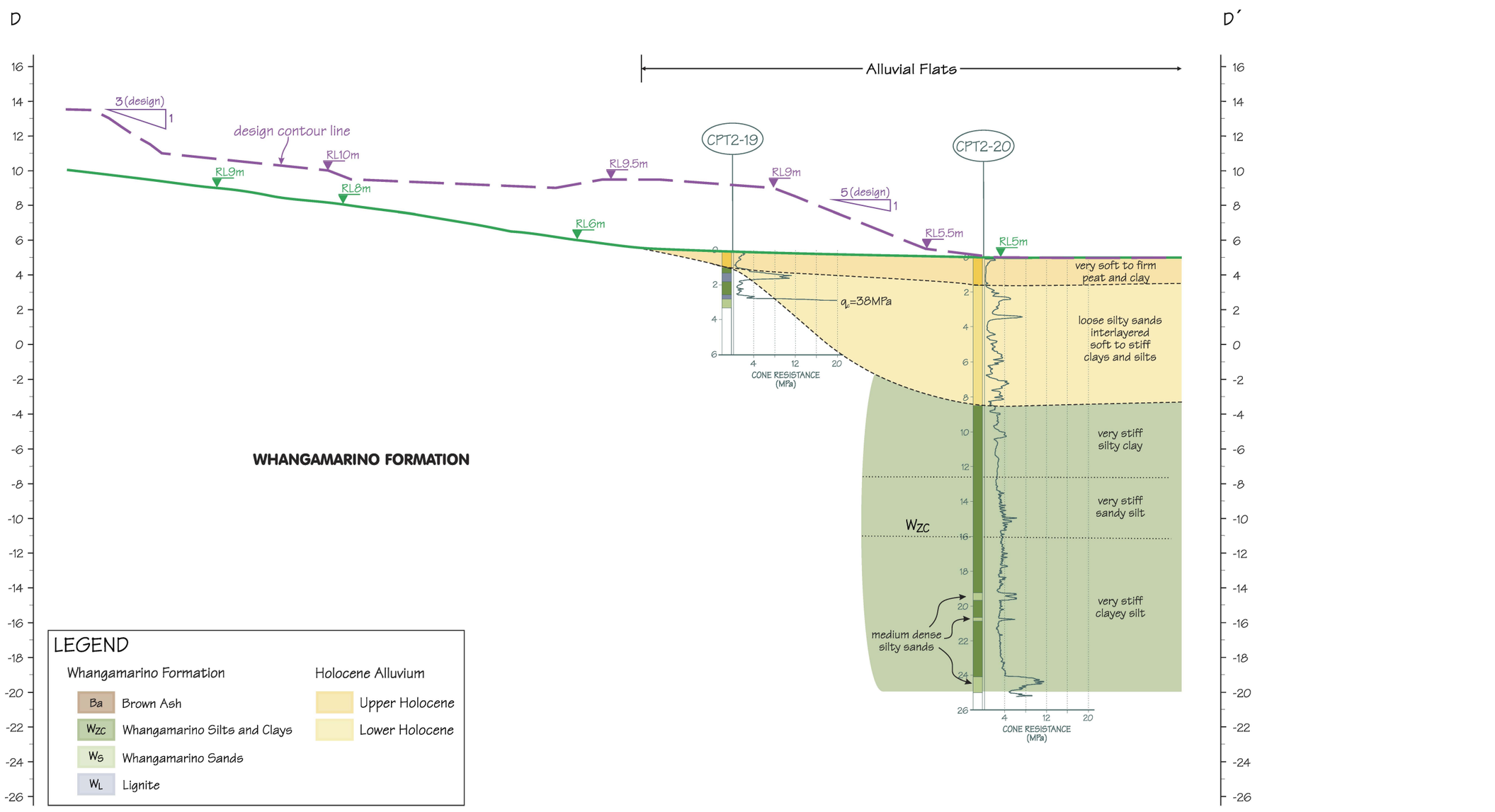
EARTHTECH

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

Stage 1 Cross Section B-B´ (Page 2)

DRAWING NO.: FIG. 4.2B

DRAWN:	P.K	CHECKED:	P.K	SCALE (A3):		VERSION:	A
TRACED:	C.M/S.H	DATE:	21/12/17	1:500(h)	1:250(v)	REF:	4036



NOT FOR CONSTRUCTION

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

EARTHTECH

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 1 Cross Section D-D´

DRAWING NO.: FIG. 4.4

DRAWN:	P.K	CHECKED:	P.K	SCALE (A3):	VERSION: A
TRACED:	C.M/S.H	DATE:	21/12/17	1:500(h) 1:250(v)	REF: 4036

HAND-AUGER LOG

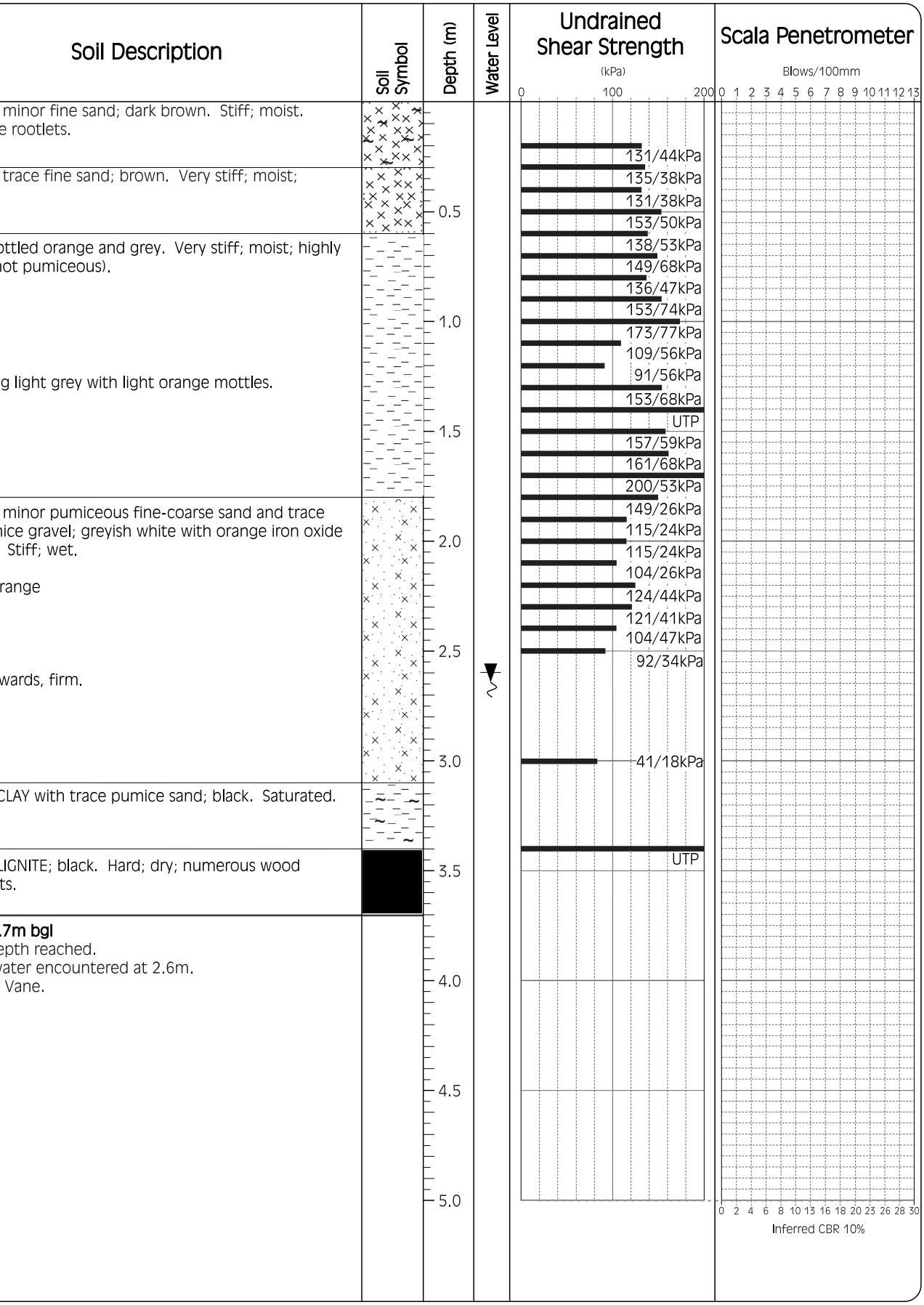
Bore No.: **HA07**

Project: Scott Road, Te Kauwhata

Augered by: MW/SLH | Checked by: MW

Date: 11/10/2016 Ref: 4036

Geology	Soil Description
TOP SOIL	SILT with minor fine sand; dark brown. Stiff; moist. Minor live rootlets.
BROWN ASH	SILT with trace fine sand; brown. Very stiff; moist;
	CLAY; mottled orange and grey. Very stiff; moist; highly plastic (not pumiceous).
	Becoming light grey with light orange mottles.
WHANGAMARINO	SILT with minor pumiceous fine-coarse sand and trace fine pumice gravel; greyish white with orange iron oxide staining. Stiff; wet.
	2.2m: Orange
	2.6m onwards, firm.
	Organic CLAY with trace pumice sand; black. Saturated.
	Organic LIGNITE; black. Hard; dry; numerous wood fragments.
	EOH = 3.7m bgl Target depth reached. Groundwater encountered at 2.6m. PK Shear Vane.



EARTHTECH CONSULTING LIMITED

HAND-AUGER LOG

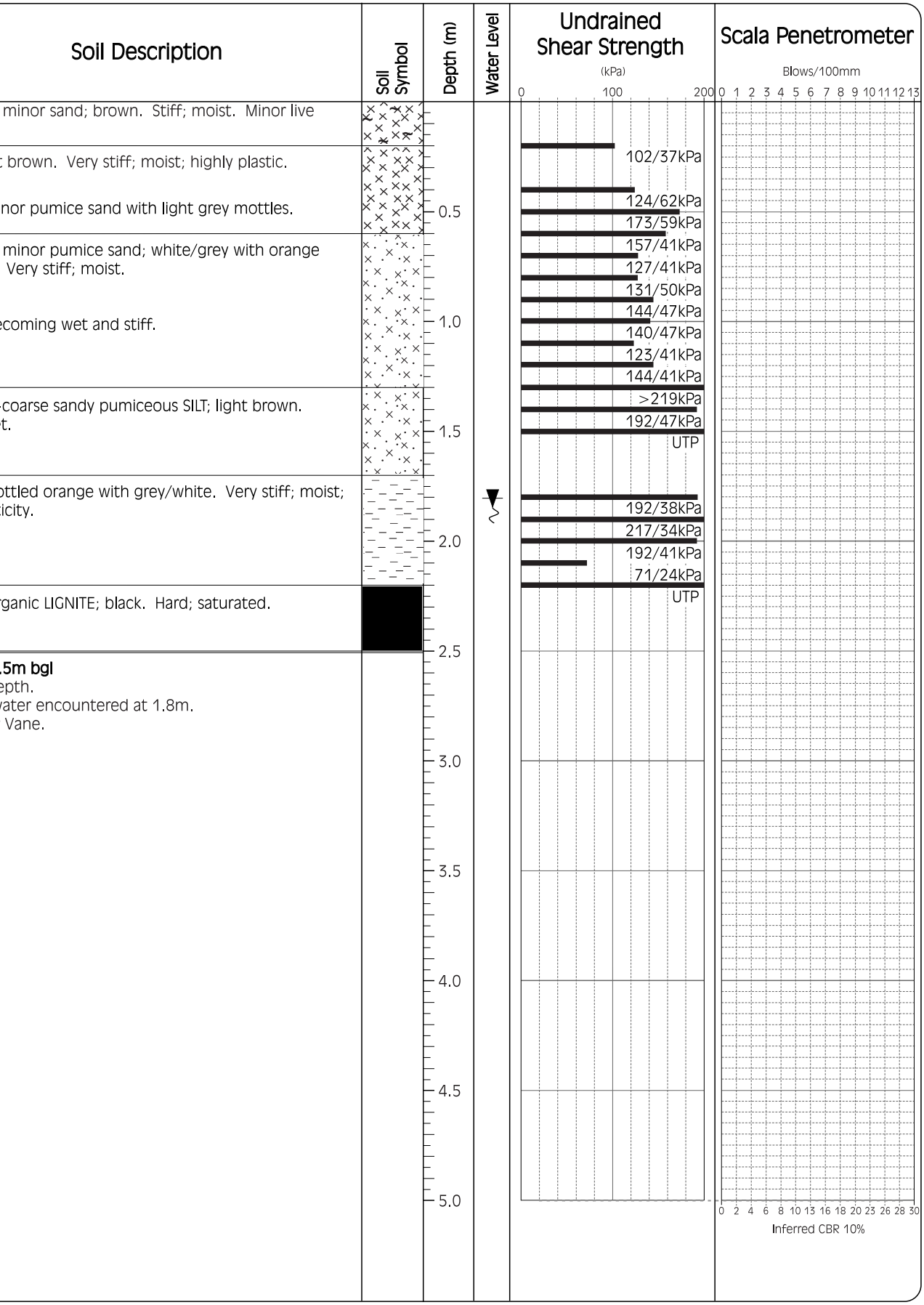
Bore No.: **HA10**

Project: Scott Road, Te Kauwhata

Augered by: MW/SLH | Checked by: MW

Date: 12/10/2016 Ref: 4036

Geology	Soil Description
TOP SOIL	SILT with minor sand; brown. Stiff; moist. Minor live rootlets.
BROWN ASH	SILT; light brown. Very stiff; moist; highly plastic. 0.5m: Minor pumice sand with light grey mottles.
WHANGAMARINO	SILT with minor pumice sand; white/grey with orange mottles. Very stiff; moist. 1.0m: Becoming wet and stiff.
	Medium-coarse sandy pumiceous SILT; light brown. Hard; wet.
	CLAY; mottled orange with grey/white. Very stiff; moist; low plasticity.
	Highly organic LIGNITE; black. Hard; saturated.
	EOH = 2.5m bgl Target depth. Groundwater encountered at 1.8m. PK Shear Vane.



EARTHTECH CONSULTING LIMITED

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 (kPa)	Scala Penetrometer Blows/100mm
	TOPSOIL; dry.		0			
HAMILTON-KAUROA ASH	Sandy SILT; light brown. Hard; dry.					
	Sandy CLAY; dark orange brown. Hard; slightly moist; plastic.		0.5		UTP	
PUKETOKA ALLUVIUM	Clayey SAND; mottled yellow and white. Hard; slightly moist; slightly plastic.		1.0		UTP UTP UTP	
	Sandy CLAY; mottled orange and yellow, flecked red. Moist; plastic.		1.5		>219/104kPa	
	Clayey SILT (ignimbrite silt?); pale yellow white. Wet; plastic.		2.0		>219/89kPa 192/62kPa	
	No auger recovery below 2.4m	?	2.5		>219/62kPa UTP 192/93kPa 192/83kPa	
	EOH =2.4m bgl No recovery. Groundwater not encountered. PK Shear Vane.		3.0 3.5 4.0 4.5 5.0			

Undrained Shear Strength: 0 – 100 – 200 (kPa)

Scala Penetrometer: Blows/100mm 0 1 2 3 4 5 6 7 8 9 10 11 12 13

0 2 4 6 8 10 13 16 18 20 23 26 28 30

Inferred CBR 10%

EARTHTECH CONSULTING LIMITED

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
PUKETOKA ALLUVIUM	TOPSOIL; dry.
	Sandy SILT; pale yellow brown. Hard; slightly moist.
	Sandy SILT; mottled yellow, orange and brown. Very stiff; moist; plastic.
	Fine clean SAND; pale yellow white. Medium dense; non plastic; becomes grey white with occasional orange staining.
	Wet below 2.1m
	EOH =2.2m bgl Target depth reached. Groundwater encountered at 2.1m. PK Shear Vane.

Soil Symbol

Depth (m): 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0

Water Level

Undrained Shear Strength (kPa): 0, 100, 200

UTP

UTP

UTP

>219/59kPa

Scala Penetrometer: Blows/100mm 0 1 2 3 4 5 6 7 8 9 10 11 12 13

0 2 4 6 8 10 13 16 18 20 23 26 28 30

Inferred CBR 10%

EARTHTECH CONSULTING LIMITED

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
PUKETOKA ALLUVIUM	TOPSOIL; dry.
	Sandy SILT; light orange brown. Stiff; slightly moist; moderately plastic; minor grit from hardpan layers. Becomes more sandy with depth.
	Silty SAND; yellow, white and orange. Medium dense; slightly moist; slightly plastic.
	Sandy CLAY; pale yellow and white. Very stiff; moist; highly plastic.
	Wet below 2.1m; poor recovery; purplish brown; possibly top of lignite?
	EOH =2.1m bgl Poor recovery. Groundwater encountered at 2.1m. PK Shear Vane.

Soil Symbol

Depth (m): 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0

Water Level

Undrained Shear Strength (kPa): 0, 100, 200

UTP
131/29kPa
UTP
UTP
UTP
199/95kPa
>219/62kPa

Scala Penetrometer: Blows/100mm 0 1 2 3 4 5 6 7 8 9 10 11 12 13

0 2 4 6 8 10 13 16 18 20 23 26 28 30

Inferred CBR 10%

EARTHTECH CONSULTING LIMITED

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					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

5857295.67mN 1790357.826mE

Geology	Soil Description	Depth (m)
BROWN ASH	TOPSOIL.	0.28
	CLAY with some fine sand; dark brown. Massive; very stiff; moist; friable.	0.5
WHANGAMARINO FORMATION	CLAY with minor sand; mottled grey and light yellowish brown. Massive; very stiff; moist; moderately plastic.	0.6
	SILT with some fine-medium sand and trace gravel; cream and light yellowish brown. Stiff; wet.	1.0
	2.6m: Groundwater seepage.	1.5
	Organic CLAY; black. Stiff.	2.0
	Fine-medium SAND.	2.5
	LIGNITE with wood fragments; black. Hard; moist.	3.0
	(Peaty odour when excavating lignite.)	3.5
	Medium-coarse SAND; light grey. Pumiceous.	3.8

Undrained Shear Strength (kPa): 0 / 100 / 200

Undrained Shear Strength (kPa)	Water Content %
169/47kPa	43
206/95kPa	
165/71kPa	
112/79kPa	48
92/56kPa	
121/63kPa	60
118/71kPa	
104/71kPa	62
77/47kPa	
92/62kPa	67
136/48kPa	
UTP	215
UTP	204

Testing: 3.0 – 3.6

MACHINE TYPE:

TEST PIT TERMINATED AT:

- Target Depth [X]
- Refusal [ ]
- Near Refusal [ ]
- Flooding [ ]

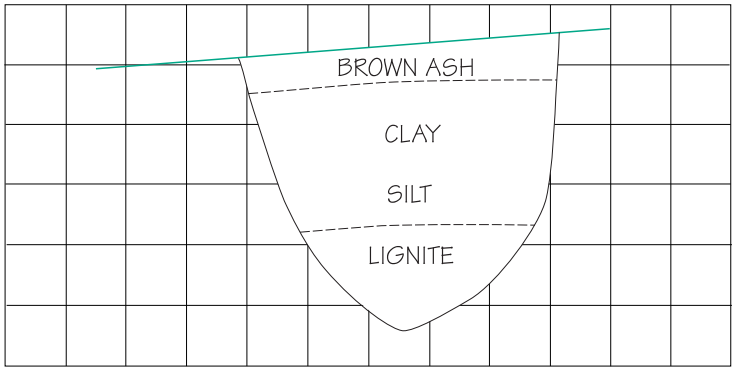
SAMPLE TYPE:

- [ ] bulk sample
- [ ] tube sample
- [ ] disturbed profile sample

FIELD SHEAR STRENGTH:

- [V] Shear vane
- [P] Hand penetrometer
- [E] Estimate only

TEST PIT SECTION **SCALE:**



EARTHTECH CONSULTING LIMITED

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 (kPa) 0 100 200	Water Content %	Testing
WHANGAMARINO FORMATION	LIGNITE; black. Hard; moist.		4.5		UTP UTP	241 233	4.0 4.6
	Fine-medium SAND with trace silt. Medium dense; pumiceous.		5.0			45	
	LIGNITE; black. Hard; moist.					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 [X] Refusal [ ]

Near Refusal [ ] Flooding [ ]

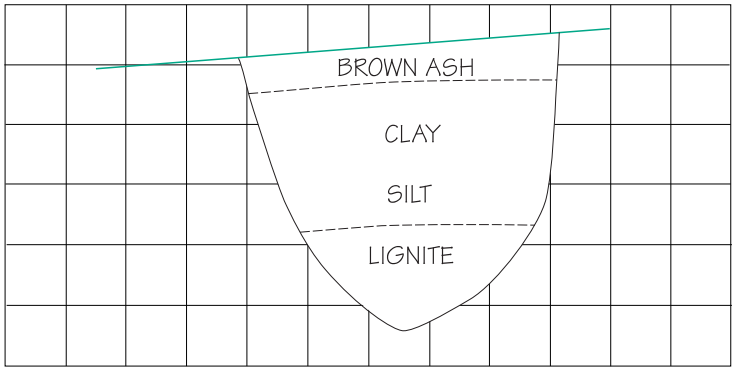
SAMPLE TYPE:

- [ ] bulk sample
- [ ] tube sample
- [ ] disturbed profile sample

FIELD SHEAR STRENGTH:

- [V] Shear vane
- [P] Hand penetrometer
- [E] Estimate only

TEST PIT SECTION **SCALE:**



EARTHTECH CONSULTING LIMITED

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

5857325.593mN 1790533.163mE

Geology	Soil Description	Depth (m)
BROWN ASH	TOPSOIL.	0.25
	CLAY with minor fine sand; light yellowish brown. Massive; very stiff; moist; friable.	0.5
WHANGAMARINO FORMATION	CLAY with some fine sand and trace fine gravl; mottled grey and light yellowish brown. Massive; stiff; moist.	1.0
	Silty CLAY; light greyish brown. Massive; stiff; wet; low plasticity.	1.5
	Layered SILT; light grey. Stiff; moist; pumiceous; low plasticity.	2.0
	Fine SAND with trace silt; light grey. Medium dense; moist; pumiceous.	2.3 / 2.5
	EOP = 3.0m Target depth reached. Groundwater not encountered. PK shear vane.	3.0 / 3.5

Undrained Shear Strength (kPa): 0 | 100 | 200

- 169/53kPa
- 149/83kPa
- 126/79kPa
- 123/63kPa
- 131/48kPa
- 114/44kPa
- 106/41kPa
- 114/59kPa
- 115/48kPa

Water Content %: 33 | 48 | 55 | 76 | 81 | 72

Testing: 0.6 – 2.6

0.6m-2.6m
NZ standard compaction
OWC=49%
NWC=64%

MDD=1.03t/m³
S_u (OWC)=162kPa
Av (OWC)=9 %
sd=2.54t/m³

MACHINE TYPE:

TEST PIT TERMINATED AT:

Target Depth [X] Refusal [ ]
Near Refusal [ ] Flooding [ ]

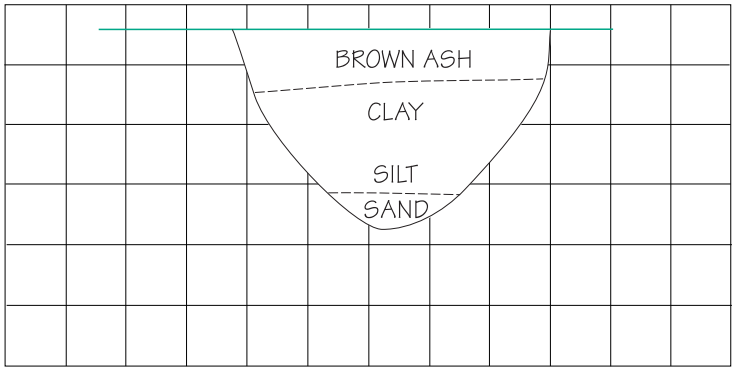
SAMPLE TYPE:

- [ ] bulk sample
- [ ] tube sample
- [ ] disturbed profile sample

FIELD SHEAR STRENGTH:

- [V] Shear vane
- [P] Hand penetrometer
- [E] Estimate only

TEST PIT SECTION **SCALE:**



EARTHTECH CONSULTING LIMITED

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

Geology	Soil Description NZTM 5857023.034mN 1790277.810mE	Depth (m)
BROWN ASH	TOPSOIL.	0.25
	CLAY with trace fine sand; light yellowish brown. Massive; very stiff; moist; friable; moderately plastic.	0.5 1.0 1.5
WHANGAMARINO FORMATION	CLAY; light grey and light yellowish brown. Massive; very stiff; moist; moderately plastic.	1.8 2.0
	Silty CLAY; light grey and reddish brown. Massive; very stiff; moist.	2.3 2.5
	Clayey SILT; light grey. Massive; stiff; wet.	2.9 3.0
	Silty medium-coarse SAND; light grey. Massive; medium dense; wet.	3.4 3.5

Undrained Shear Strength (kPa): 0 | 100 | 200

- UTP
- 213/59kPa
- 165/86kPa
- 184/101kPa
- 192/109kPa
- 202/83kPa
- 151/83kPa
- 147/63kPa
- 149/71kPa
- 71/38kPa
- 120/45kPa

Water Content %: 46 | 47 | 46 | 51 | 68 | 52 | 68

Testing

0.3–1.7m: **0.3m-1.7m NZ standard compaction**
MDD=1.17t/m³
OWC=44%
NWC=42%

1.0–1.7m:
S_u (OWC)=162kPa
Av (OWC)=5%
sd=2.71t/m³
CBR (OWC)=5%
PI=46%
LS=13%

1.7–3.4m: **1.7m-3.4m NZ standard compaction**
MDD=1.14t/m³
OWC=45%
NWC=57%

1.7–2.7m:
S_u (OWC)=162kPa
Av (OWC)=5%

MACHINE TYPE:

TEST PIT TERMINATED AT:

- Target Depth [X]
- Refusal [ ]
- Near Refusal [ ]
- Flooding [ ]

SAMPLE TYPE:

- [ ] bulk sample
- [ ] tube sample
- [ ] disturbed profile sample

FIELD SHEAR STRENGTH:

- [V] Shear vane
- [P] Hand penetrometer
- [E] Estimate only

TEST PIT SECTION **SCALE:**

EARTHTECH CONSULTING LIMITED

TEST PIT LOG

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

Project: Lakeside Developments

Excavator:

Logged by: PK

Date: 08/11/17

Ref: 4036

Geology	Soil Description	Soil Symbol	Depth (m)	Sample Type	Undrained Shear Strength (kPa)	Water Content %	Testing
WHANGAMARINO FORMATION	5857023.034mN 1790277.810mE Silty medium- coarse SAND; light grey. Massive; medium dense; wet.		4.5		0 100 200	63	4.4
	4.8 Medium-coarse SAND; light grey. Massive; medium dense; wet.		5.0			50 51 45	
	EOP = 5.4m Target depth reached. Groundwater not encountered. PK shear vane.		5.5 6.0 6.5 7.0 7.5				

MACHINE TYPE:

TEST PIT TERMINATED AT:

Target Depth [X] Refusal [ ]

Near Refusal [ ] Flooding [ ]

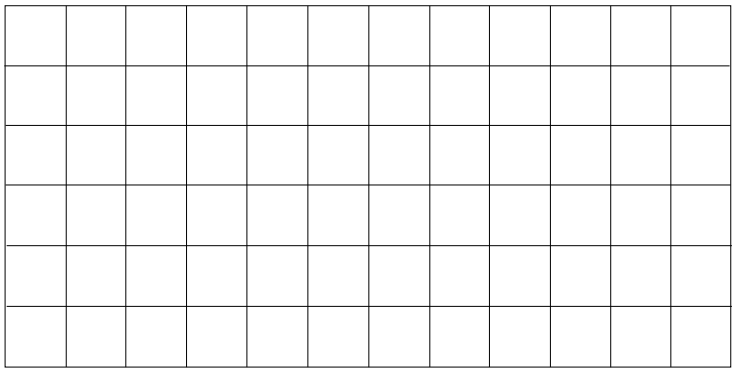
SAMPLE TYPE:

- [ ] bulk sample
- [ ] tube sample
- [ ] disturbed profile sample

FIELD SHEAR STRENGTH:

- [V] Shear vane
- [P] Hand penetrometer
- [E] Estimate only

TEST PIT SECTION **SCALE:**



EARTHTECH CONSULTING LIMITED

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	Depth (m)	Undrained Shear Strength (kPa)	Water Content %	Testing
	NZTM 5856958.69mN 1790529.703mE		0 100 200		
BROWN ASH	TOPSOIL.	0.25			
	CLAY with minor fine sand; dark yellowish brown. Massive; very stiff; moist; moderately plastic; friable; quartz; mica.	0.5	161/48kPa 151/89kPa 140/45kPa	35	
WHANGAMARINO FORMATION	CLAY; mottled grey and light yellowish brown. Massive; stiff; moist; moderately plastic.	1.0	96/48kPa 90/48kPa	49	
	Silty CLAY; cream and light yellowish brown. Massive; siff; moist; low plasticity.	1.5	115/45kPa 84/41kPa	56	
		2.0	114/63kPa	58	
	SILT; light grey. Massive; stiff; moist; low plasticity.	2.5	123/48kPa 106/47kPa	58	
	EOP = 3m Target depth reached. Groundwater not encountered. PK shear vane.	3.0	118/47kPa	58	3.0m NWC=59% PI=15% LS=3%
		3.5			

MACHINE TYPE:

TEST PIT TERMINATED AT:

- Target Depth [X]
- Refusal [ ]
- Near Refusal [ ]
- Flooding [ ]

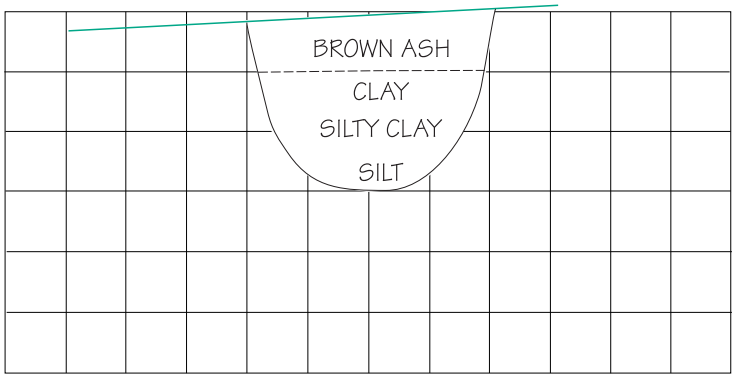
SAMPLE TYPE:

- [ ] bulk sample
- [ ] tube sample
- [ ] disturbed profile sample

FIELD SHEAR STRENGTH:

- [V] Shear vane
- [P] Hand penetrometer
- [E] Estimate only

TEST PIT SECTION **SCALE:**



EARTHTECH CONSULTING LIMITED

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

NZTM 5856986.885mN 1790375.378mE

Geology	Soil Description	Depth (m)
BROWN ASH	TOPSOIL.	0.15
	CLAY with some fine sand; dark yellowish brown. Massive; very stiff; moist; friable.	0.45
WHANGAMARINO FORMATION	CLAY with trace sand; mottled grey, light yellowish brown. Massive; very stiff; moist; moderate-high plasticity.	0.5
	CLAY with minor organics; dark grey. Massive; very stiff; moist; moderate plasticity.	0.8
	Fine-medium sandy SILT.	1.0
	Silty fine-medium SAND; light grey. Medium dense; moist; layered; pumiceous.	1.5
	Fine-medium SAND; light grey. Dense; moist; pumiceous.	1.65
	Fine-medium SAND with minor silt; light yellowish grey. Massive; dense; pumiceous.	2.0
		2.10
		2.5
		3.0
		3.5

Undrained Shear Strength (kPa): 0 | 100 | 200

- 142/68kPa
- >219/79kPa
- 177/93kPa
- 202/83kPa
- 206/98kPa
- >219kPa

Water Content %: 27, 29, 45, 49, 37, 38, 36, 27

Testing:
- 0.6 – 1.5
- 1.7 – 2.7: **1.7m-3.7m NZ standard compaction** MDD=1.19t/m³ OWC=37% NWC=35%
- 3.7

MACHINE TYPE:

TEST PIT TERMINATED AT:

Target Depth [X] Refusal [ ]

Near Refusal [ ] Flooding [ ]

SAMPLE TYPE:

[X] bulk sample

[ ] tube sample

[ ] disturbed profile sample

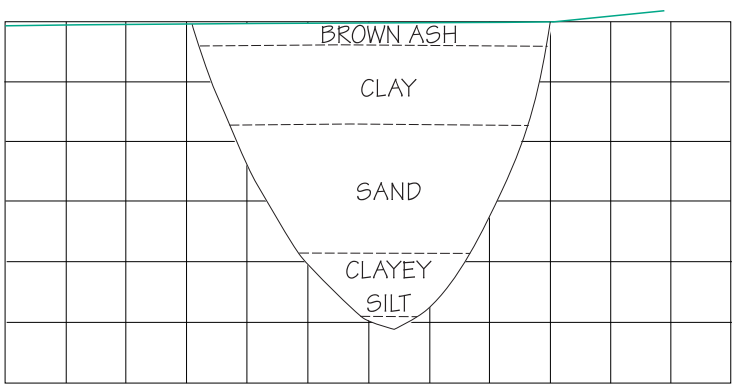
FIELD SHEAR STRENGTH:

[V] Shear vane

[P] Hand penetrometer

[E] Estimate only

TEST PIT SECTION **SCALE:**



EARTHTECH CONSULTING LIMITED

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

MACHINE TYPE:

TEST PIT TERMINATED AT:

Target Depth [X] Refusal [ ]

Near Refusal [ ] Flooding [ ]

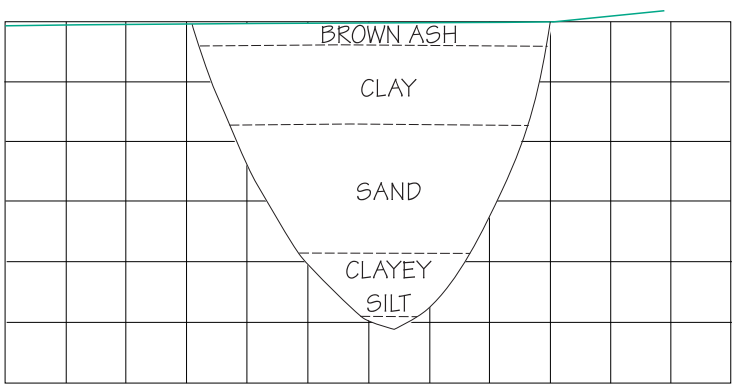
SAMPLE TYPE:

- [X] bulk sample
- [ ] tube sample
- [ ] disturbed profile sample

FIELD SHEAR STRENGTH:

- [V] Shear vane
- [P] Hand penetrometer
- [E] Estimate only

TEST PIT SECTION **SCALE:**



EARTHTECH CONSULTING LIMITED

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

NZTM 5856946.089mN 1790000.557mE

Geology	Soil Description	Depth (m)
BROWN ASH	TOPSOIL.	0.23
	CLAY with some fine sand; dark brown. Massive; very stiff; moist; friable; quartz; mica.	0.5
		1.0
WHANGAMARINO FORMATION	CLAY with trace sand; mottled grey and light yellowish brown. Massive; very stiff; moist; moderate plasticity.	1.5
	SILT with trace sand; dark yellowish brown. Massive; very stiff; wet; friable.	2.0
		2.5
	SILT with some fine sand; light yellowish brown. Massive; stiff; wet; low plasticity.	3.0
		3.5
		3.95

Undrained Shear Strength (kPa): 0 – 100 – 200

- 115/60kPa
- 138/81kPa
- 155/98kPa
- 83/48kPa
- >219/101kPa
- 142/48kPa
- 115/48kPa
- 131/71kPa
- 93/48kPa
- 109/50kPa
- 98/47kPa
- 93/48kPa
- 86/44kPa

Water Content %: 41, 52, 64, 88, 95, 79, 84

Testing: sensitive soil on basis NWC 64% to 95% av 82%

MACHINE TYPE:

TEST PIT TERMINATED AT:

Target Depth [X] Refusal [ ]

Near Refusal [ ] Flooding [ ]

SAMPLE TYPE:

- [ ] bulk sample
- [ ] tube sample
- [ ] disturbed profile sample

FIELD SHEAR STRENGTH:

- [V] Shear vane
- [P] Hand penetrometer
- [E] Estimate only

TEST PIT SECTION **SCALE:**

Level site
soils subhorizontally layered

EARTHTECH CONSULTING LIMITED

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 NZTM 5856946.089mN 1790000.557mE	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.				153/93kPa 127/95kPa	42	
	SILT with some fine sand; cream and pink. Massive; stiff; moist; low plasticity; pumiceous.		4.5		121/74kPa	50	
	EOP = 5.2m Target depth reached. Groundwater not encountered. PK shear vane.		5.0 5.5 6.0 6.5 7.0 7.5			58	5.0m NWC=58% PI=40% LS=15%

MACHINE TYPE:

TEST PIT TERMINATED AT:

Target Depth [X] Refusal [ ]

Near Refusal [ ] Flooding [ ]

SAMPLE TYPE:

- [ ] bulk sample
- [ ] tube sample
- [ ] disturbed profile sample

FIELD SHEAR STRENGTH:

- [V] Shear vane
- [P] Hand penetrometer
- [E] Estimate only

TEST PIT SECTION **SCALE:**

Level site
soils subhorizontally layered

EARTHTECH CONSULTING LIMITED

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 25 50 75	Weathered (rock only) sw mw hw	Fracture Log (cm) 50 10 5 1	Drill Water Loss (%) 25 50 75	Piezometer Construction	Depth (m)	Legend	DESCRIPTION OF STRATA	Geology
	HQ		1.5						0		TOPSOIL.	BROWN ASH
											Clayey SILT; dark yellowish orange. Loose; firm-soft; Fe mottles; rootlets.	
									1		Clayey SILT; light grey with orange Fe mottles. Loose.	
											Becoming hematitic brown below 1.2m	
	SPT		1.95								**SPT 0/1//1/0/0/1 N=2**	
											1.6m: oxides; dark yellowish orange staining. Black MnO_2 disseminated; fine grained.	
	HQ		3						2		Slightly sandy SILT with trace clay; pale yellowish brown. Stiff; clasts, quartz dominated.	
											Increasing sand towards base, flakes of black organic material.	
	SPT		3.45	LC					3		**SPT 2/2//2/3/4/4 N=13**	WHANGAMARINO FORMATION
											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.	
	HQ		4.5	LC					4		**SPT 6/7//7/7/8/8 N=30**	
	SPT		4.95									
	HQ		6						5		CLAY; light brown with Greenish brown disseminated mottles. Stiff-very stiff; moderately plastic lacustrine clay.	
											SILT with trace sand; greenish brown. Medium dense-dense; fine grained.	
	SPT		6.45						6		SPT 4/5//5/4/5/7 N=21	
											Silty SAND with decreasing silt; light yellowish brown. Medium dense; black fine grained disseminated material; fine grained sand.	
	HQ		7.5						7		Fine-medium grained SAND; grey. Medium-dense.	
	SPT		7.95								**SPT 2/3//4/5/4/3 N=16**	
											Fine grained SAND; grey. Medium dense.	
	HQ		9.15						8		Medium grained SAND; grey.	
											Fine grained SAND, slightly silty; light grey to light brownish grey; medium dense; clean sand.	
									9		Silty SAND; light grey. Medium dense; very fine grained; becoming organic.	
	SPT		9.6								**SPT 1/2//2/1/2/3 N=8**	
											Sandy SILT; brown. Medium dense; very fine grained sand; organic.	
	HQ		10.7						10		SILT with trace sand; brown. Medium dense; organic with thin lignite bands. 9.9m: 10mm lignite band 10.2m: 30mm lignite band	
	SPT		11.15								**SPT 2/2//3/2/2/4 N=11**	
											Slightly silty SAND; grey. Medium dense; very fine grained.	
	HQ		12						11		LIGNITE; black; hard.	
											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
Date:	
Checked By:	PIK
Scale:	14/12/17
Hole Length:	15.45m
Core Boxes:	

Water Level Observations During Drilling

Date	Time	Depth of Hole	Depth of Casing	Depth of Water

EARTHTECH CONSULTING LIMITED

DRILL HOLE LOG

Bore No.: BH203	Sheet 2 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

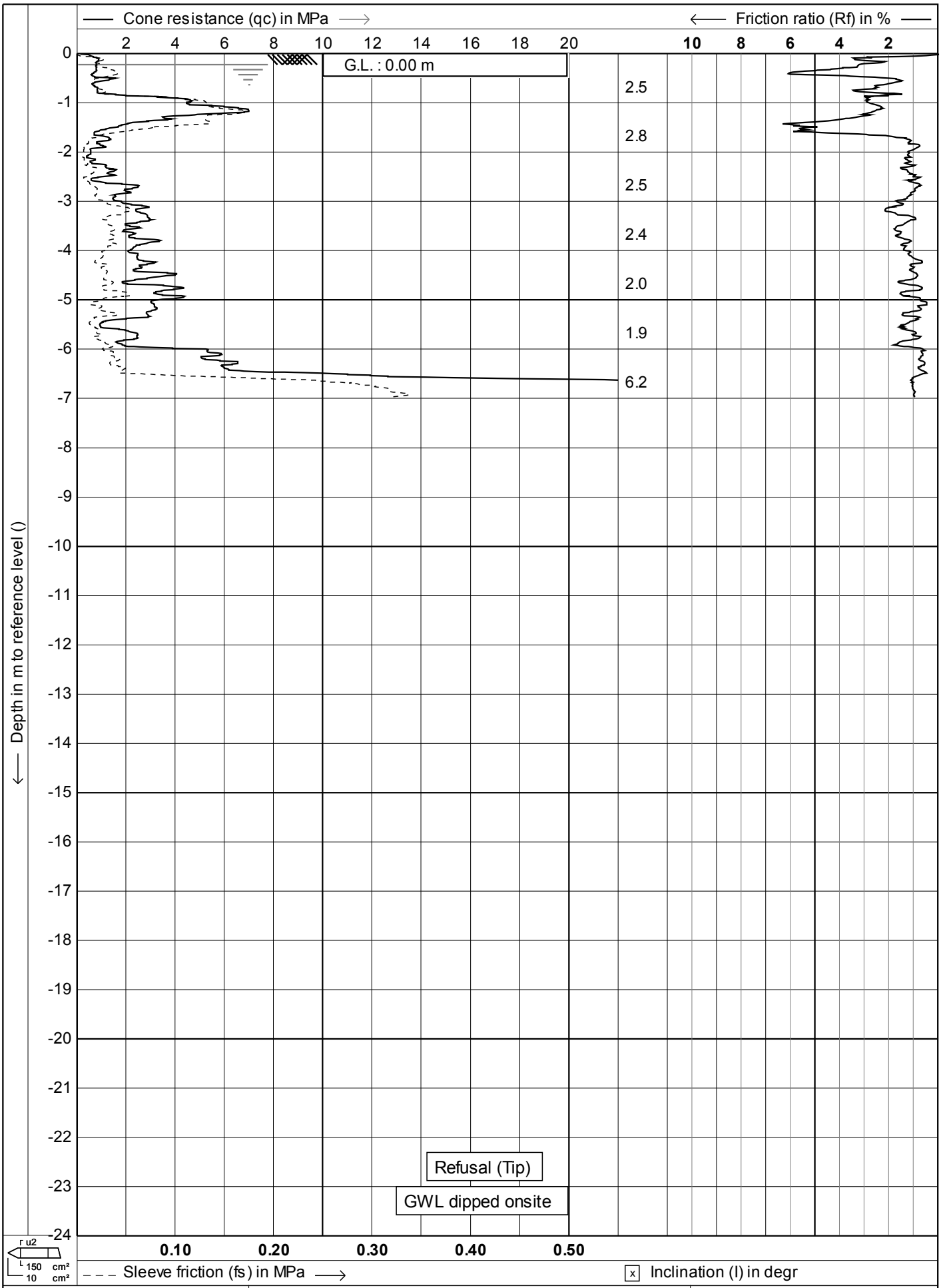
Drilling Progress	Sample Type	Casing Depth (m)	Drill Run (m)	TCR 25 50 75	Weathered (rock only) sw mw hw	Fracture Log (cm) 50 10 5 1	Drill Water Loss (%) 25 50 75	Piezometer Construction	Depth (m)	Legend	DESCRIPTION OF STRATA	Geology
	SPT		12.45								**SPT 1/2//2/4/5/4 N=15**	
	HQ								13		LIGNITE; black. Hard.	
			13.5								12.05m: Sand horizon, medium grained sand.	
	SPT		13.95								13.35m: Sand horizon, medium grained sand.	
	HQ								14		**SPT 3/4//5/4/6/8 N=23**	
			15									
	SPT		15.45						15		SPT 5/6//9/10/8/6 N=33	WHANGAMARINO FORMATION
											SAND with some silt; grey with black organic fragments to 50mm. Dense; clean; fine grained sands.	
											EOB @ 15.45m	
									16			
									17			
									18			
									19			
									20			
									21			
									22			
									23			

Remarks:

Logged By:	NH
Date:	
Checked By:	NH
Scale:	
Hole Length:	15.45m
Core Boxes:	

Water Level Observations During Drilling				
Date	Time	Depth of Hole	Depth of Casing	Depth of Water

EARTHTECH CONSULTING LIMITED



PERRY GEOTECH

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

Project : **Site Investigation**

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

Date : **6-10-2016**

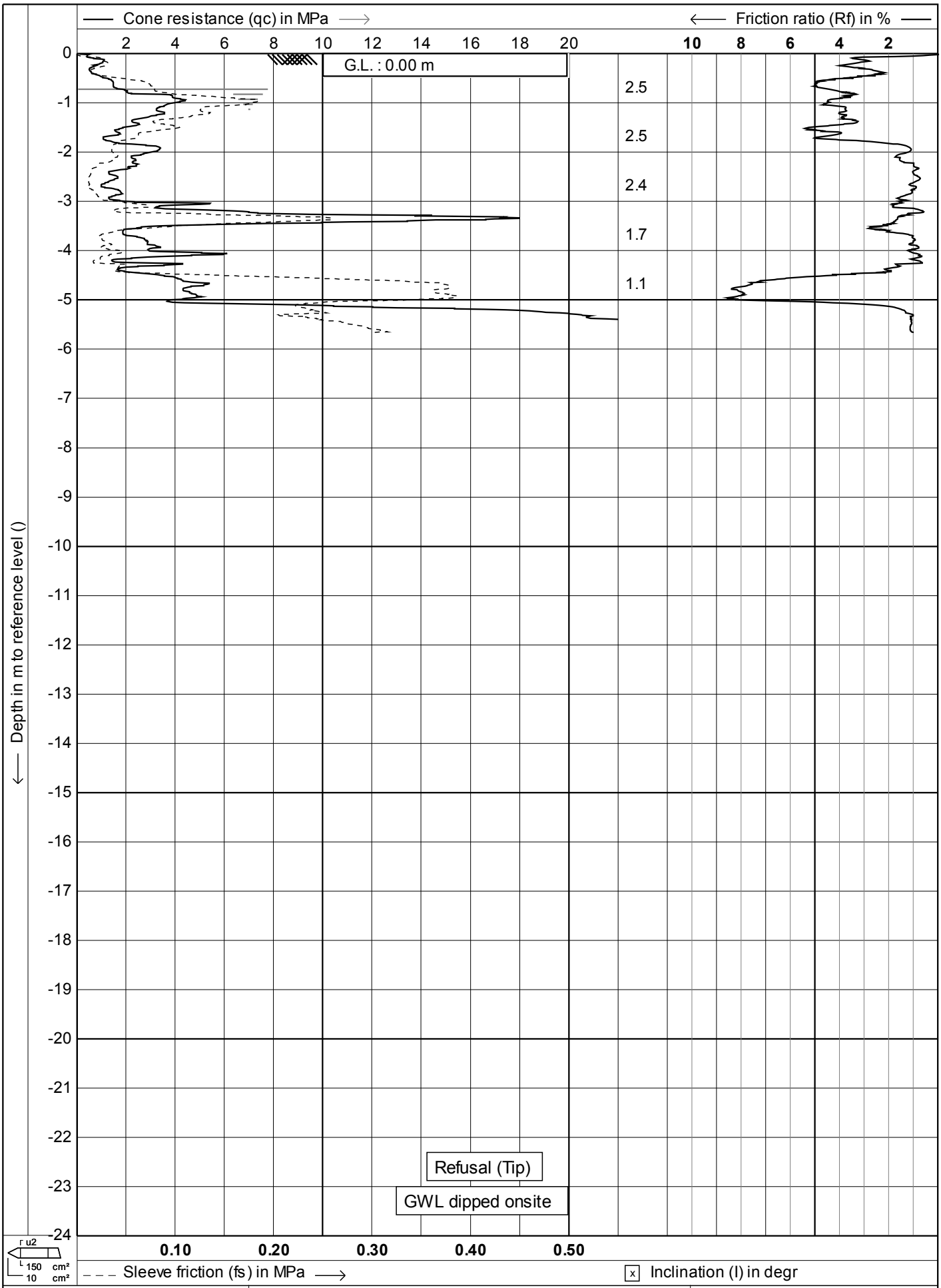
Cone no. : **C10CFIIP.C14432**

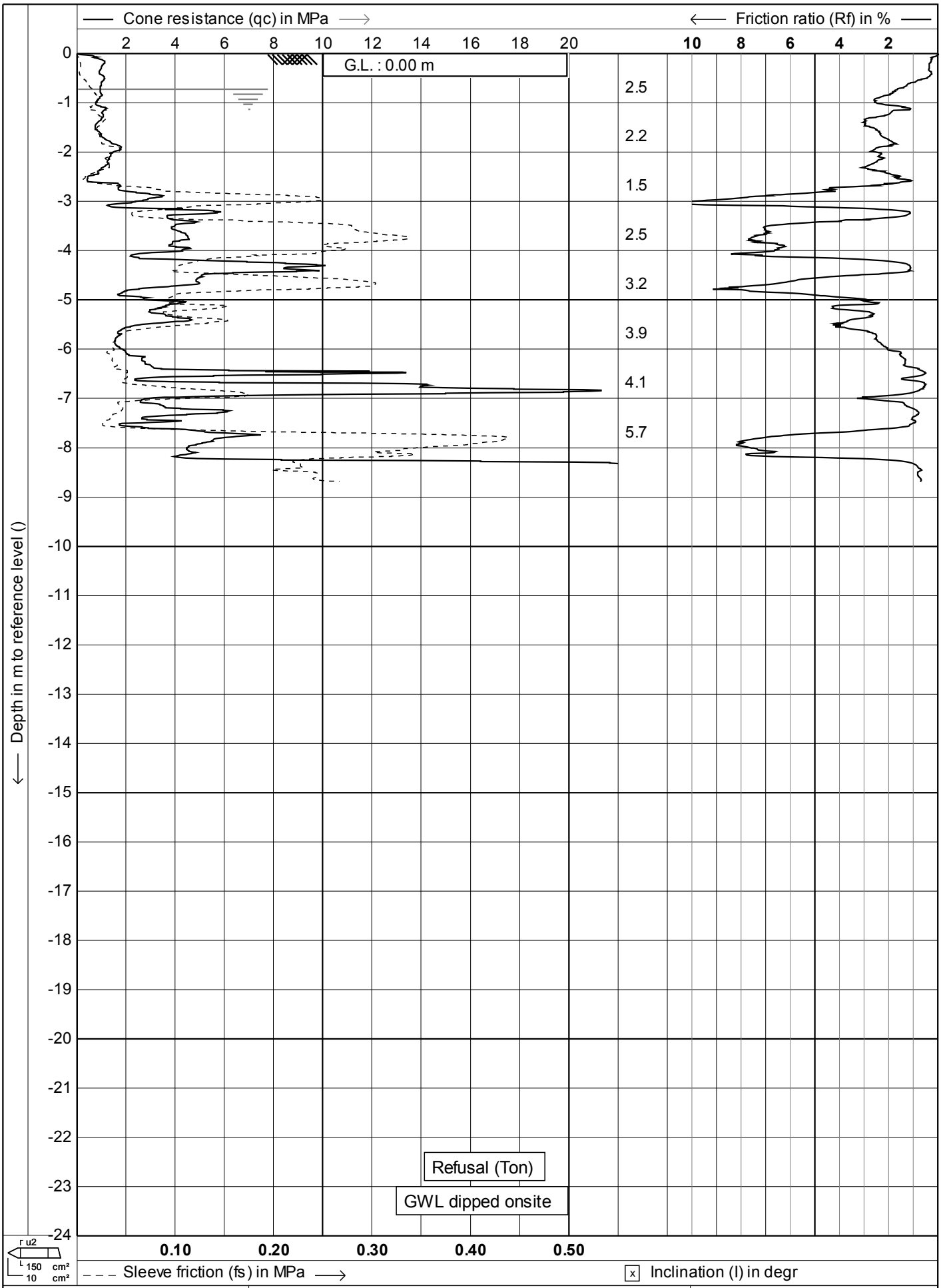
Project no. : **02ET01**

CPT no. : **08**

1/14

CPTask V1.33

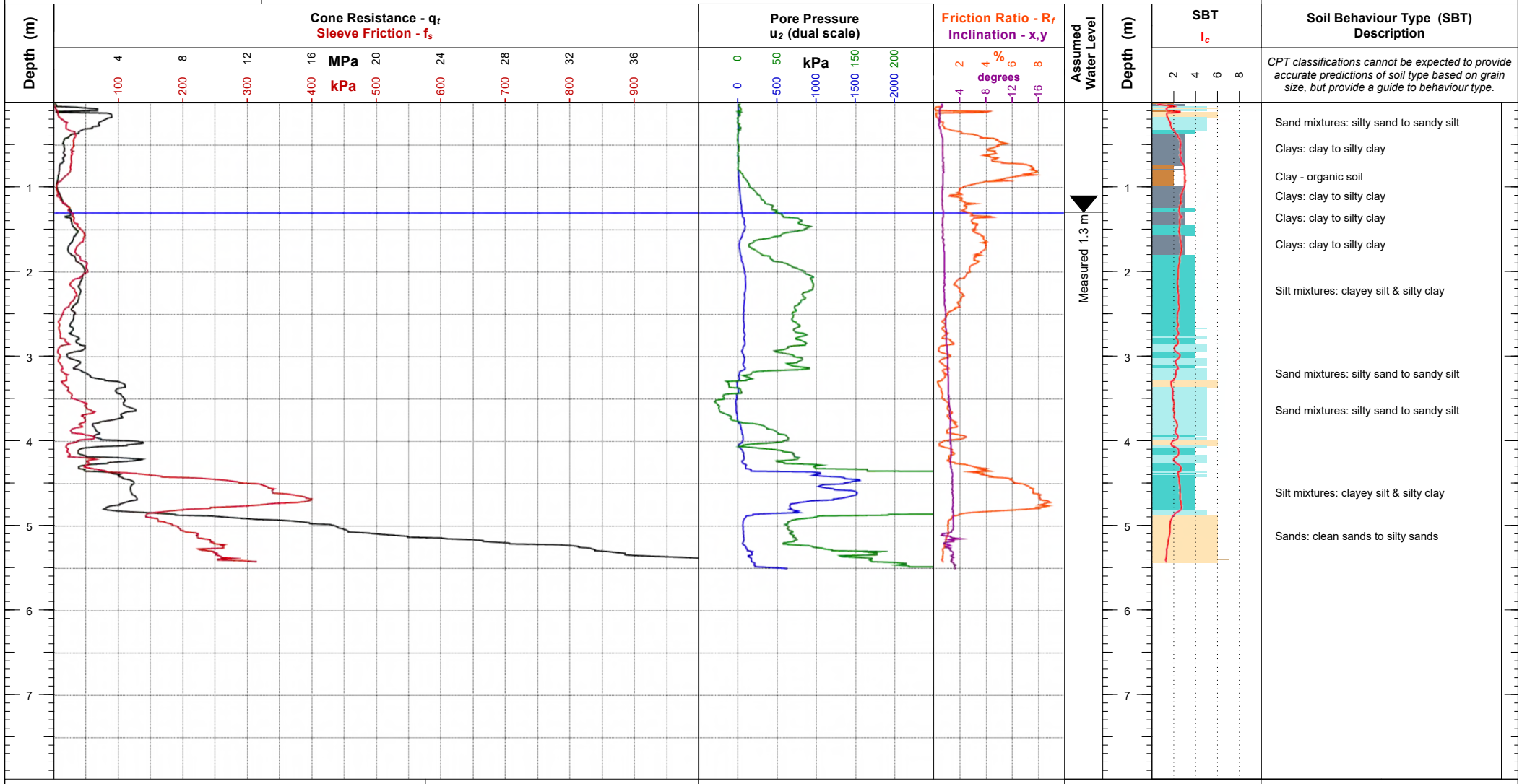

Cone resistance (qc) in MPa
Friction ratio (Rf) in %
Depth in m to reference level ()
G.L. : 0.00 m
2.5
2.5
2.4
1.7
1.1
Refusal (Tip)
GWL dipped onsite
Sleeve friction (fs) in MPa
Inclination (I) in degr
Test according A.S.T.M. Standard D 5778-12
Project : Site Investigation
Location: 94 Scott rd - Te Kauwhata
Date : 6-10-2016
Cone no. : C10CFIIP.C14432
Project no. : 02ET01
CPT no. : 09
1/14



PERRY GEOTECH	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. : **10** 1/14

CPTask V1.33

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

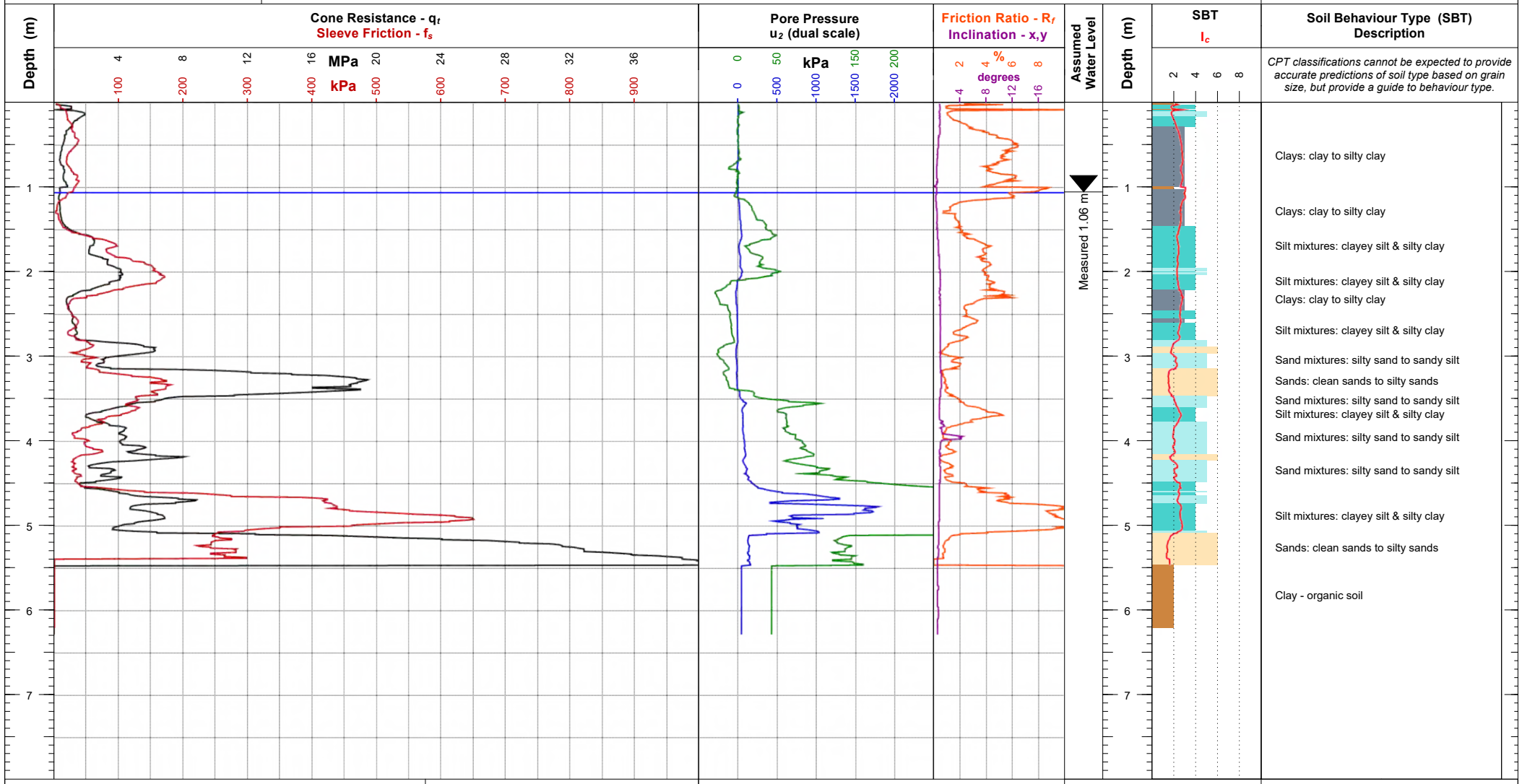
Client Job Ref:

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 cm² 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

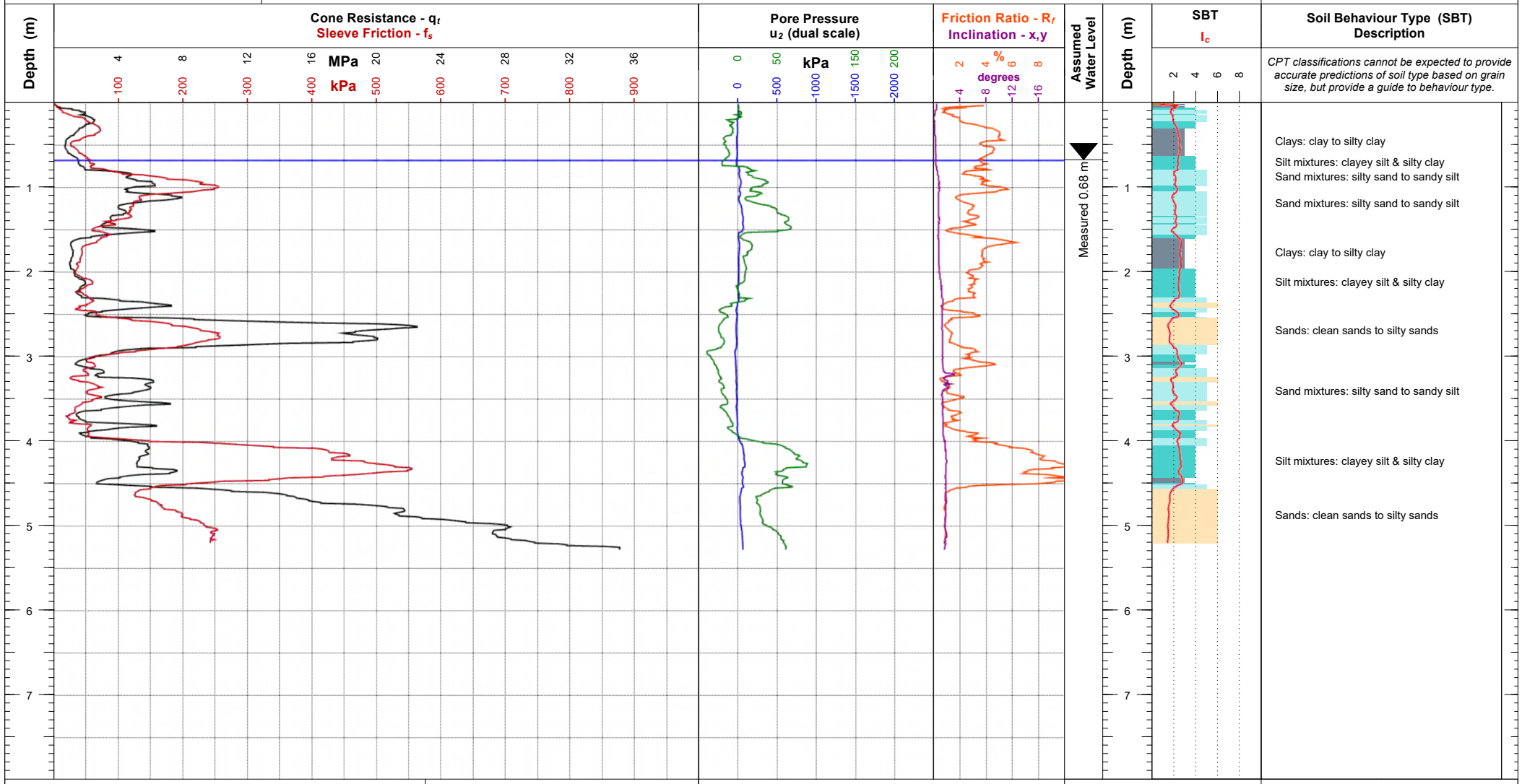
Client Job Ref:

CPT Number: **CPT-216**

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

NZTM2000 N,E (m): 5857123.81, 1790459.04
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

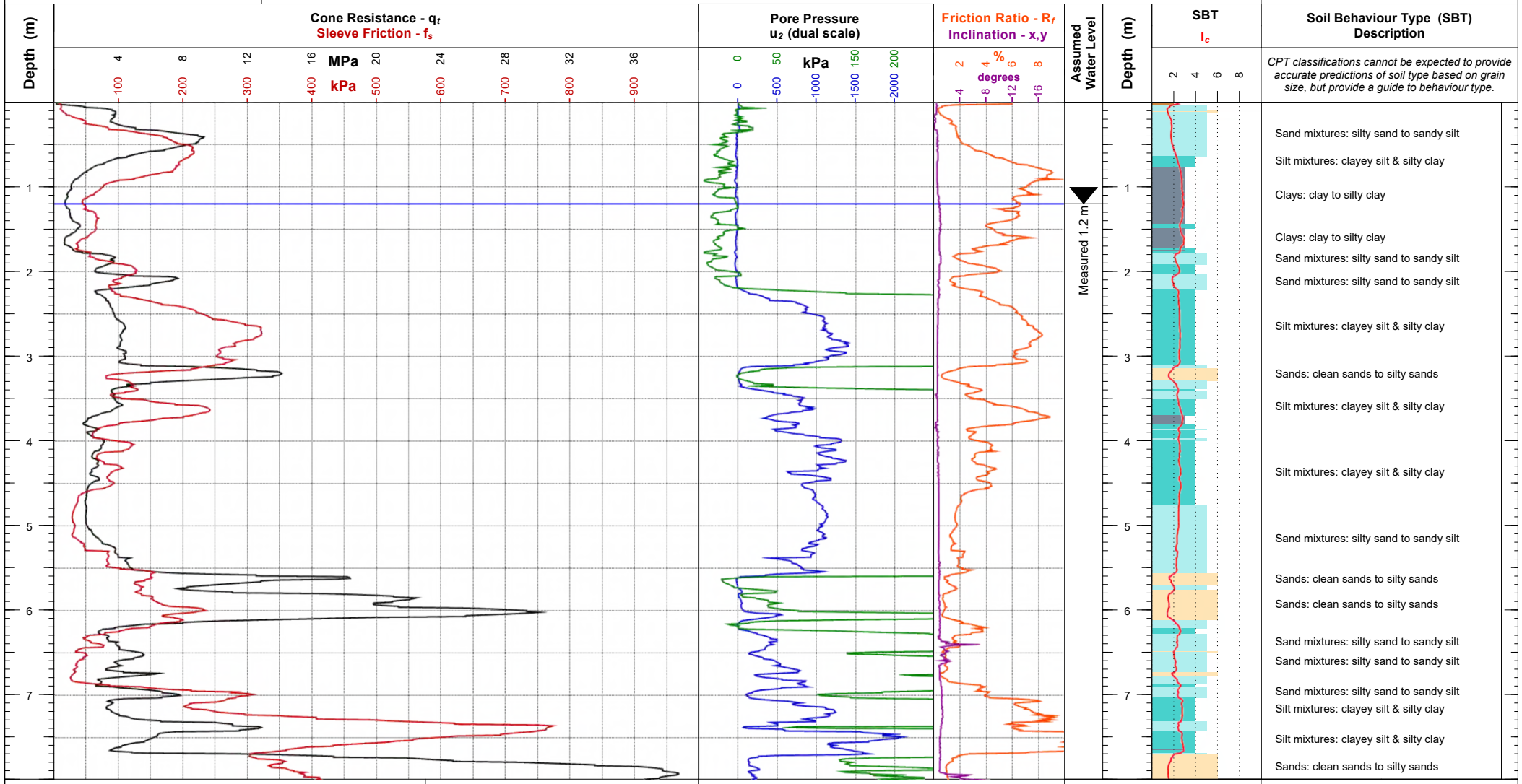
Client Job Ref:

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

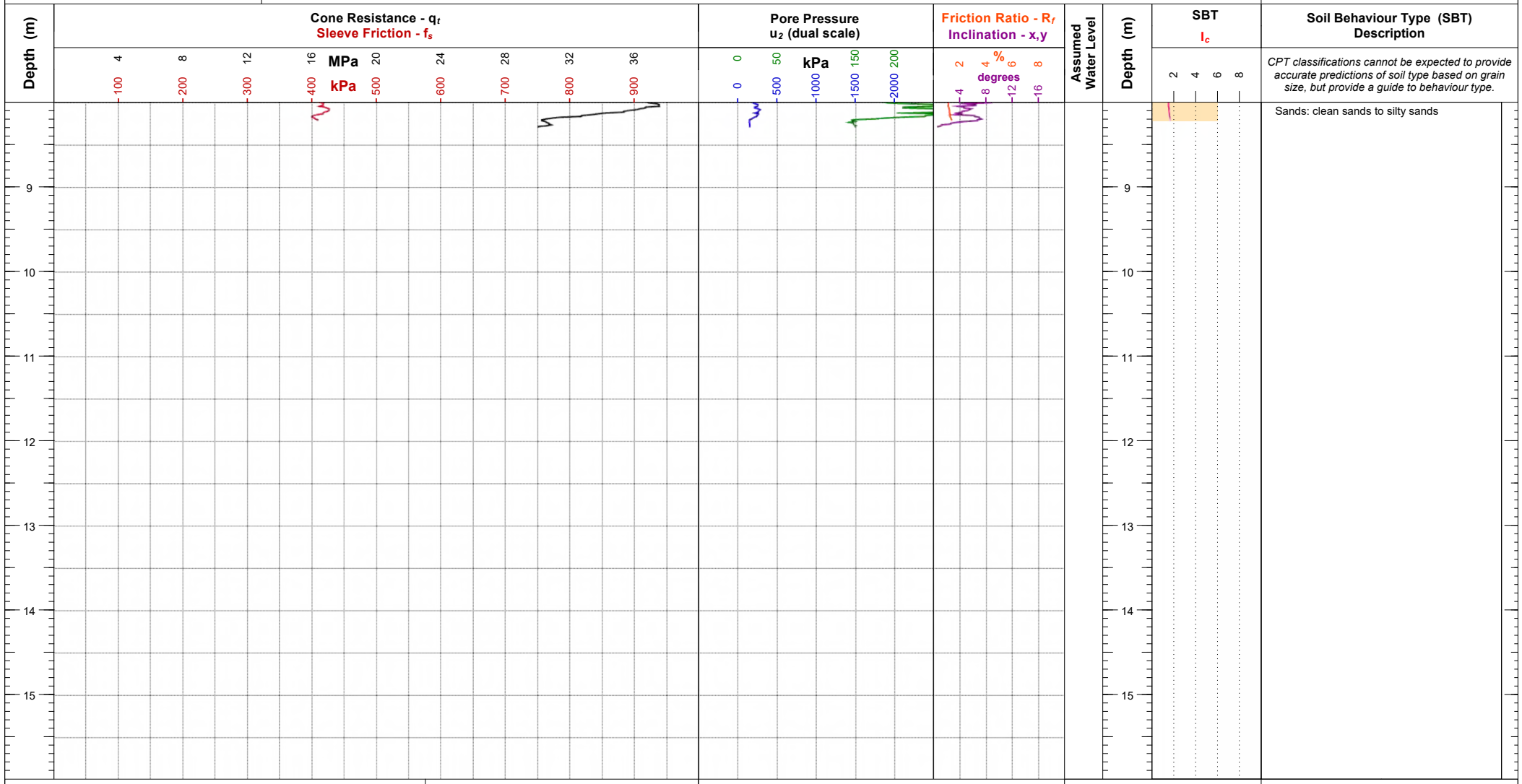
Client Job Ref:

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 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

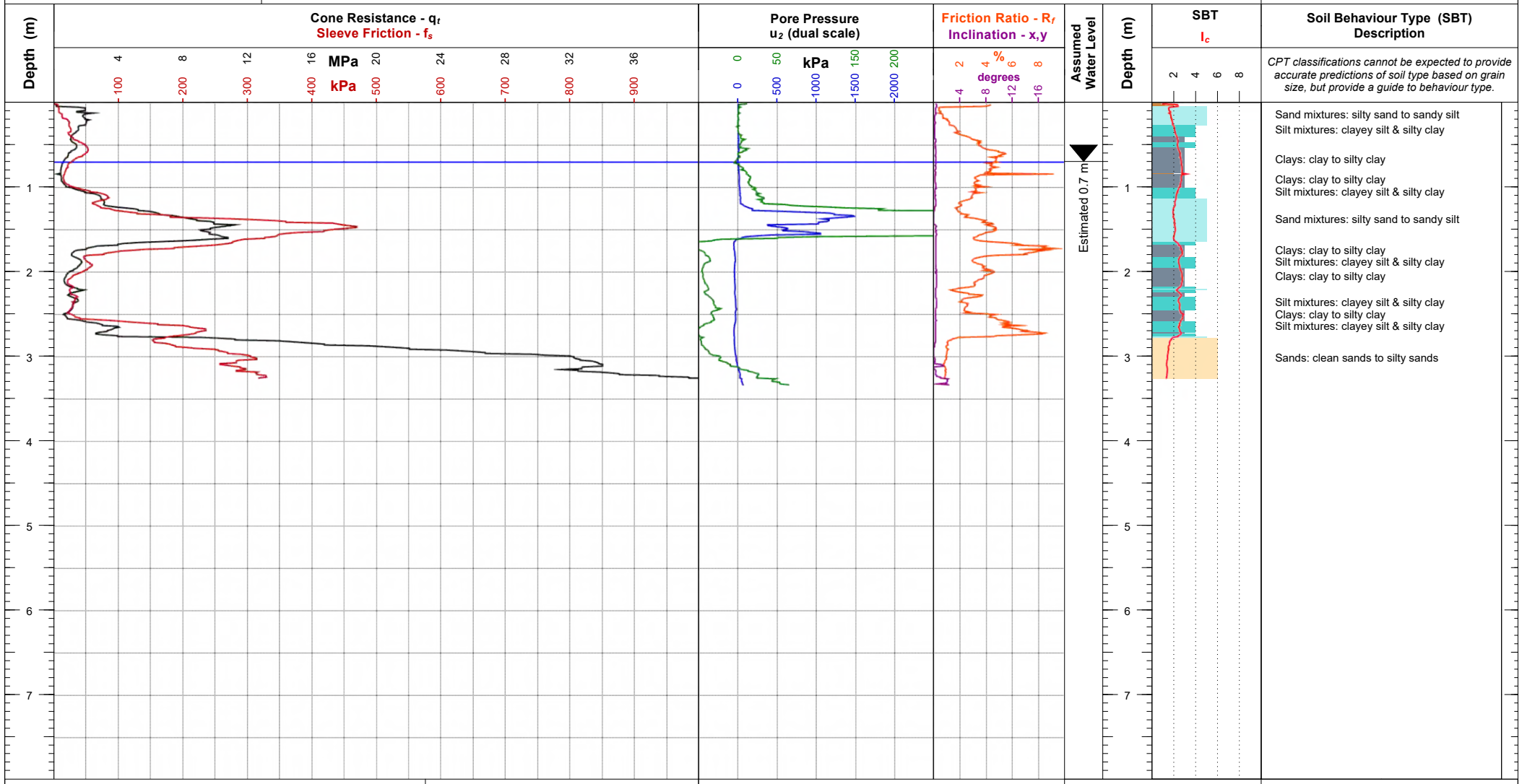
Client Job Ref:

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

NZTM2000 N,E (m): 5857055.06, 1790528.4
WGS84, (deg): 175.152932, --37.413722
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: High cone end resistance

Elevation (m): -
Date of Test: 29/11/2017
Depth (m): 3.34
Pre-Drill (m): N/A

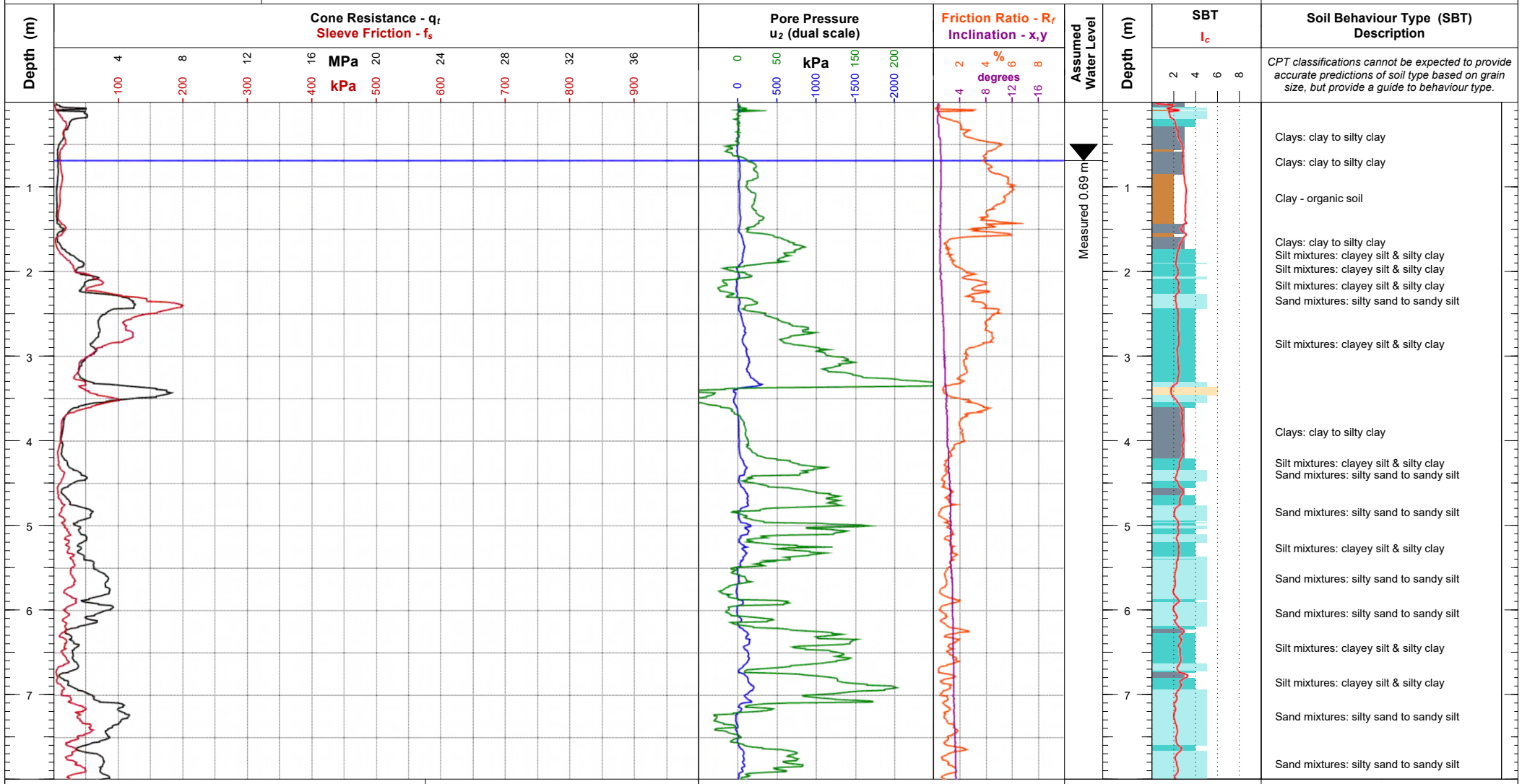
Client Job Ref:

CPT Number: **CPT-219**

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

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

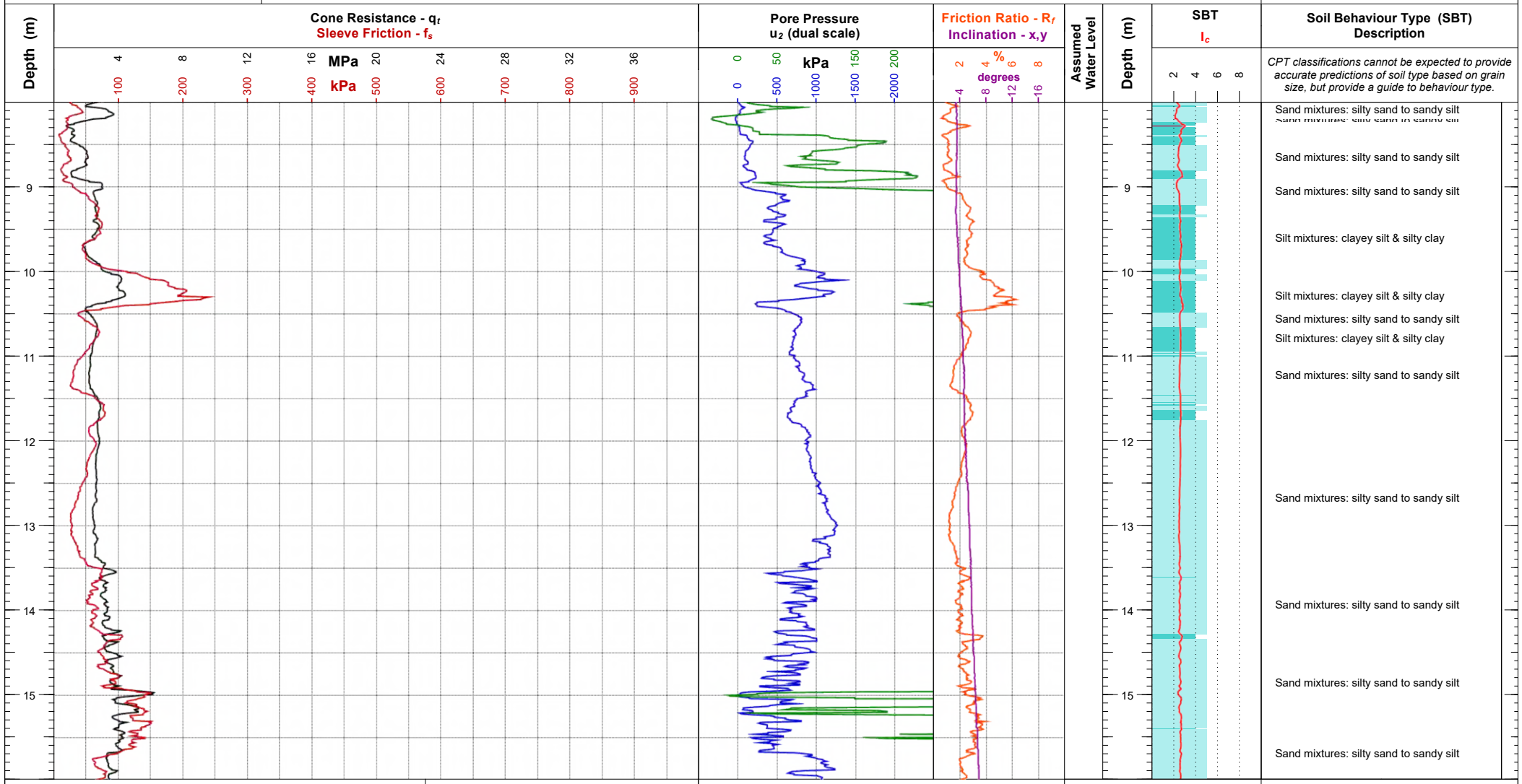
Client Job Ref:

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 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

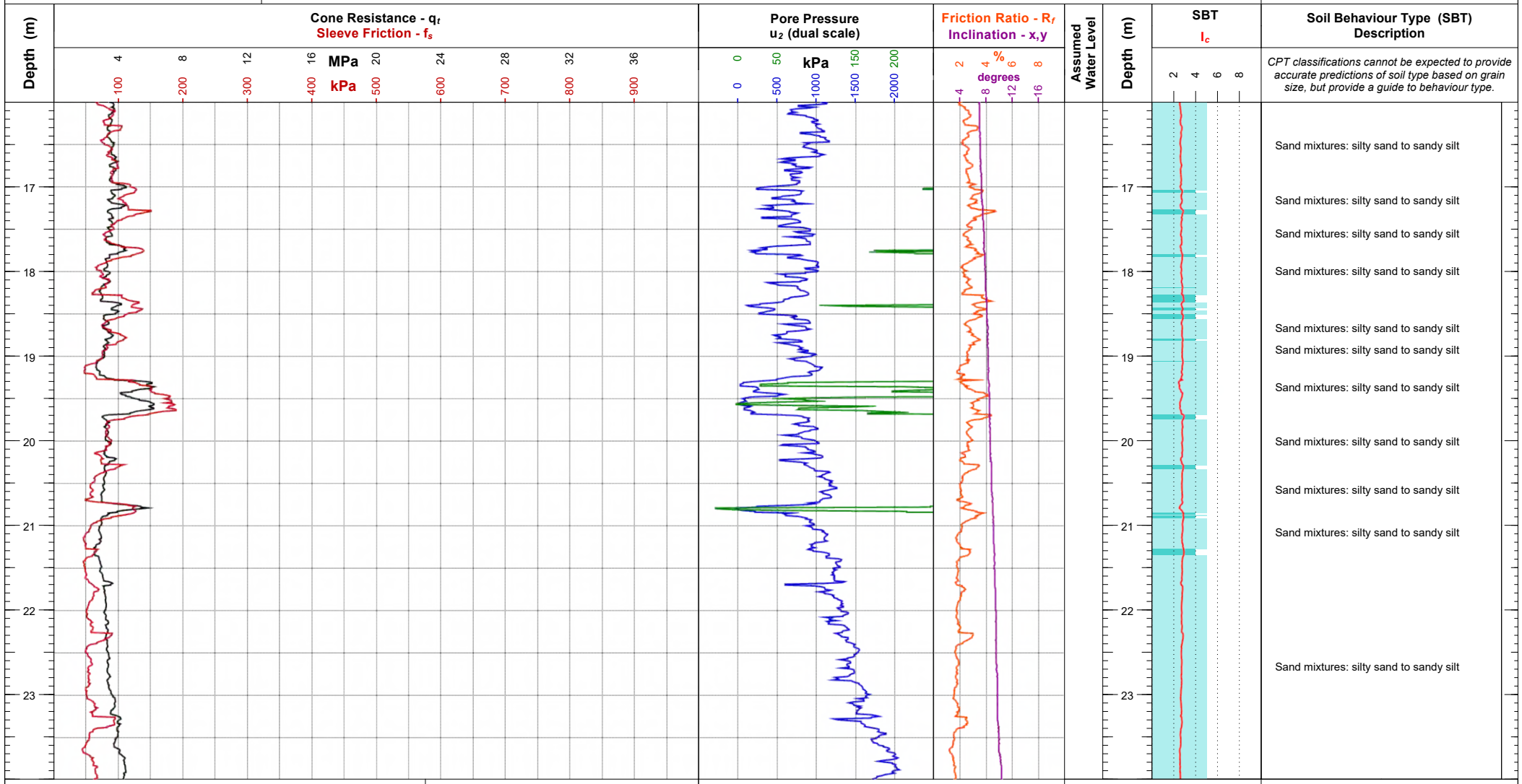
Client Job Ref:

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 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

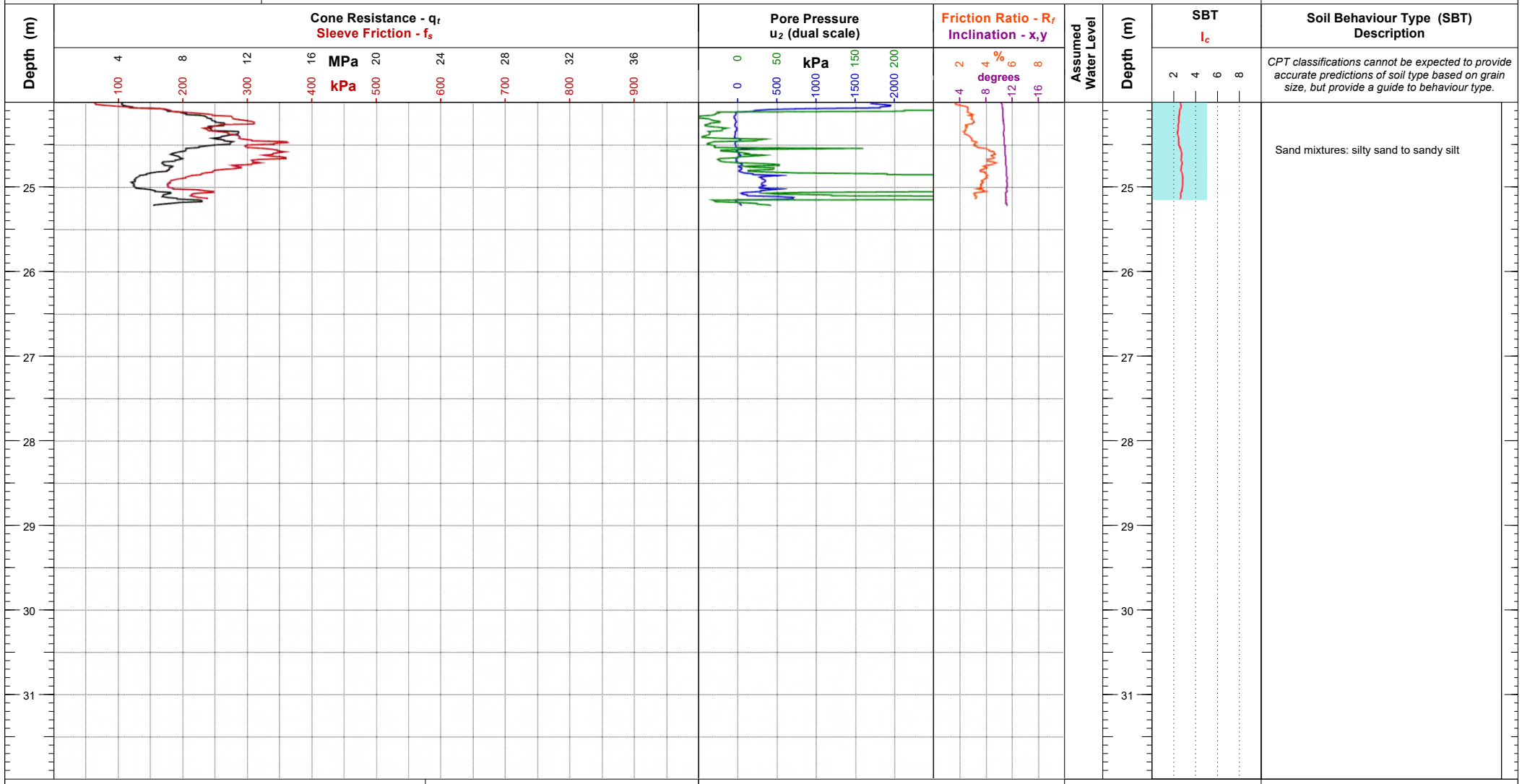
Client Job Ref:

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 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

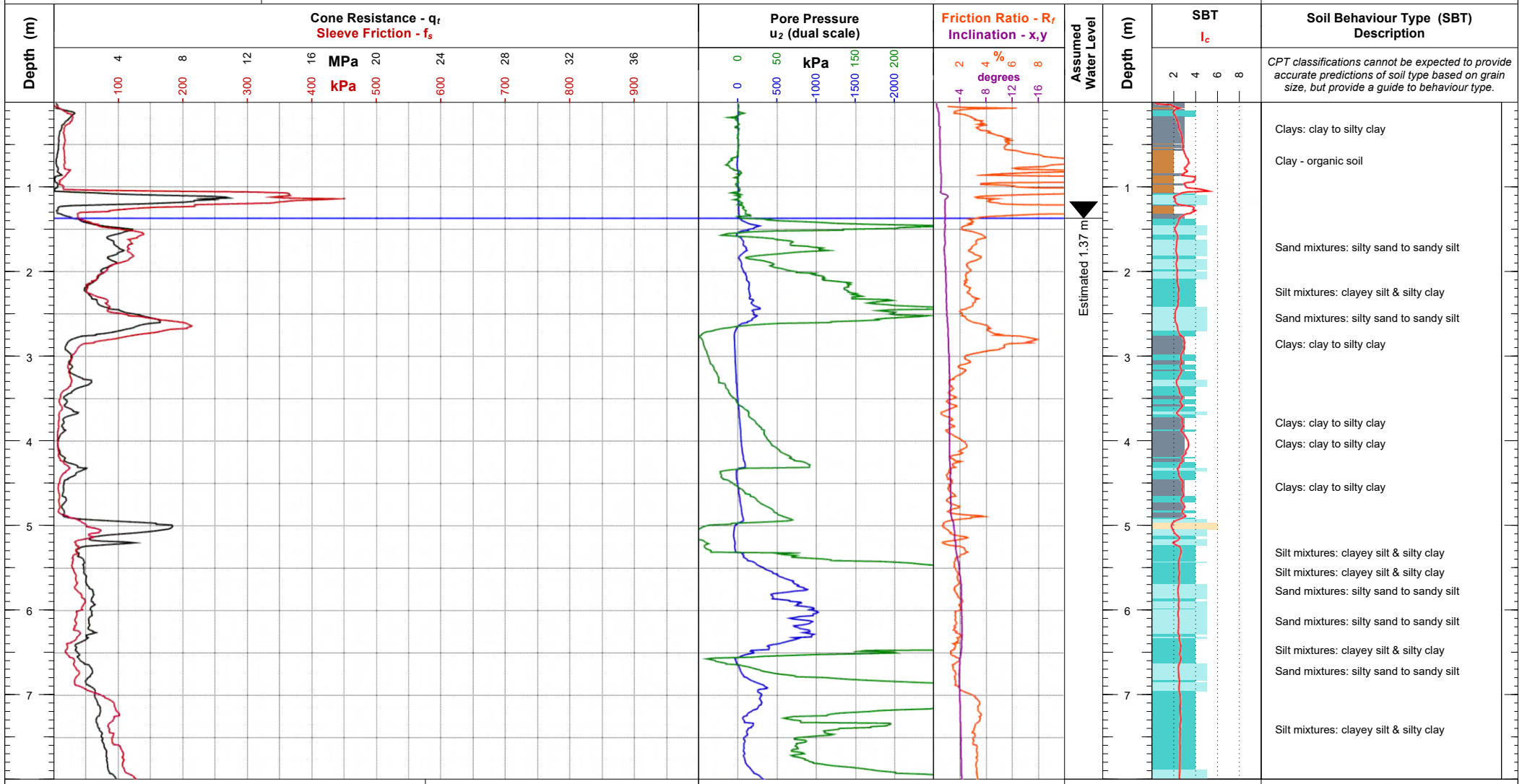
Client Job Ref:

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: MKJ208
Cone Type: 10 cm² 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

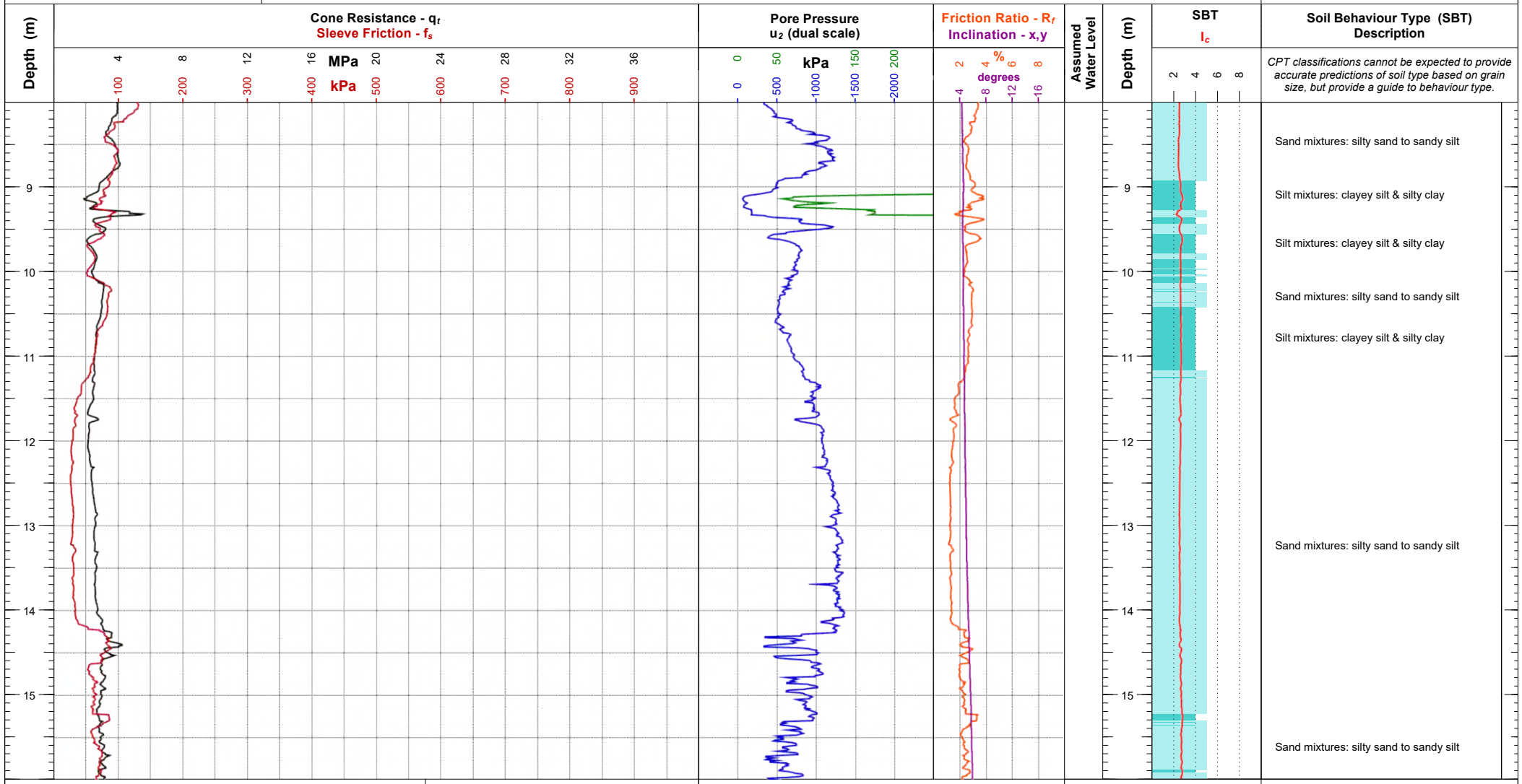
Client Job Ref:

CPT Number: **CPT-221**

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

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): 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

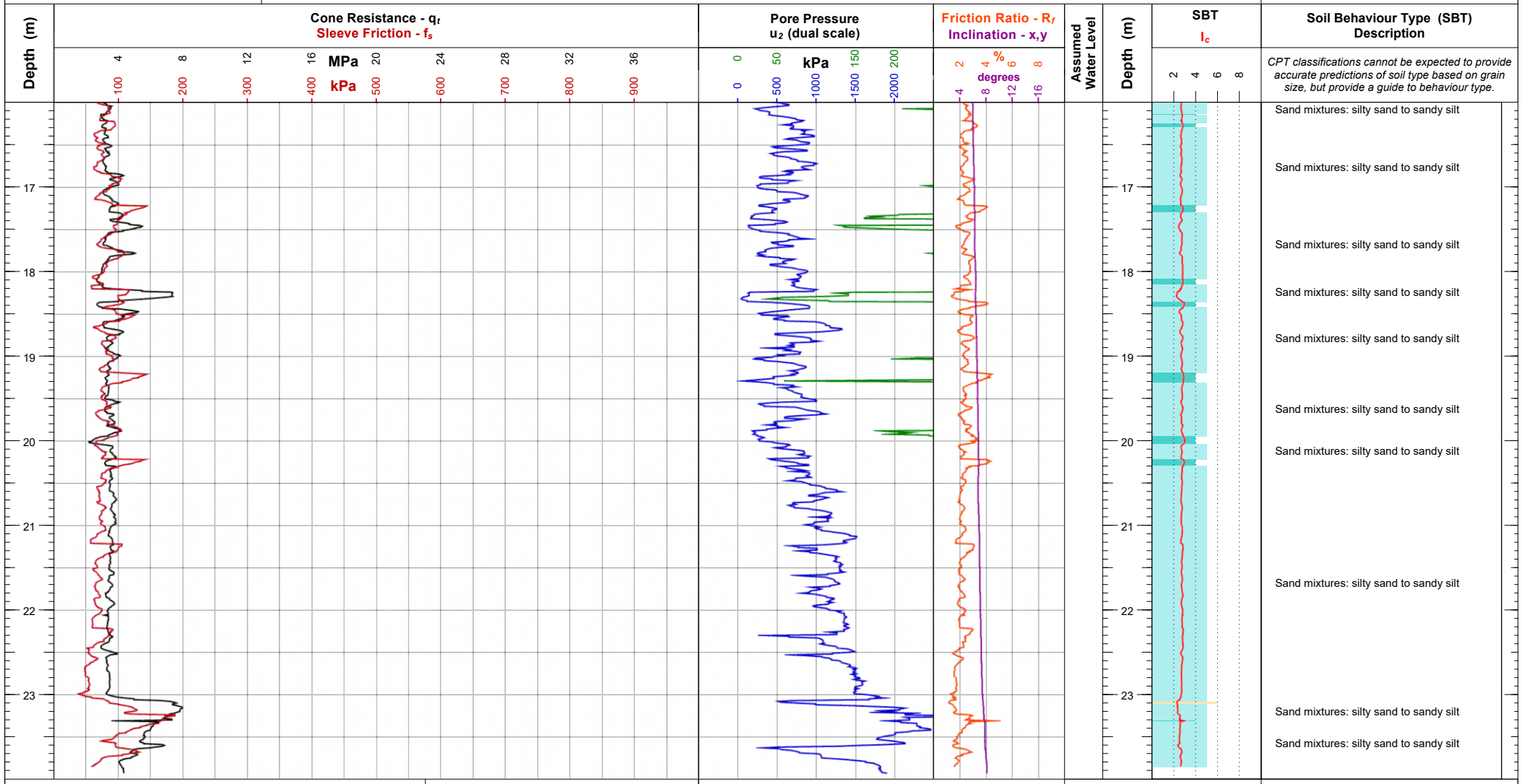
Client Job Ref:

CPT Number: **CPT-221**

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

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): 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

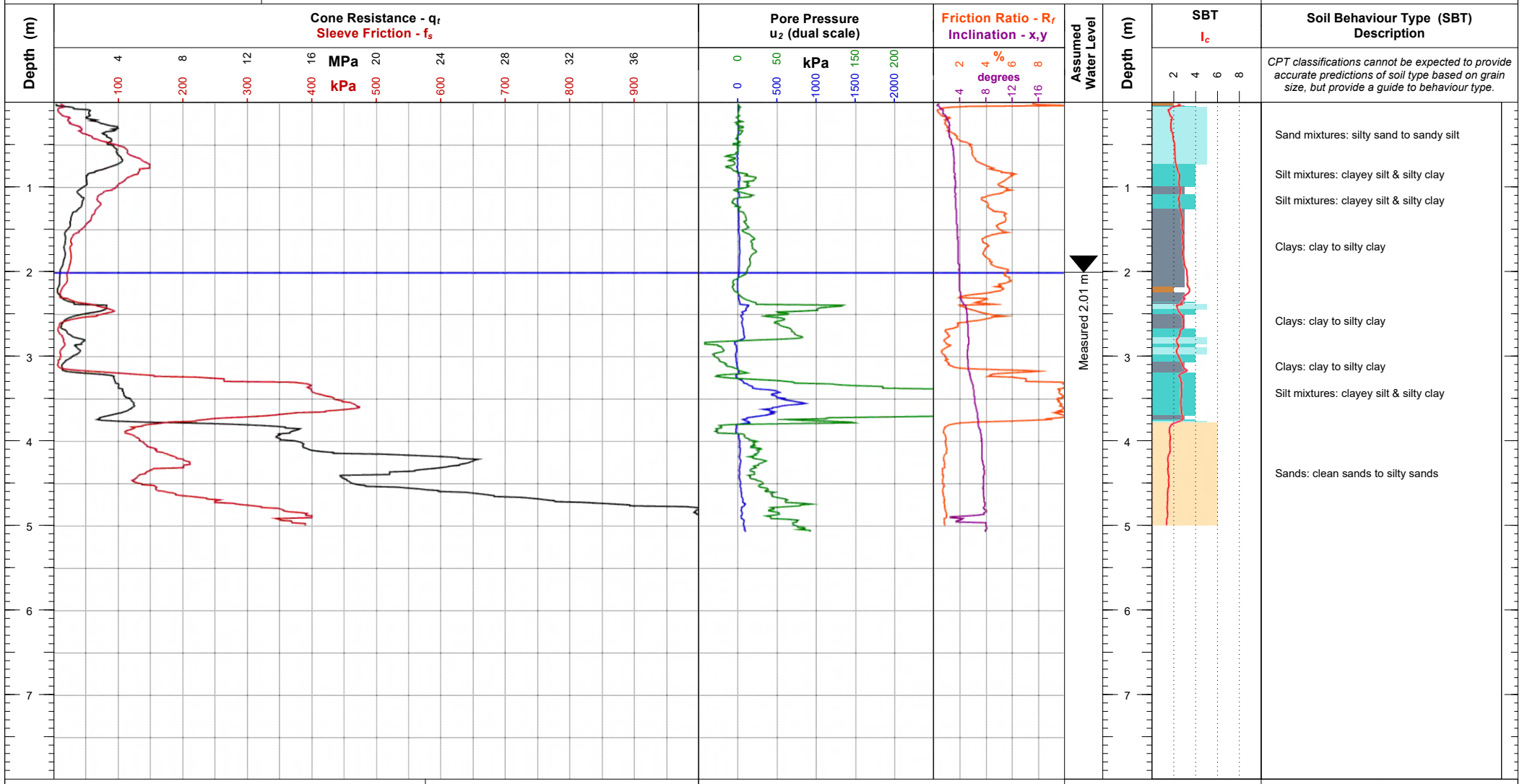
Client Job Ref:

CPT Number: **CPT-221**

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

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

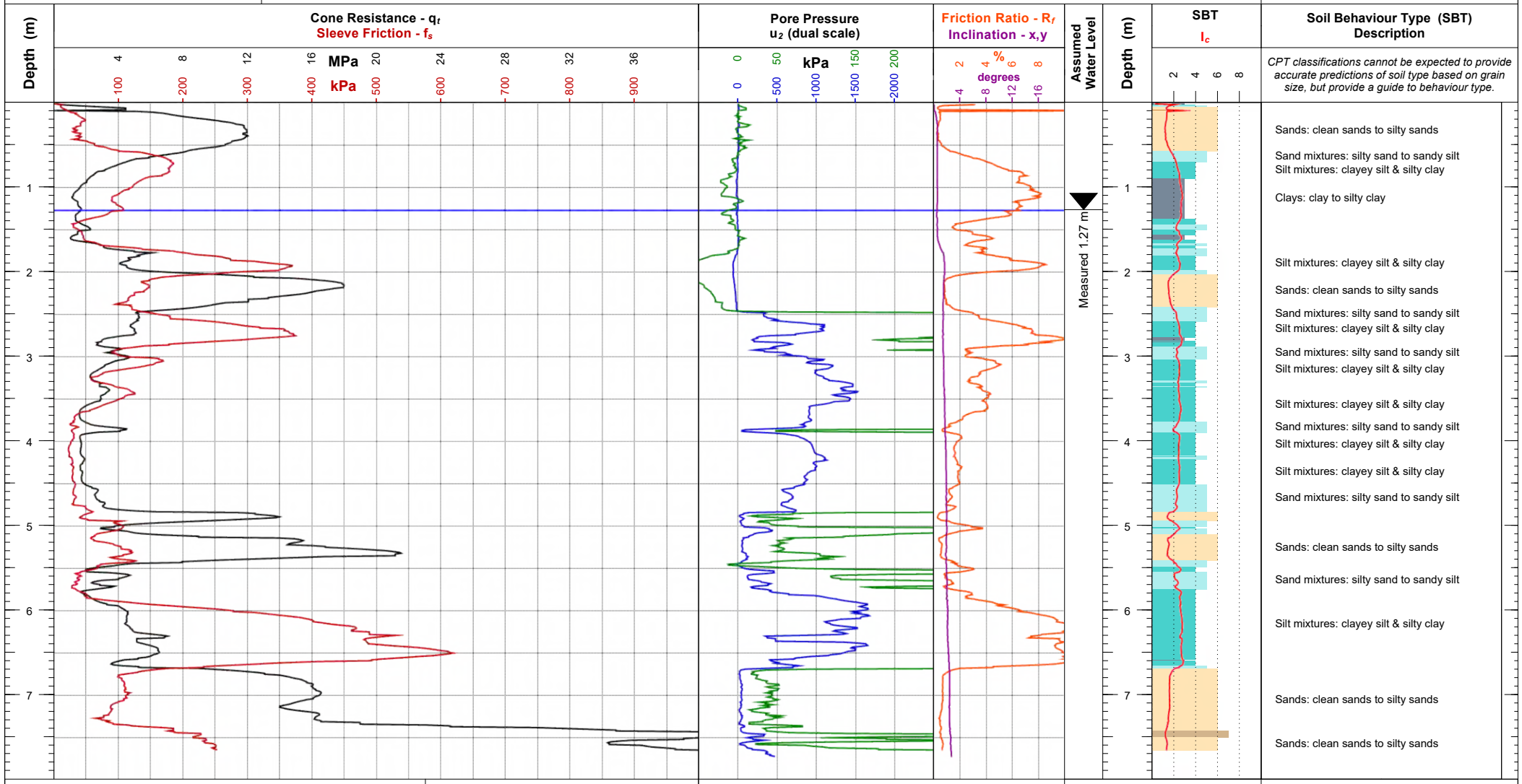
Client Job Ref:

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

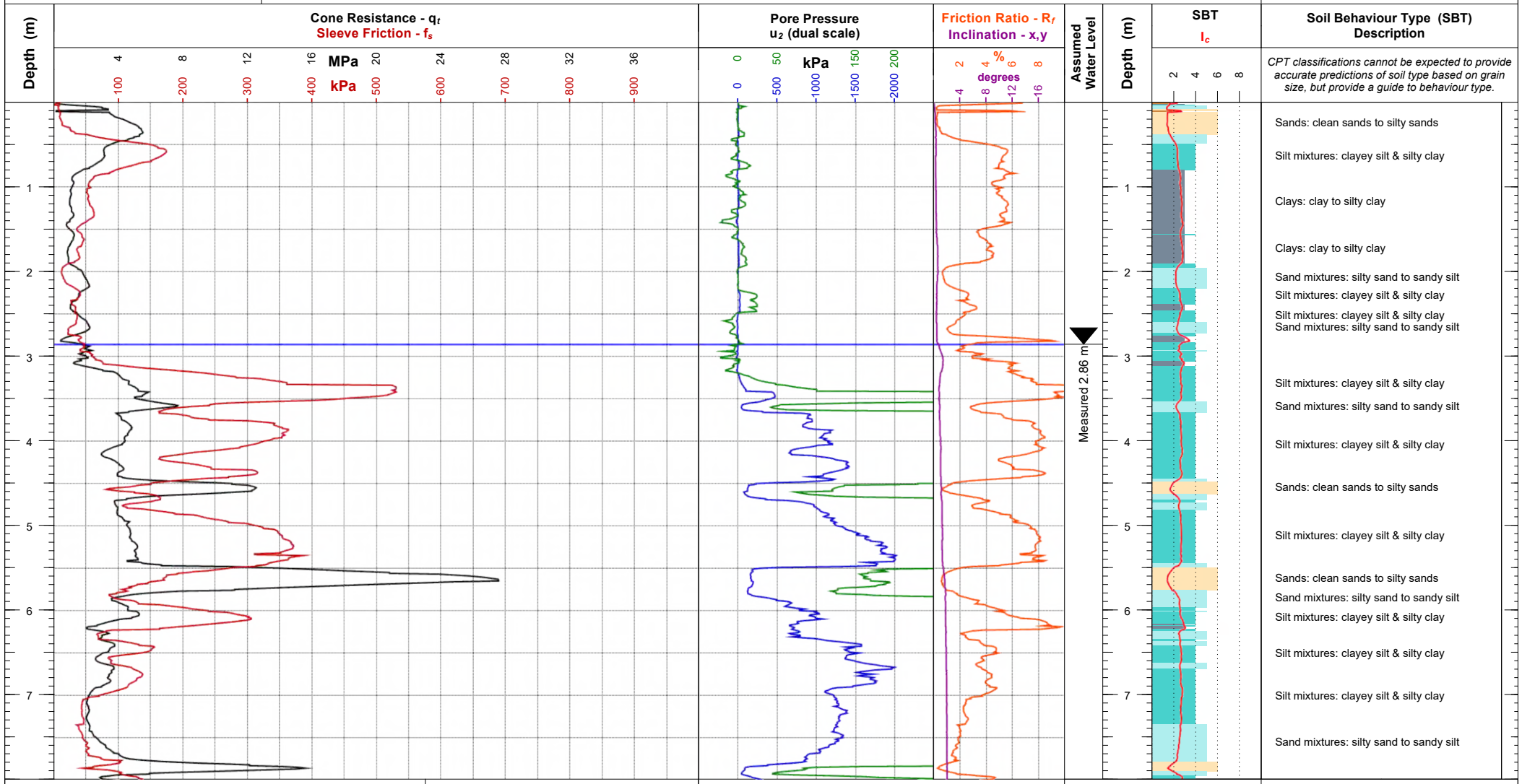
Client Job Ref:

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 cm² 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

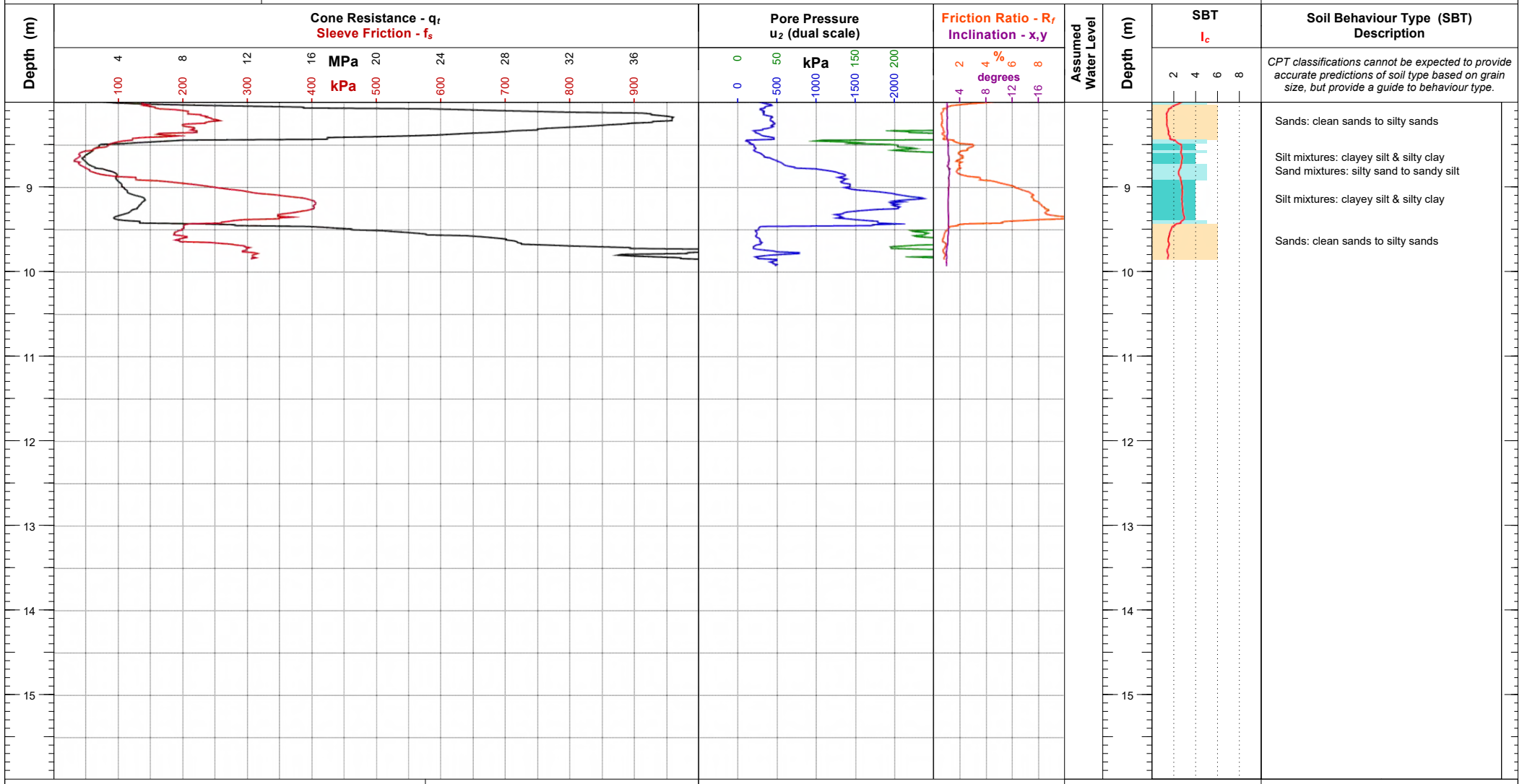
Client Job Ref:

CPT Number: **CPT-224**

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

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): 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

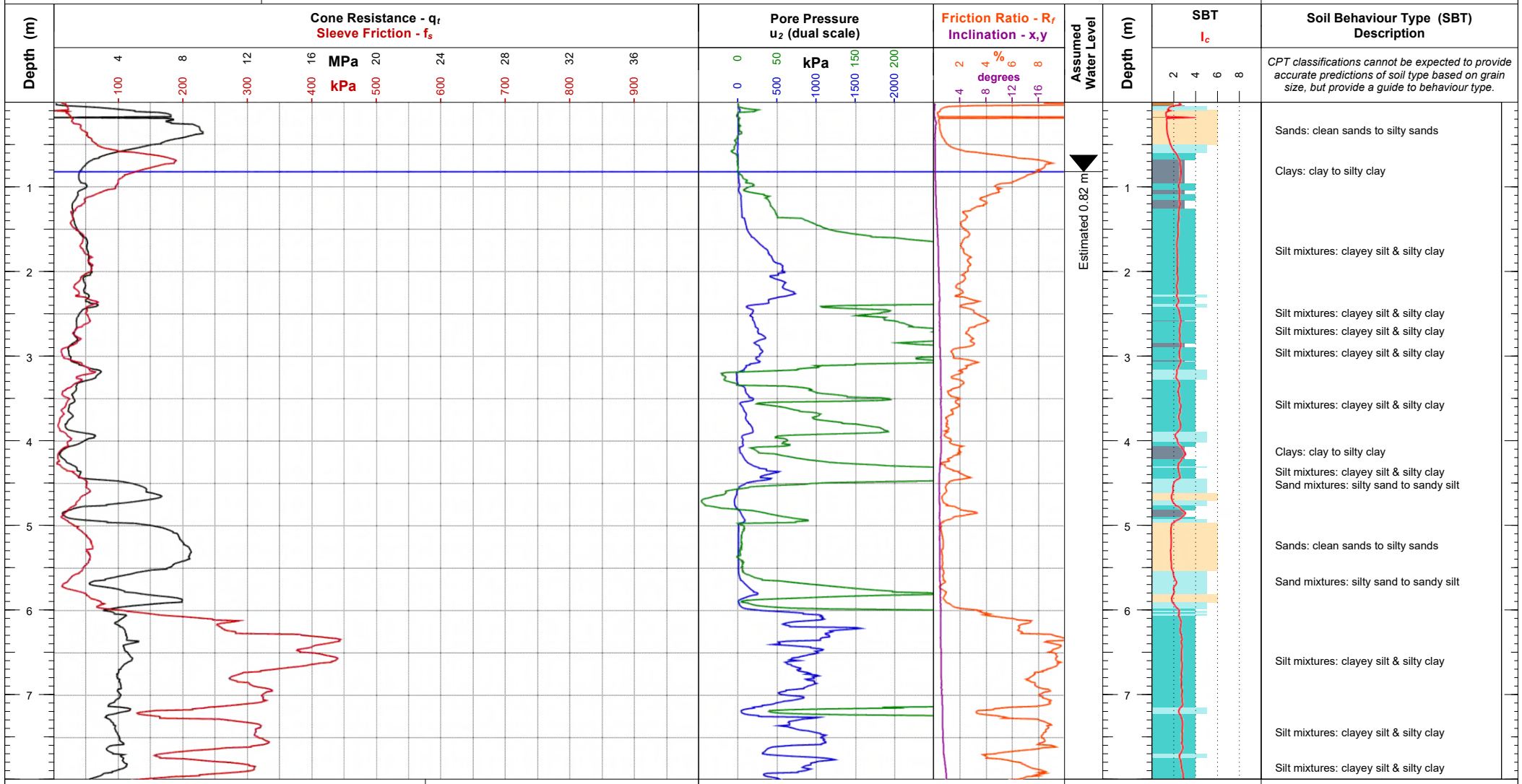
Client Job Ref:

CPT Number: **CPT-224**

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

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

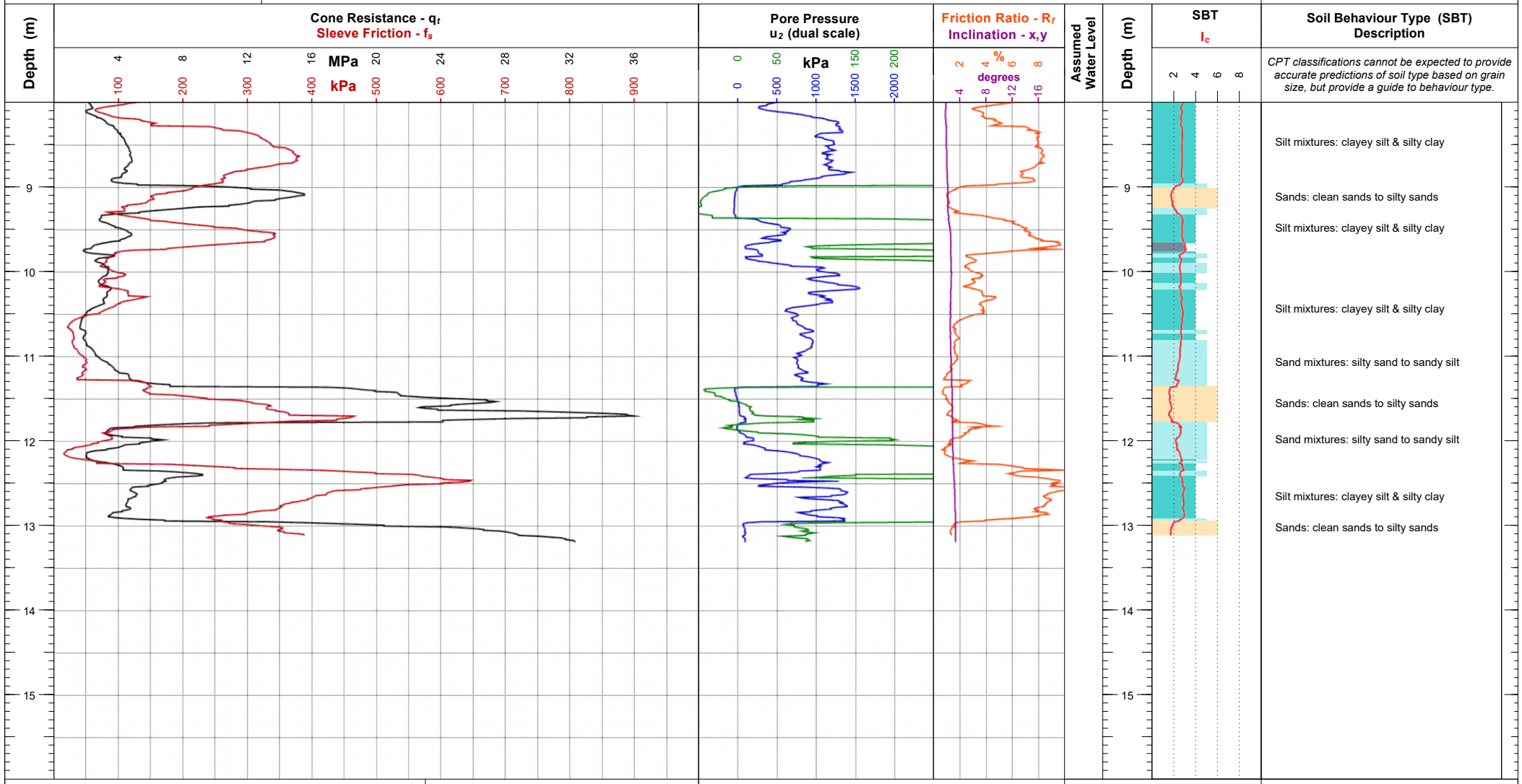
Client Job Ref:

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 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

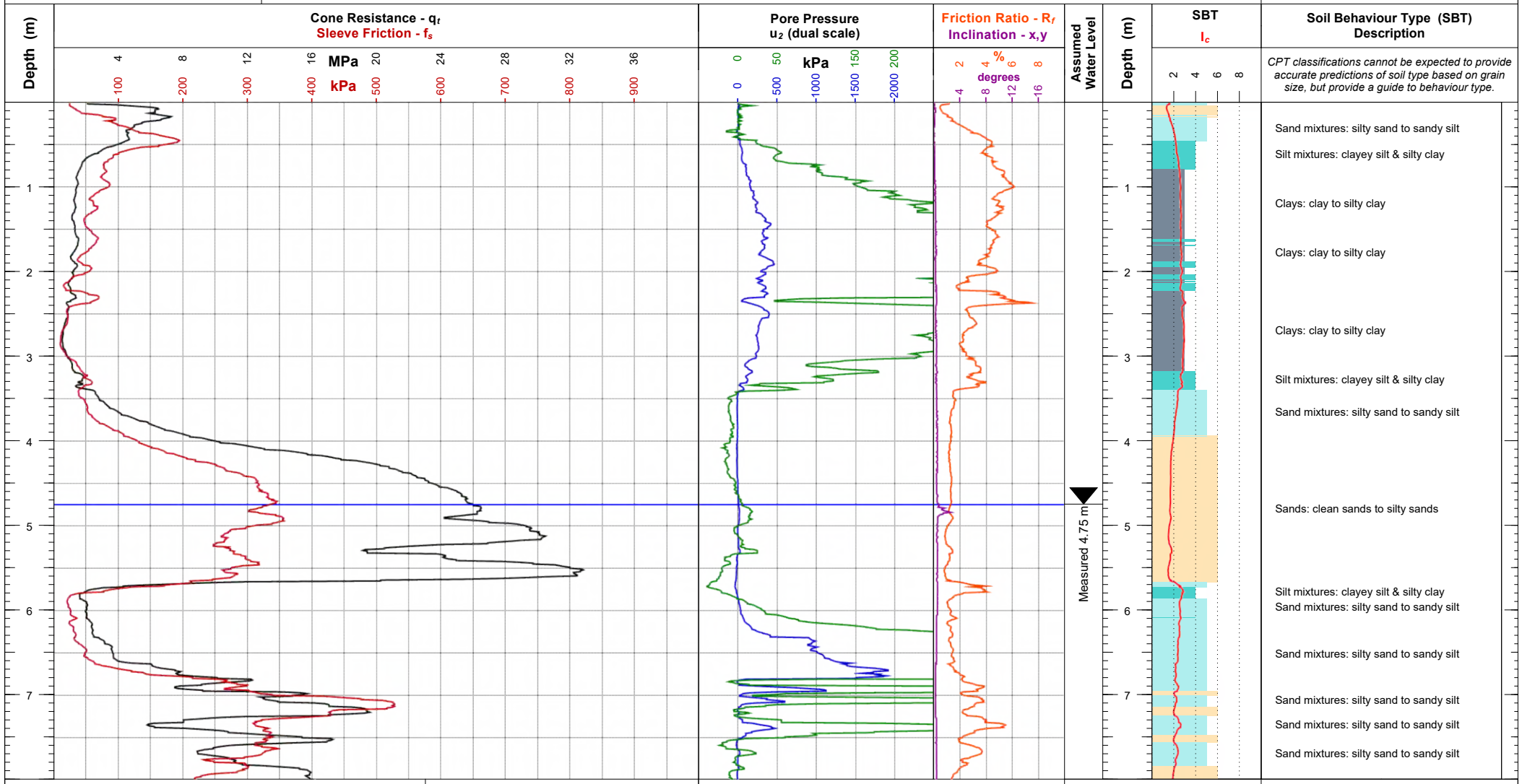
Client Job Ref:

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: MKJ335
Cone Type: 10 cm² 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

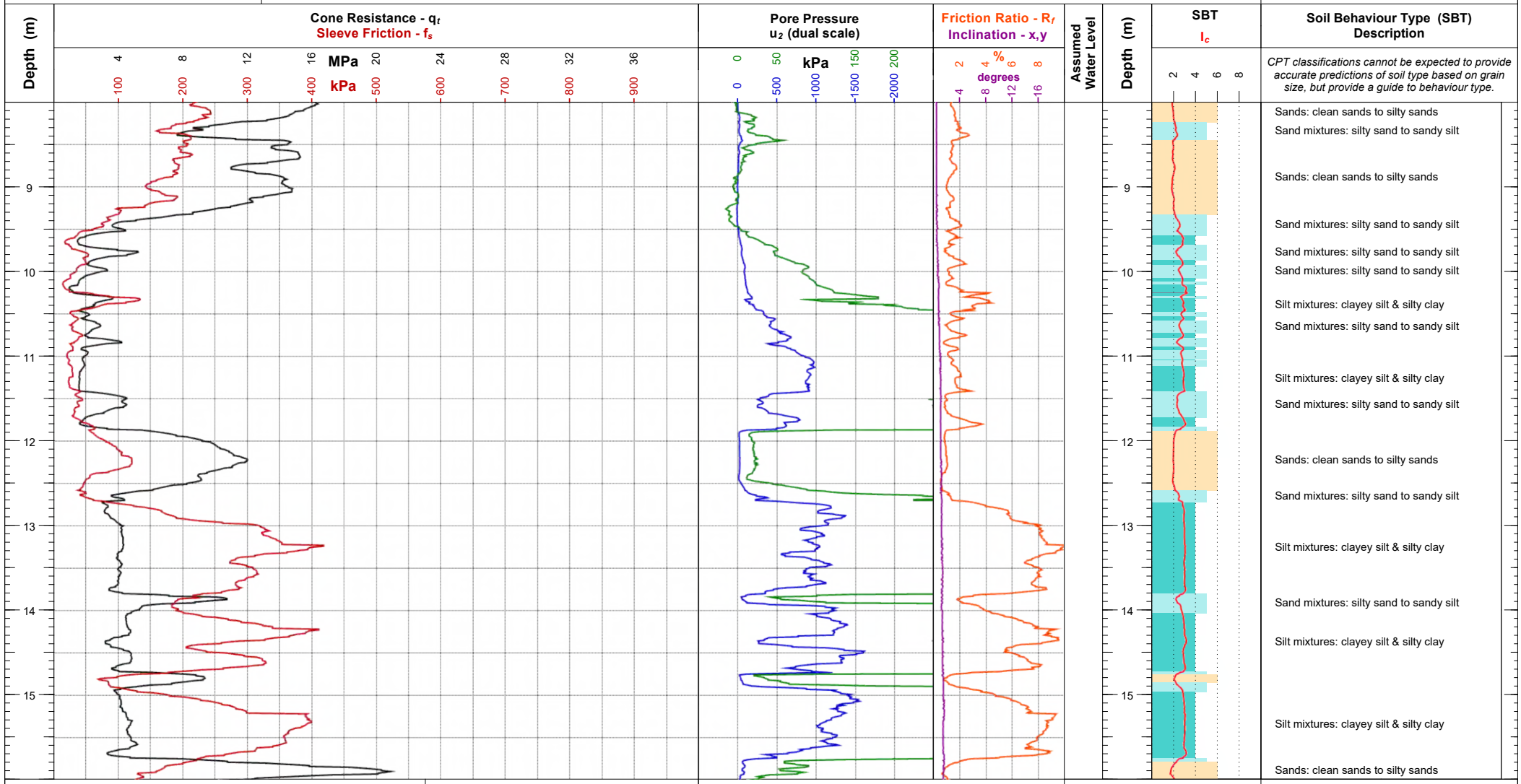
Client Job Ref:

CPT Number: **CPT-226**

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

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): 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

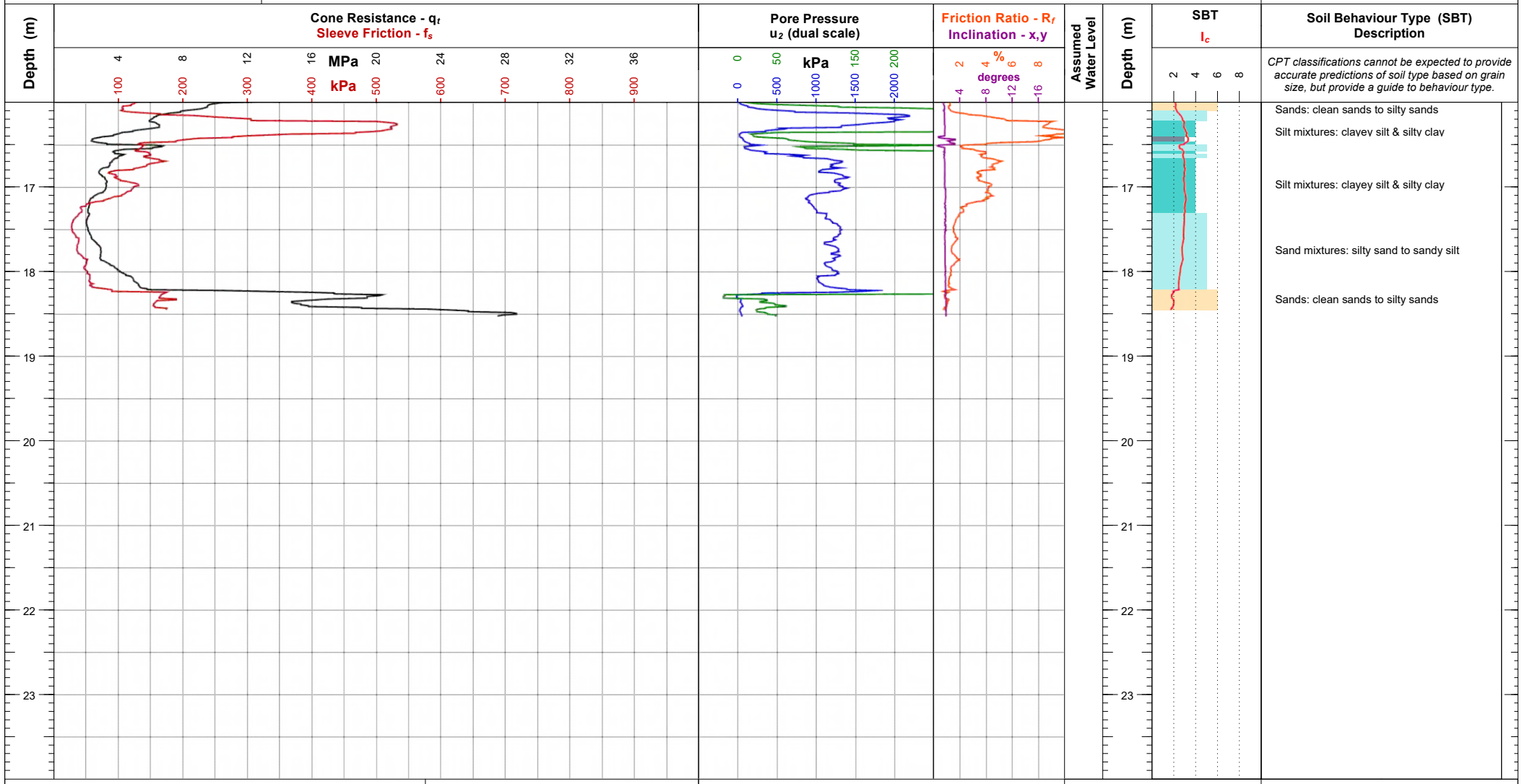
Client Job Ref:

CPT Number: **CPT-226**

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

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): 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

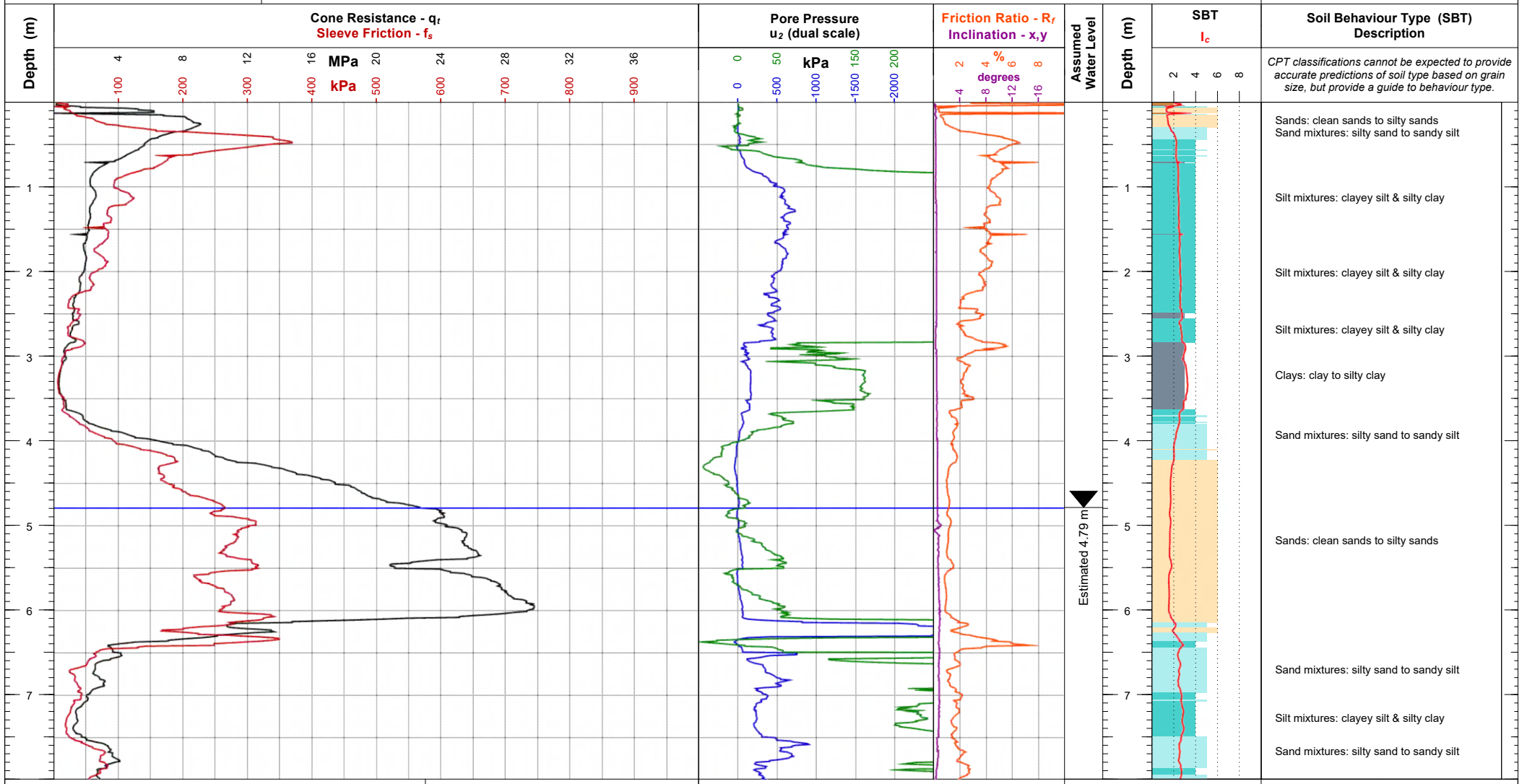
Client Job Ref:

CPT Number: **CPT-226**

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

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): 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

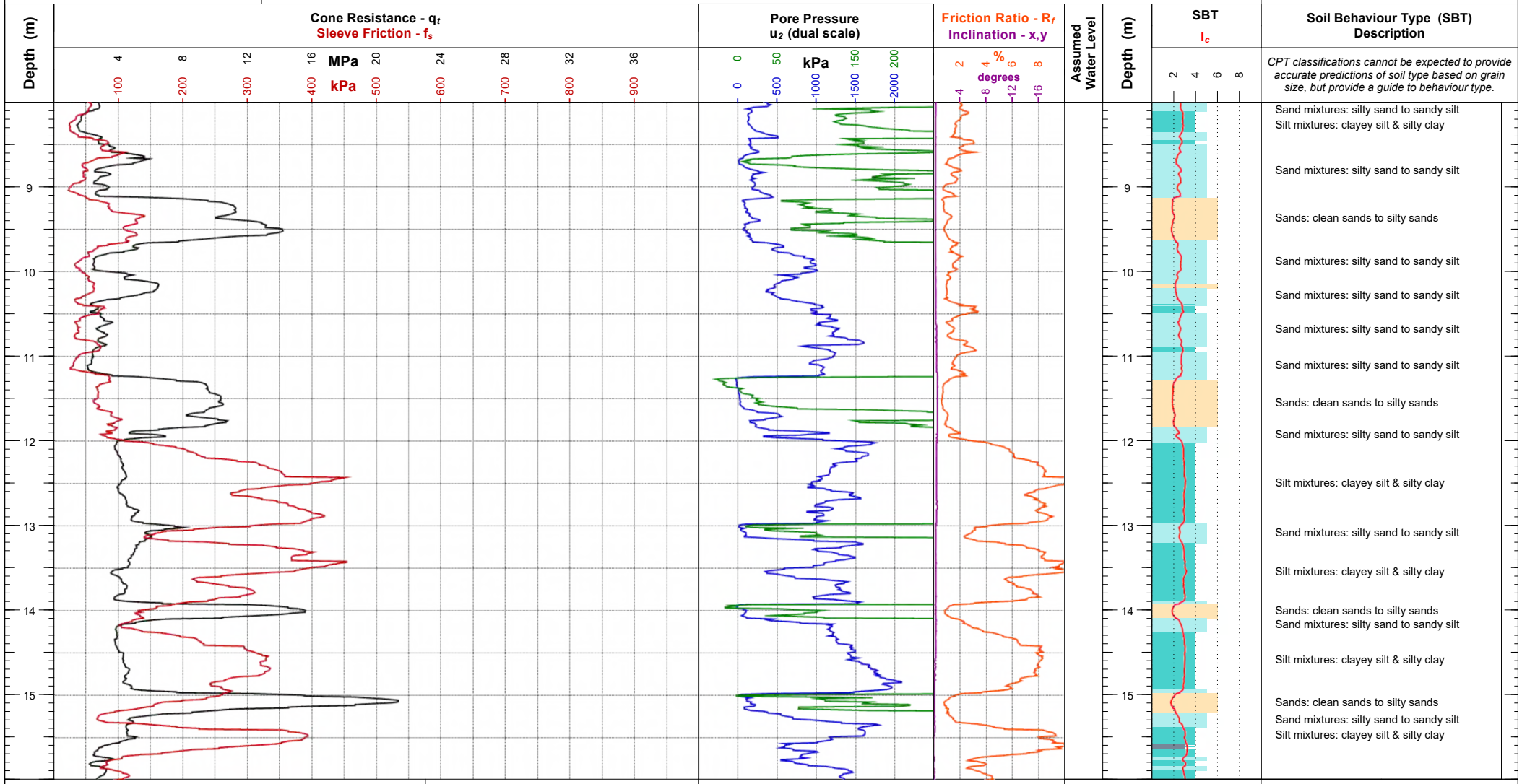
Client Job Ref:

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 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

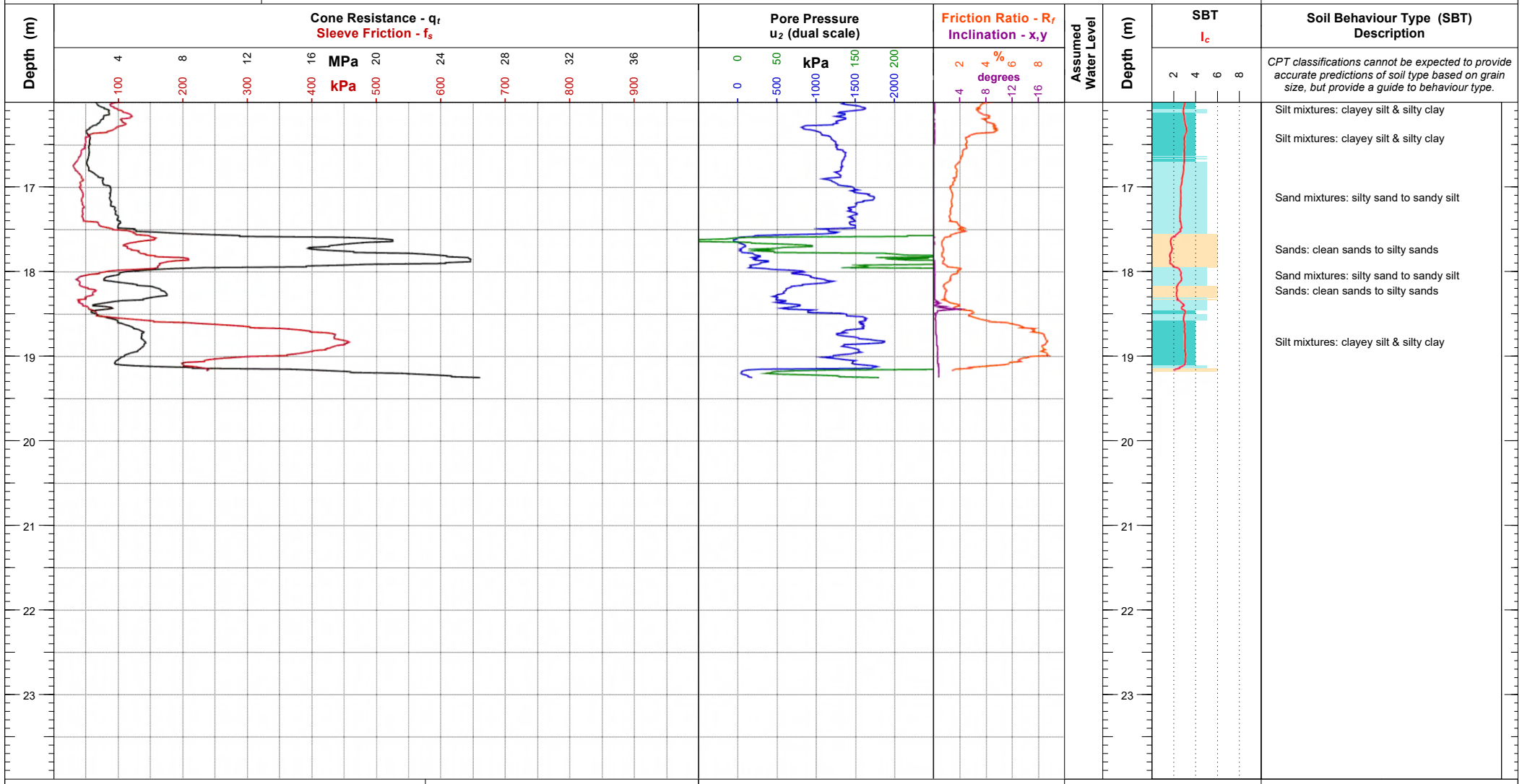
Client Job Ref:

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 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

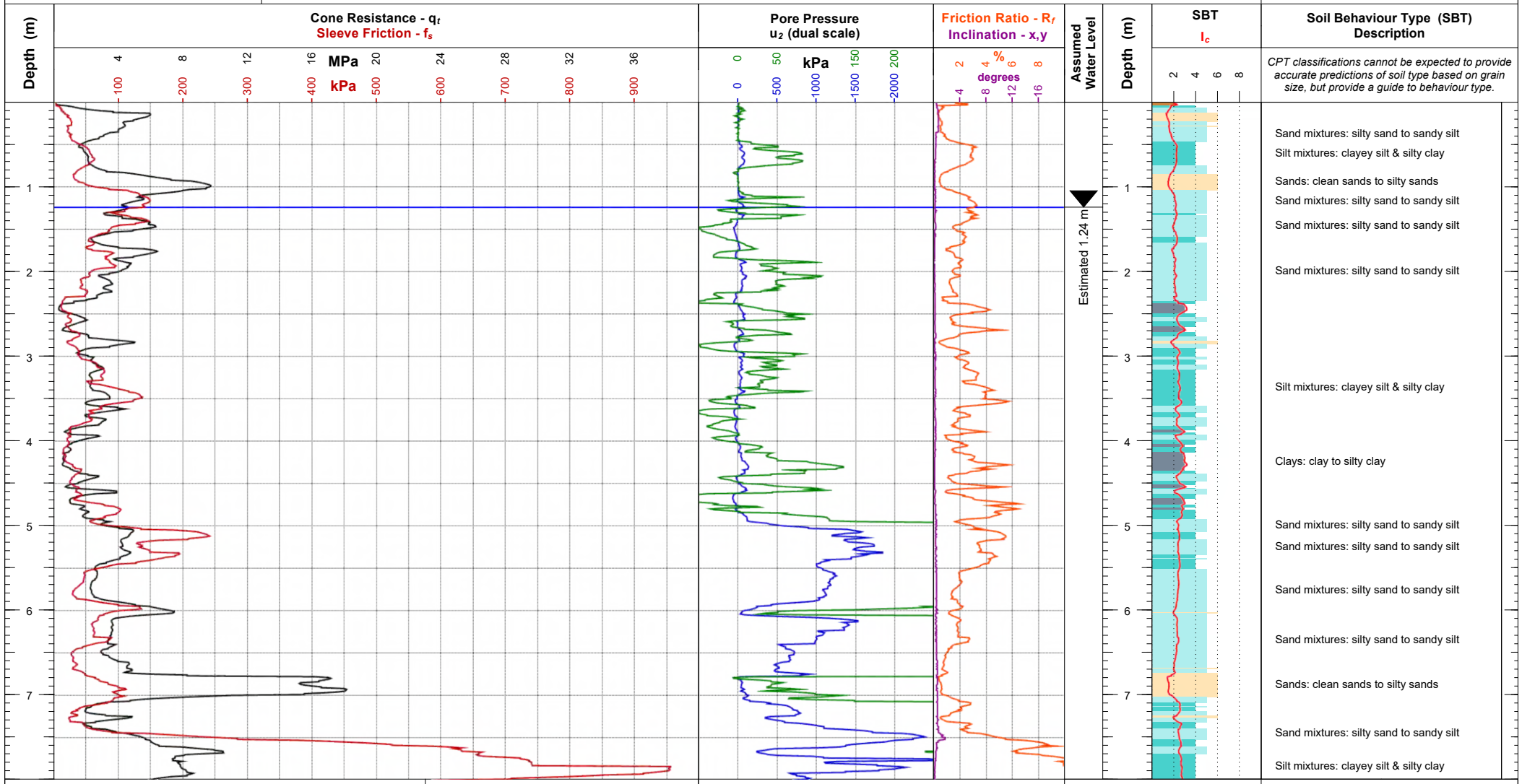
Client Job Ref:

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 cm² 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:

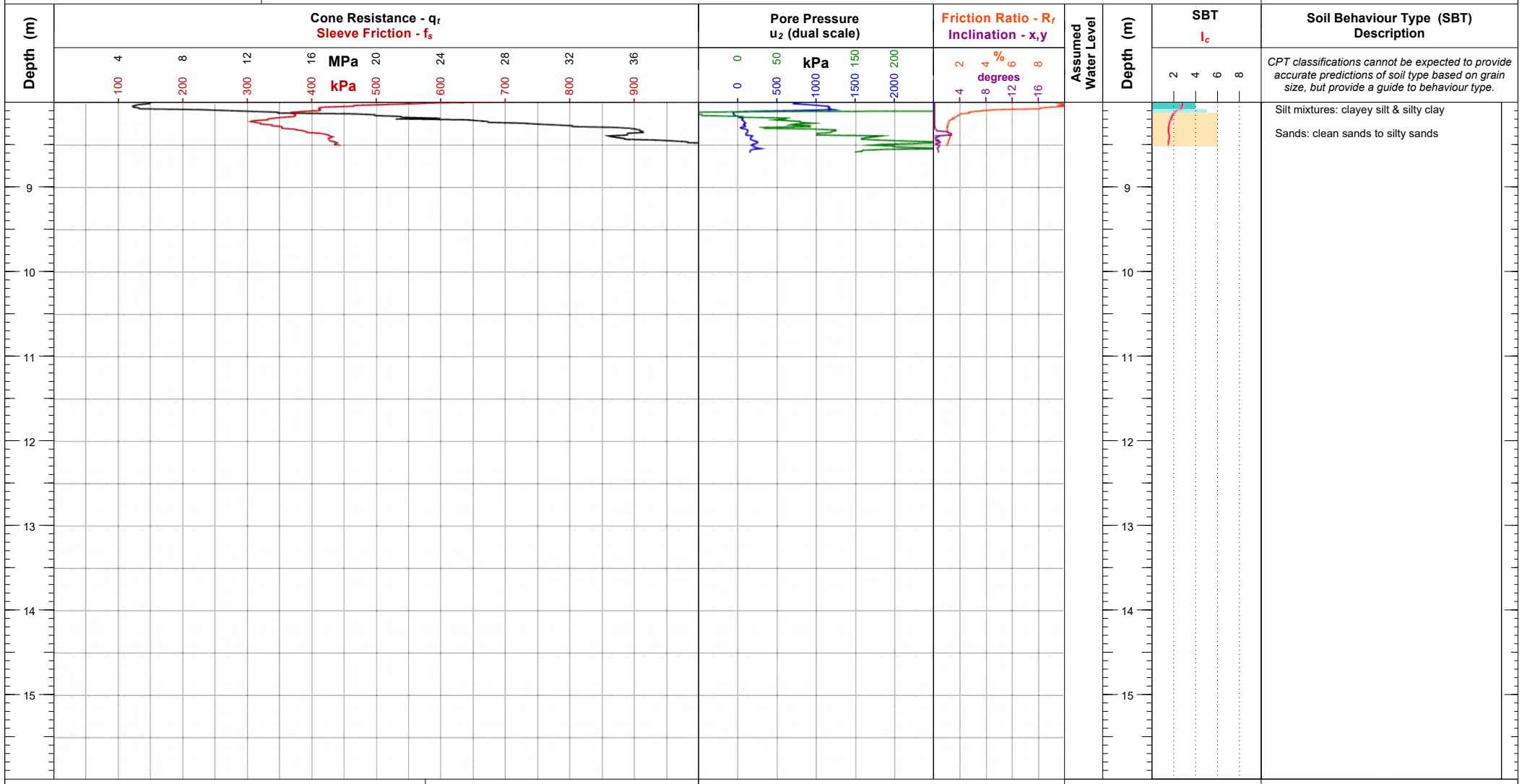
CPT Number: **CPT-228**

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

Remarks:

CONE PENETRATION TEST (CPT) LOG

GROUND INVESTIGATION



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): 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

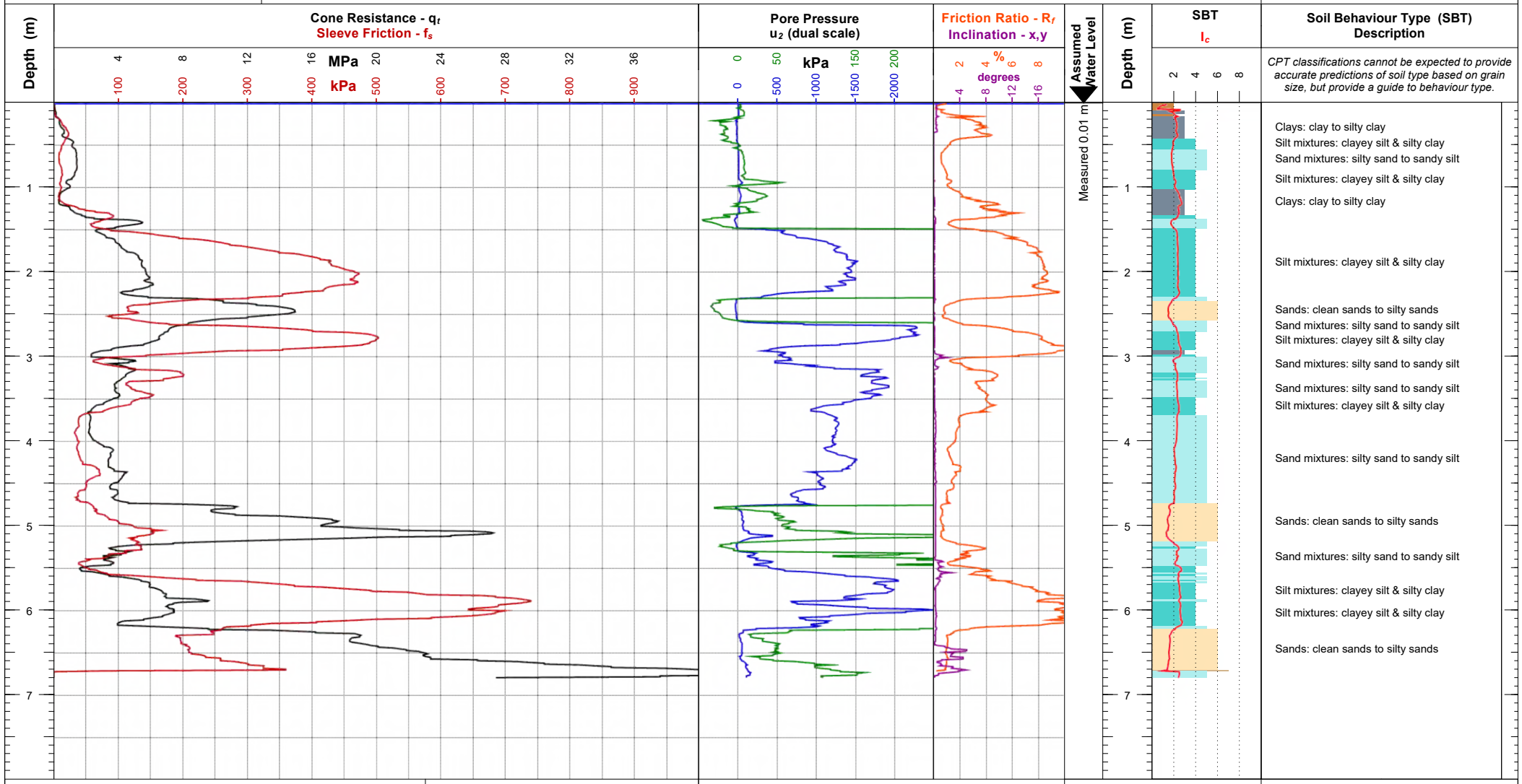
Client Job Ref:

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 cm² 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

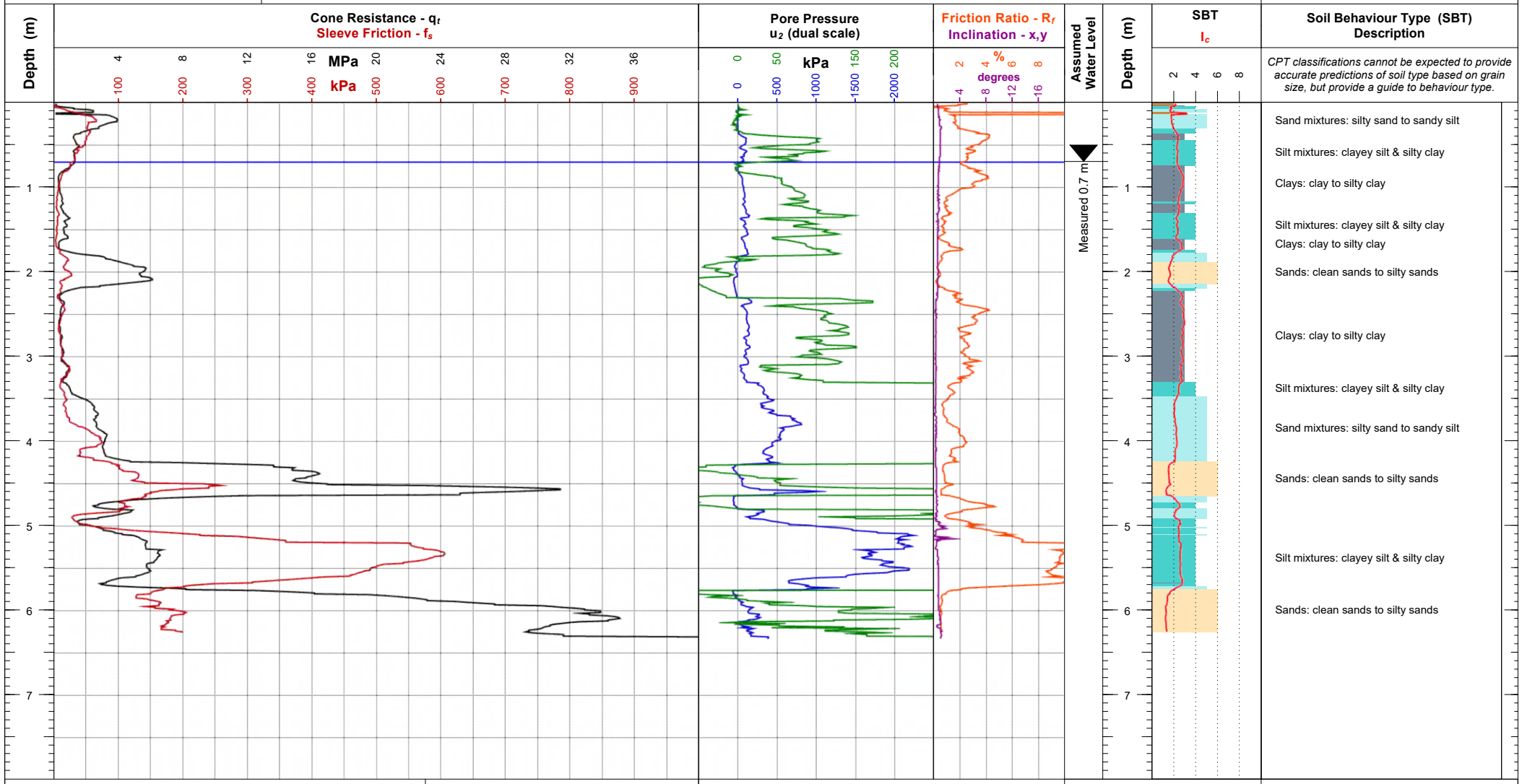
Client Job Ref:

CPT Number: **CPT-230**

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): 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

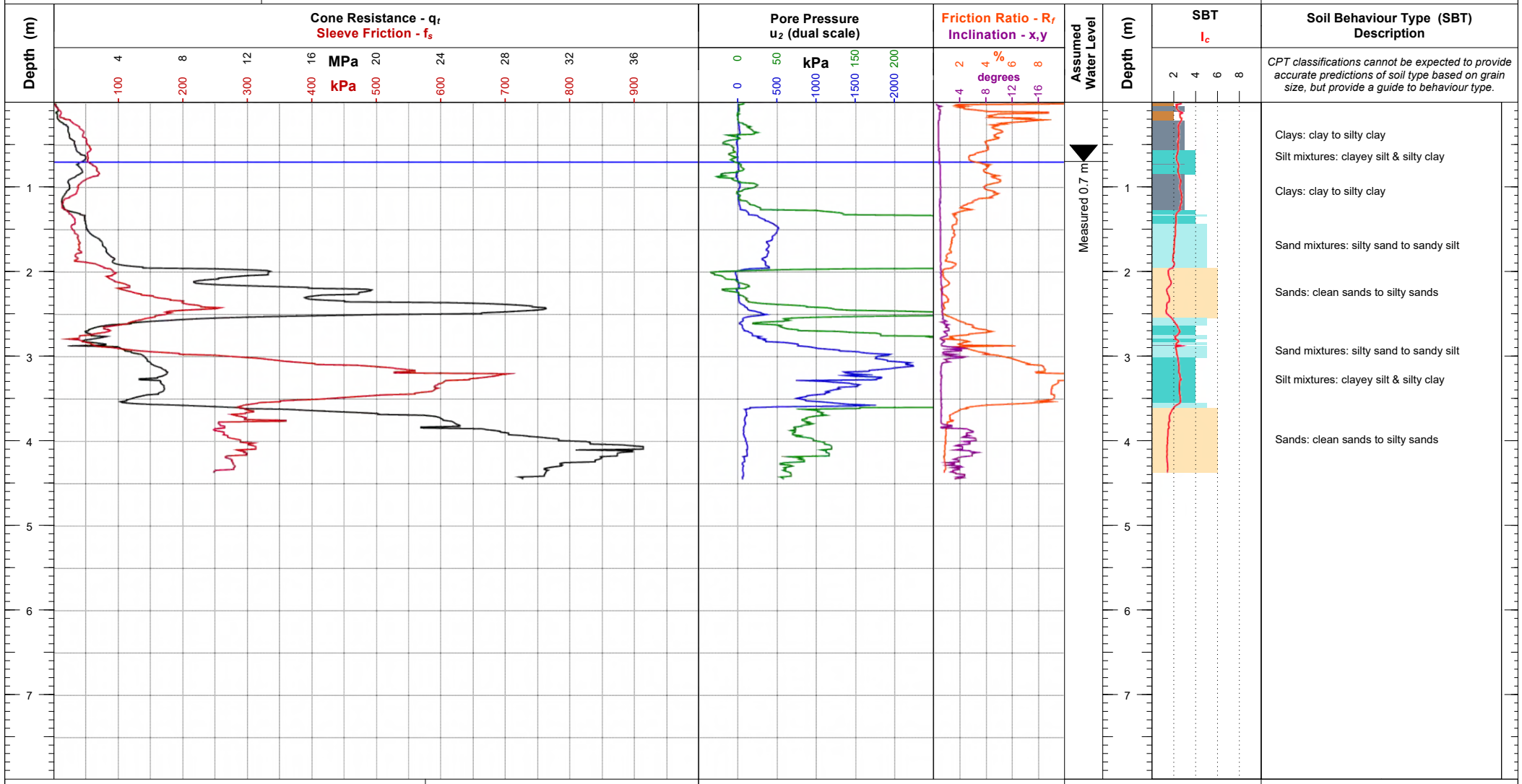
Client Job Ref:

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 cm² 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

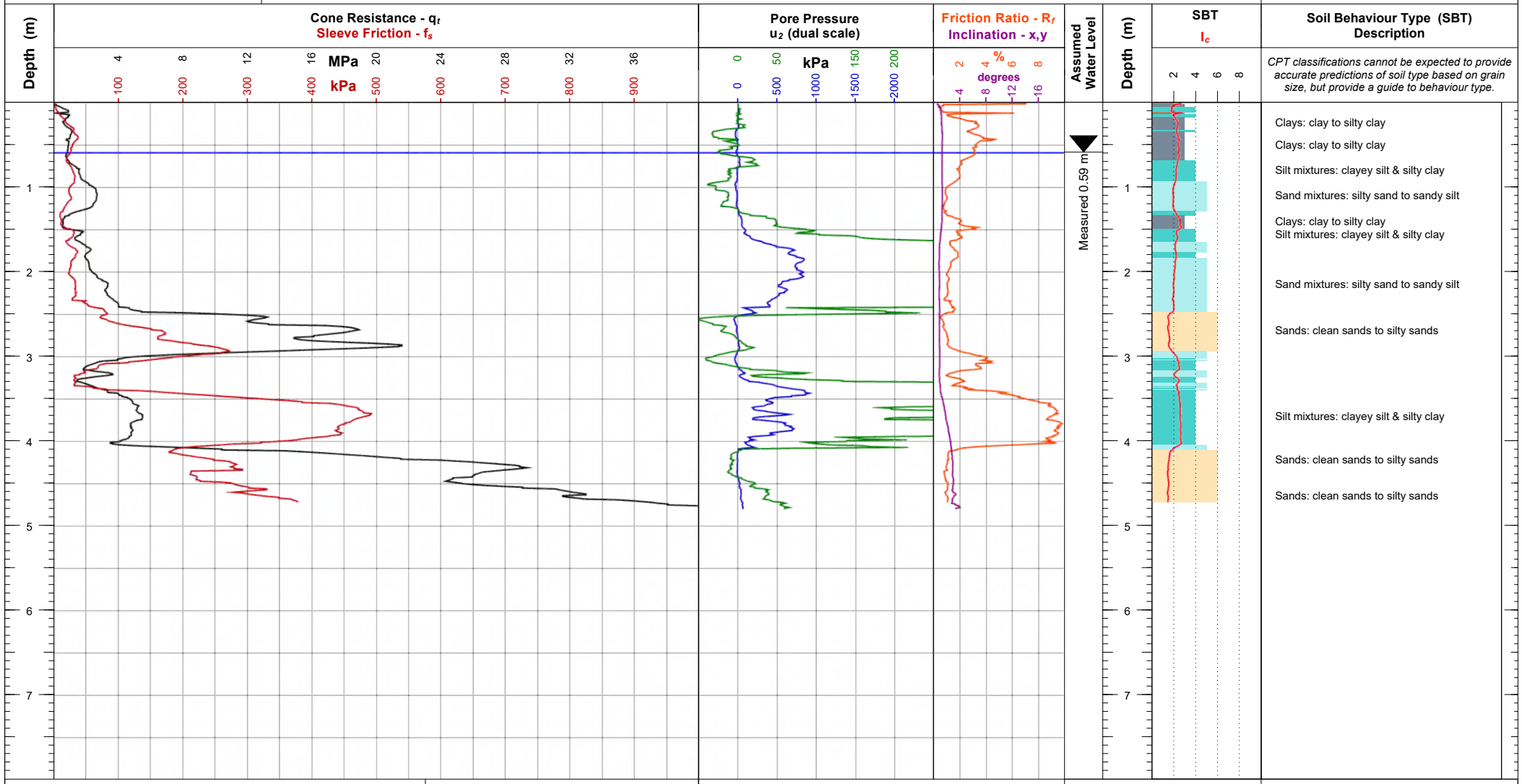
Client Job Ref:

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 cm² 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:

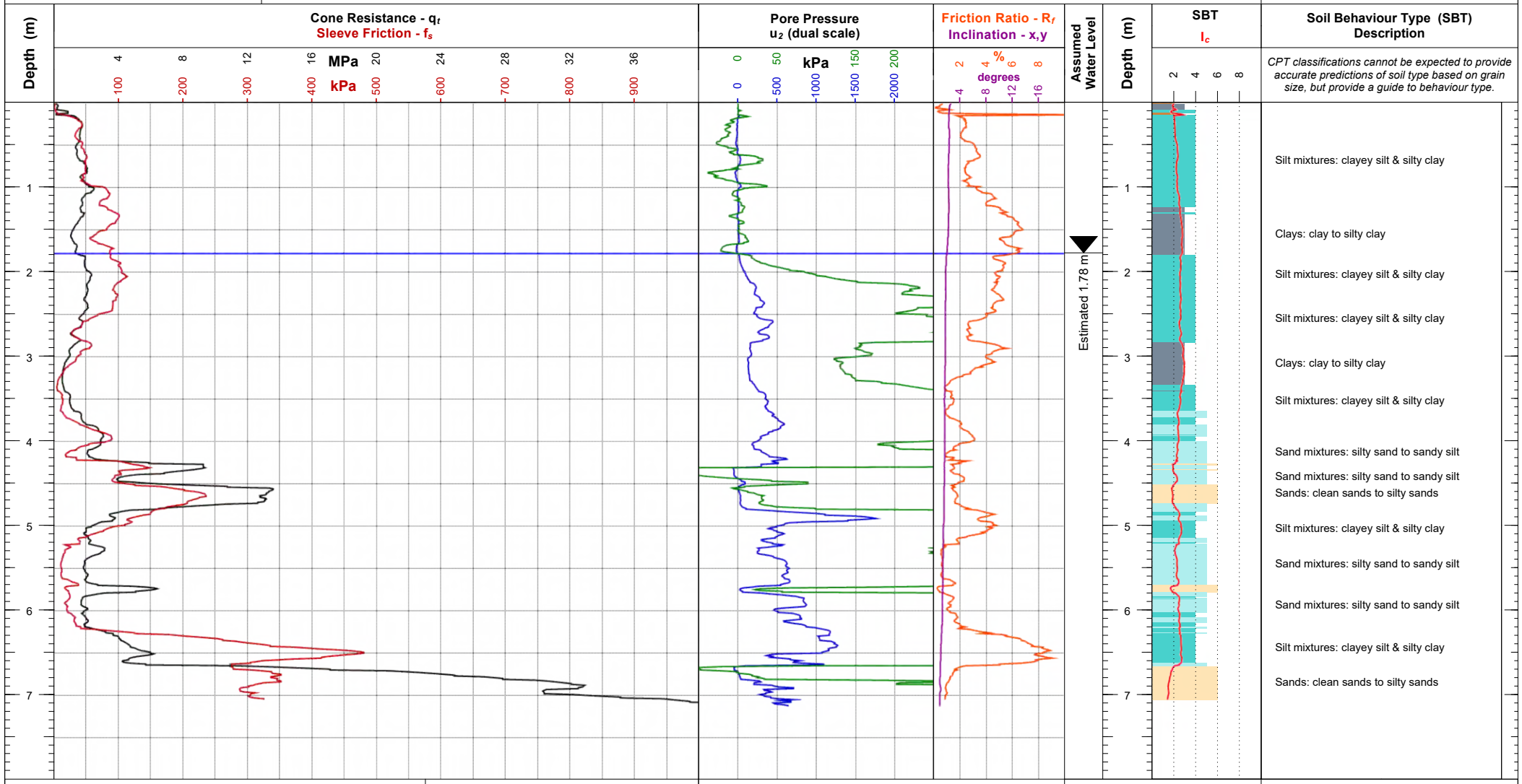
CPT Number: **CPT-233**

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

Remarks:

CONE PENETRATION TEST (CPT) LOG

GROUND INVESTIGATION



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): 5857216.9, 1790378.54
WGS84, (deg): 175.151198, --37.412295
Location Method: Handheld GPS
Surveyor: N/A
Termination Reason: Limit of reaction force

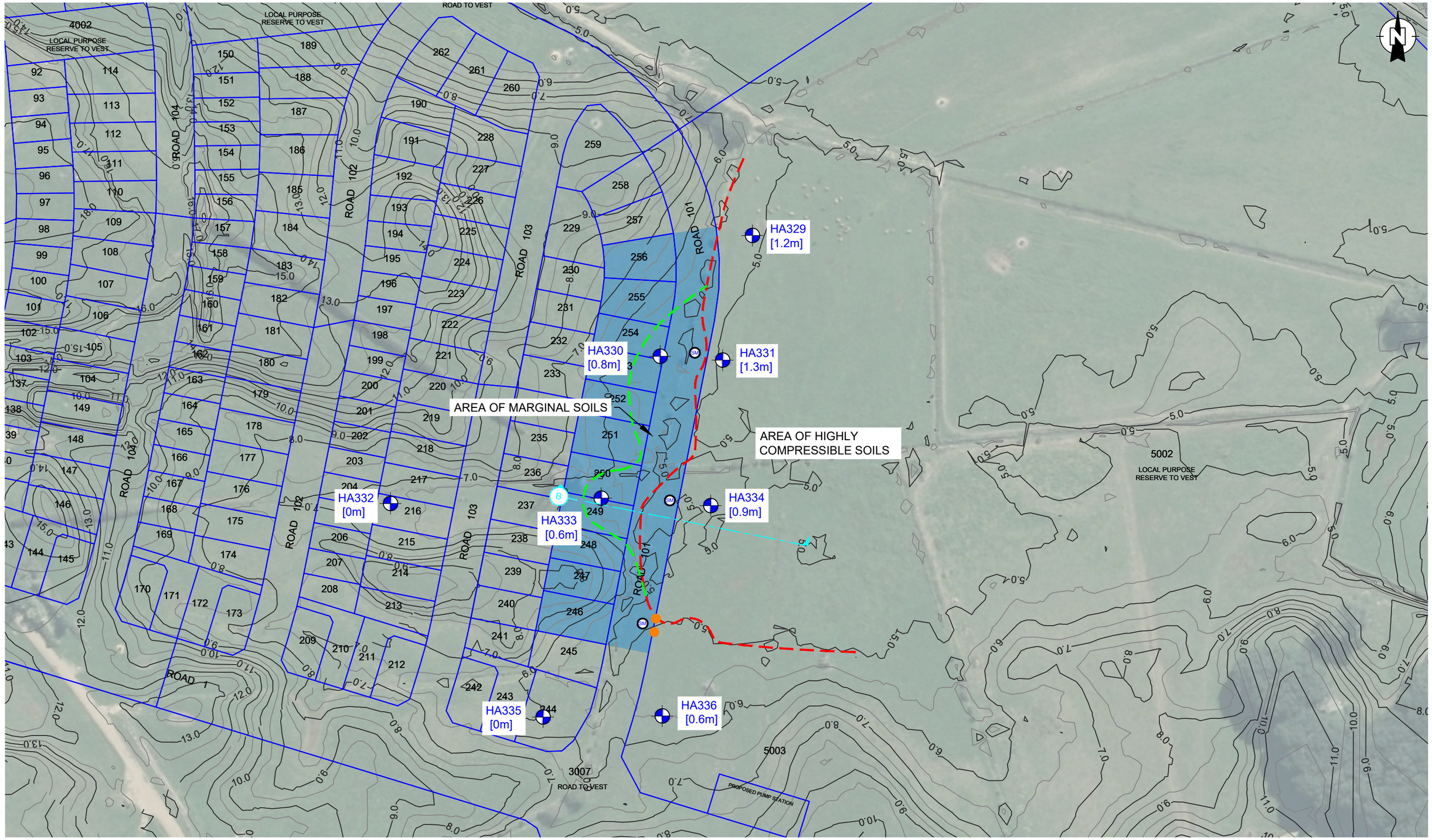
Elevation (m): -
Date of Test: 30/11/2017
Depth (m): 7.13
Pre-Drill (m): N/A

Client Job Ref:

CPT Number: **CPT-234**

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

Remarks:



LEGEND:

- AREA TO BE FILLED 300mm ABOVE FINISHED LEVEL
- AIR RELEASE VALVE MANHOLE LOCATION
- SETTLEMENT PLATE LOCATION
- HA329 [0.5m] HAND AUGER (HA) LOCATION AND ASSOCIATED DEPTH OF RECENT ALLUVIUM
- EXISTING CONTOURS
- APPROXIMATE EXTENT OF SOFT TO FIRM RECENT ALLUVIUM
- APPROXIMATE EXTENT OF FIRM TO STIFF RECENT ALLUVIUM

NOTES:

1. BASE IMAGE ADAPTED FROM THE WAIKATO 0.5m RURAL AERIAL PHOTOS 2012-2013 SOURCED FROM LINZ ONLINE DATABASE.
2. SUBDIVISION LAYOUT AND CONTOUR DATA PROVIDED BY CANDOR3 29 OCTOBER 2018, PROJECT NO. 1239.
3. TESTS LOCATED USING HANDHELD GPS.

1:1500 0 15 30 45 60 75 m

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2018-0106
PROJECT: STAGE 5 INVESTIGATIONS, LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	FIGURE: 01
		REVISION: 0	SCALE: 1:1500
TITLE: GEOTECHNICAL SITE INVESTIGATION PLAN		DATE: 16/08/2019	SHEET: A3

X:\01 PROJECTS\HAM\HAM2018\HAM2018-0101 TO 0150\HAM2018-0106 LAKESIDE 2018-2019 EARTHWORK SEASON\07 DRAWINGS\STAGE 5 PEAT INVESTIGATION\PROPOSED INVESTIGATION PLAN.DWG

BOREHOLE LOG - HA329

Client: Lakeside Developments (2017) Limited
Project: Lakeside Developments
Site Location: 98 Scott Road, Te Kauwhata
Project No.: HAM2018-0106
Date: 23/07/2019
Borehole Location: Stage 5 Alluvial Flats

CMW Geosciences

1:25 Sheet 1 of 1

Logged by: LK | Position: E.434554.8m N.740577.9m | Elevation: RL 5.00m
Checked by: LYK | Survey Source: Hand Held GPS | Datum: Mount Eden | Angle from horizontal: 90°

Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	Drilling Method/ Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
	23-07-2019	0.3	Peak = 55kPa Residual = 9kPa	5.0	0		Pt: Silty plastic PEAT: black. (Recent Deposits)	W				5 10 15	
		0.6	Peak = 71kPa Residual = 18kPa	4.9			ML: SILT: light greyish brown. Low plasticity, moderately sensitive to sensitive. (Recent Deposits) *... at 0.30m, Becoming brown, mottled orange.* *... from 0.60m to 0.70m, Contains a lenses of completely decomposed wood fragments.*		St				
		0.9	Peak = 52kPa Residual = 15kPa	4.0	1		*... at 0.90m, Contains trace medium to coarse subrounded gravel.* Pt: Plastic PEAT: dark brown. (Recent Deposits)				HA		
		1.3	Peak = 95kPa Residual = 18kPa	3.8			MH: Clayey SILT: light grey. High plasticity, sensitive. (Whangamarino Formation)	S					
		1.6	Peak = UTP	3.5			CH: CLAY: light bluish grey. High plasticity. (Whangamarino Formation)		H				
		2.0	Peak = UTP		2								
		2.2	Peak = UTP				Borehole terminated at 2.2 m						
					3								
					4								
					5								

Termination reason: Refusal on hard clay.

Remarks: Groundwater encountered at 0.2m. Shear vane # 1911.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - HA330

Client: Lakeside Developments (2017) Limited
Project: Lakeside Developments
Site Location: 98 Scott Road, Te Kauwhata
Project No.: HAM2018-0106
Date: 23/07/2019
Borehole Location: Stage 5 Alluvial Flats

CMW Geosciences

1:25 Sheet 1 of 1

Logged by: RP | Position: | Elevation: RL 5.50m | Hole Diameter: 50mm
Checked by: LYK | Survey Source: Site Plan | Datum: Mount Eden | Angle from horizontal: 90°

Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	Drilling Method/ Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
	23-07-2019	0.3	Peak = 86kPa Residual = 20kPa	5.5 5.2	0		OL: Organic Clayey SILT : Black. Non plastic. (Topsoil)						
		0.6	Peak = 58kPa Residual = 9kPa	4.8			ML: SILT: Light grey. Non plastic, sensitive. (Recent Alluvium) *... from 0.50m to 0.70m, Becoming brown.*	M to W	St				
		0.9	Peak = >200kPa		1		ML: Gravelly clayey SILT: Light grey and mottled orange. Low plasticity; gravel, fine to medium, pumiceous. (Whangamarino Formation)				HA		
		1.2	Peak = UTP					S	H				
		1.6	Peak = UTP				*... from 1.60m to 2.00m, Becoming blueish grey.*						
					2		Borehole terminated at 2.0 m						
					3								
					4								
					5								

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15

Structure & Other Observations: Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks

Termination reason: Target Depth Reached

Remarks: Groundwater encountered at 0.7m. Shear Vane # 2532.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - HA331

Client: Lakeside Developments (2017) Limited
Project: Lakeside Developments
Site Location: 98 Scott Road, Te Kauwhata
Project No.: HAM2018-0106
Date: 23/07/2019
Borehole Location: Stage 5 Alluvial Flats

CMW Geosciences

1:25 Sheet 1 of 1

Logged by: LYK | Position: E.434542.3m N.740525.9m | Elevation: RL 5.00m | Hole Diameter: 50mm
Checked by: LYK | Survey Source: Hand Held GPS | Datum: Mount Eden | Angle from horizontal: 90°

Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	Drilling Method/ Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
	23-07-2019	0.3	Peak = 62kPa Residual = 9kPa	5.0	0		Pt: Silty plastic PEAT: black. (Recent Deposits)	W					
		0.6	Peak = 62kPa Residual = 9kPa	4.7			ML: SILT: fine to coarse sand; brown mottled orange. Low plasticity, sensitive. (Recent Deposits)		F to St				
		0.9	Peak = 37kPa Residual = 9kPa		1		*... at 1.10m, Contains trace medium to coarse subrounded gravel.*						
		1.3	Peak = 185kPa Residual = 15kPa	3.7			ML: SILT: light grey. Low plasticity, extra sensitive. (Whangamarino Formation)	S	VSt		HA		
		1.6	Peak = >200kPa Residual = 22kPa	3.5			CH: Silty CLAY: with some fine to coarse sand; light grey. High plasticity, extra sensitive. (Whangamarino Formation)						
		2.0	Peak = UTP	3.1	2		CH: CLAY: light grey. High plasticity. (Whangamarino Formation)		H				
		2.5	Peak = UTP				Borehole terminated at 2.5 m						
					3								
					4								
					5								

Termination reason: Refusal on hard clay.

Remarks: Groundwater encountered at 0.3m. Shear vane # 1911.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - HA332

Client: Lakeside Developments (2017) Limited
Project: Lakeside Developments
Site Location: 98 Scott Road, Te Kauwhata
Project No.: HAM2018-0106
Date: 23/07/2019
Borehole Location: Stage 5 Alluvial Flats

CMW Geosciences

1:25 Sheet 1 of 1

Logged by: AS | Position: | Elevation: RL 6.50m | Hole Diameter: 50mm
Checked by: LYK | Survey Source: Site Plan | Datum: Mount Eden | Angle from horizontal: 90°

Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	Drilling Method/ Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
	23-07-2019	0.3	Peak = 164kPa Residual = 5kPa	6.5			OL: Organic SILT: dark brown. No plasticity. (Topsoil)						
				6.2			ML: SILT: light grey. Low plasticity, quick. (Whangamarino Formation)	M	VSt				
		0.6	Peak = 172kPa Residual = 27kPa	5.9			ML: Sandy SILT: light grey. Low plasticity, sensitive to extra sensitive; sand, medium to coarse, pumiceous. (Whangamarino Formation)						
		0.9	Peak = 191kPa Residual = 22kPa		1		*... at 0.80m, contains minor medium to coarse sand, pumiceous.*	S	VSt to H				
		1.2	Peak = 191kPa Residual = 98kPa	5.4			ML: SILT with trace clay: light brown. Low plasticity, insensitive. (Whangamarino Formation)						
		1.5	Peak = 191kPa Residual = 30kPa	5.2			ML: SILT with trace clay: light bluish grey mottled dark brown, sensitive. Low plasticity. (Whangamarino Formation)	M	H		HA		
		1.8	Peak = UTP		2								
		2.1	Peak = UTP	4.4			ML: SILT: dark brown. Low plasticity. (Whangamarino Formation)						
				4.3			SP: Silty fine SAND: light bluish grey. Poorly graded, sub rounded, pumiceous. (Whangamarino Formation)	S	D			11	2.2-2.5m: poor recovery.
				4.0								13	
		2.6	Peak = UTP				LIGNITE: dark brown. (Whangamarino Formation)	M				6	
				3.8			ML: SILT: dark bluish grey. Low plasticity. (Whangamarino Formation)		H			7	
		2.8	Peak = UTP	3.7			LIGNITE: dark brown. (Whangamarino Formation)	D				5	
					3		Borehole terminated at 3.0 m					12	
					4								
					5								

Termination reason: HA Refusal on hard lignite.

Remarks: Groundwater encountered at 0.6m. Shear vane #2560

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - HA333

Client: Lakeside Developments (2017) Limited
Project: Lakeside Developments
Site Location: 98 Scott Road, Te Kauwhata
Project No.: HAM2018-0106
Date: 23/07/2019
Borehole Location: Stage 5 Alluvial Flats

CMW Geosciences

1:25 Sheet 1 of 1

Logged by: AS | Position: | Elevation: RL 5.50m | Hole Diameter: 50mm
Checked by: LYK | Survey Source: Site Plan | Datum: Mount Eden | Angle from horizontal: 90°

Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	Drilling Method/ Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
												5 10 15	Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
				5.5			OL: Organic SILT: dark brown. No plasticity. (Topsoil)						
		0.3	Peak = 72kPa Residual = 19kPa	5.2			ML: Gravelly SILT: dark brown. Low plasticity, moderately sensitive; gravel, fine to medium, sub rounded, pumiceous. (Recent Alluvium)	M	St				
		0.6	Peak = 107kPa Residual = 27kPa	4.9			MH: SILT: dark greyish brown. High plasticity, moderately sensitive. (Whangamarino Formation)		VSt				
	23-07-2019	0.9	Peak = 87kPa Residual = 3kPa	4.6	1		MH: Clayey SILT with minor sand: light greyish brown mottled light orange brown. High plasticity, quick to sensitive; sand, pumiceous, fine to medium. (Whangamarino Formation)						
		1.2	Peak = 161kPa Residual = 36kPa				*... at 1.10m, becoming bluish grey.*		St to VSt				
		1.5	Peak = 191kPa Residual = 41kPa										
		1.6	Peak = 191kPa Residual = 38kPa	3.9			MH: SILT: dark brown. High plasticity, sensitive. (Whangamarino Formation)					3	
		1.8	Peak = UTP				*... at 1.80m, becoming bluish grey.*		VSt			8	
				3.6	2		ML: Clayey SILT with some sand and minor gravel: light bluish grey. Low plasticity, sand, fine to coarse, pumiceous; gravel, fine to medium, pumiceous. (Whangamarino Formation)				HA	10	
		2.1	Peak = UTP						H			9	
												5	
		2.4	Peak = UTP					S				8	
												10	
				3.0			SM: Silty fine SAND: light grey. Poorly graded. (Whangamarino Formation)					8	
												8	2.5-3.7m: no recovery, classification determined by nearby hand augers.
												8	
		2.8	Peak = 191kPa Residual = 55kPa									6	
					3							8	
												9	
												8	
		3.1	Peak = UTP						D			9	
												10	
												8	
												10	
												9	
												6	
												9	
				1.8			CH: CLAY: light grey. High plasticity. (Whangamarino Formation)		H			20	
		3.8	Peak = UTP				Borehole terminated at 3.8 m						
					4								
					5								

Termination reason: HA refusal on hard clay.

Remarks: Groundwater encountered at 0.9m. Shear vane #2560

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - HA334

Client: Lakeside Developments (2017) Limited
Project: Lakeside Developments
Site Location: 98 Scott Road, Te Kauwhata
Project No.: HAM2018-0106
Date: 23/07/2019
Borehole Location: Stage 5 Alluvial Flats

CMW Geosciences

1:25 Sheet 1 of 1

Logged by: LYK | Position: E.434537.4m N.740465.2m | Elevation: RL 5.00m | Hole Diameter: 50mm
Checked by: LYK | Survey Source: Hand Held GPS | Datum: Mount Eden | Angle from horizontal: 90°

Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	Drilling Method/ Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
	24-07-2019			5.0			Organic SILT: black. Low plasticity. (Topsoil)	W					
				4.8			Pt: Silty plastic PEAT: black. (Recent Deposits)		VS				0.3m: shear vane fell through to 0.6m.
		0.6	Peak = UTP	4.4			GP: Silty medium to coarse GRAVEL: grey. Poorly graded, rounded, loosely packed. (Recent Deposits)						
		0.9	Peak = 157kPa Residual = 12kPa	4.1	1		MH: Clayey SILT: light grey, mottled orange. High plasticity, extra sensitive. (Whangamarino Formation)	S	VSt		HA		
		1.2	Peak = UTP	3.8			ML: Sandy SILT with trace clay: light bluish grey. Low plasticity; Sand, fine to coarse. (Whangamarino Formation)		H				
		1.6	Peak = 123kPa Residual = 40kPa	3.4			SW: Fine to coarse SAND with some silt: grey. Well graded. (Whangamarino Formation)		MD to D				
					2		Borehole terminated at 2.0 m					9	
												5	
												12	
												11	
												3	
												5	
												3	
												3	
												3	
												6	
					3							4	
												6	
												11	
												11	
												5	
												5	
												4	
												5	
												5	
												6	
												5	
					4							6	
												8	
												9	
												9	
												8	
												4	
												5	
												5	
												5	
					5								

Termination reason: Time limit.

Remarks: Groundwater encountered at 0.3m. Shear vane # 1911.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - HA335

Client: Lakeside Developments (2017) Limited
Project: Lakeside Developments
Site Location: 98 Scott Road, Te Kauwhata
Project No.: HAM2018-0106
Date: 23/07/2019
Borehole Location: Stage 5 Alluvial Flats

CMW Geosciences

1:25 Sheet 1 of 1

Logged by: RP | Position: | Elevation: RL 6.00m | Hole Diameter: 50mm
Checked by: LYK | Survey Source: Site Plan | Datum: Mount Eden | Angle from horizontal: 90°

Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	Drilling Method/ Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
		0.3	Peak = 104kPa Residual = 14kPa	6.0			OL: Organic SILT: Dark brown. Non plastic. (Topsoil)						
		0.6	Peak = 173kPa Residual = 32kPa	5.6			ML: SILT: Light Grey. Low plasticity, sensitive. (Whangamarino Formation)	M to W	VSt		HA		
	24-07-2019	0.9	Peak = 187kPa Residual = 35kPa		1								
		1.2	Peak = 144kPa Residual = 35kPa				*... at 1.10m, contains 100mm thick lens of sandy silt; light grey. Low plasticity; sand, fine to coarse.*						
				4.5			SM: Silty fine to medium SAND: grey. Poorly graded. (Whangamarino Formation)	S	L			2 1 2 3	
					2		Borehole terminated at 2.0 m						
					3								
					4								
					5								

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15

Structure & Other Observations: Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks

Termination reason: Time limit.

Remarks: Groundwater encountered at 1.3m. Shear Vane # 2532.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - HA336

Client: Lakeside Developments (2017) Limited
Project: Lakeside Developments
Site Location: 98 Scott Road, Te Kauwhata
Project No.: HAM2018-0106
Date: 23/07/2019
Borehole Location: Stage 5 Alluvial Flats

CMW Geosciences

1:25 Sheet 1 of 1

Logged by: LYK | Position: E.444218.2m N.699483.7m | Elevation: RL 5.50m | Hole Diameter: 50mm
Checked by: LYK | Survey Source: Hand Held GPS | Datum: Mount Eden | Angle from horizontal: 90°

Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	Drilling Method/ Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
				5.5			OL: Organic SILT: black. Low plasticity. (Topsoil)						
		0.3	Peak = 132kPa Residual = 22kPa	5.3			ML: SILT: dark grey mottled orange. Low plasticity, sensitive. (Recent Deposits) *... from 0.30m to 0.40m, Contains a lens of medium to coarse subrounded gravel.*	M					
		0.6	Peak = 111kPa Residual = 31kPa	4.9			CH: Silty CLAY: light grey mottled orange. High plasticity, moderately sensitive. (Whangamarino Formation) *... from 0.70m to 0.80m, Contains some fine to coarse sand .*	W	VSt		HA		
		0.9	Peak = 111kPa Residual = 22kPa		1								
		1.2	Peak = >200kPa Residual = 46kPa	4.3			CH: Silty CLAY: with minor fine to coarse sand; light grey mottled orange. High plasticity, sensitive. (Whangamarino Formation)		H				
	23-07-2019	1.6	Peak = 160kPa Residual = 31kPa	4.0			ML: Sandy SILT: grey. Low plasticity, sensitive, Sand, fine. (Whangamarino Formation)		VSt				
				3.7			GP: Silty fine GRAVEL: grey. Poorly graded, rounded. (Whangamarino Formation)	S					
		2.0	Peak = >200kPa		2		Borehole terminated at 2.0 m						
					3								
					4								
					5								

Termination reason: Target Depth Reached

Remarks: Groundwater encountered at 1.6m. Shear vane # 1911.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

Appendix C: Laboratory Solid Density and Compaction Test Results

STEVENSON

STEVENSON CONSTRUCTION MATERIALS LIMITED
Private Bag 94000, Manukau City, Auckland 2241
www.stevenson.co.nz

Test Number: *172767* Report Number: *28802T*

Date of Issue: *23rd November 2017*

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:	***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

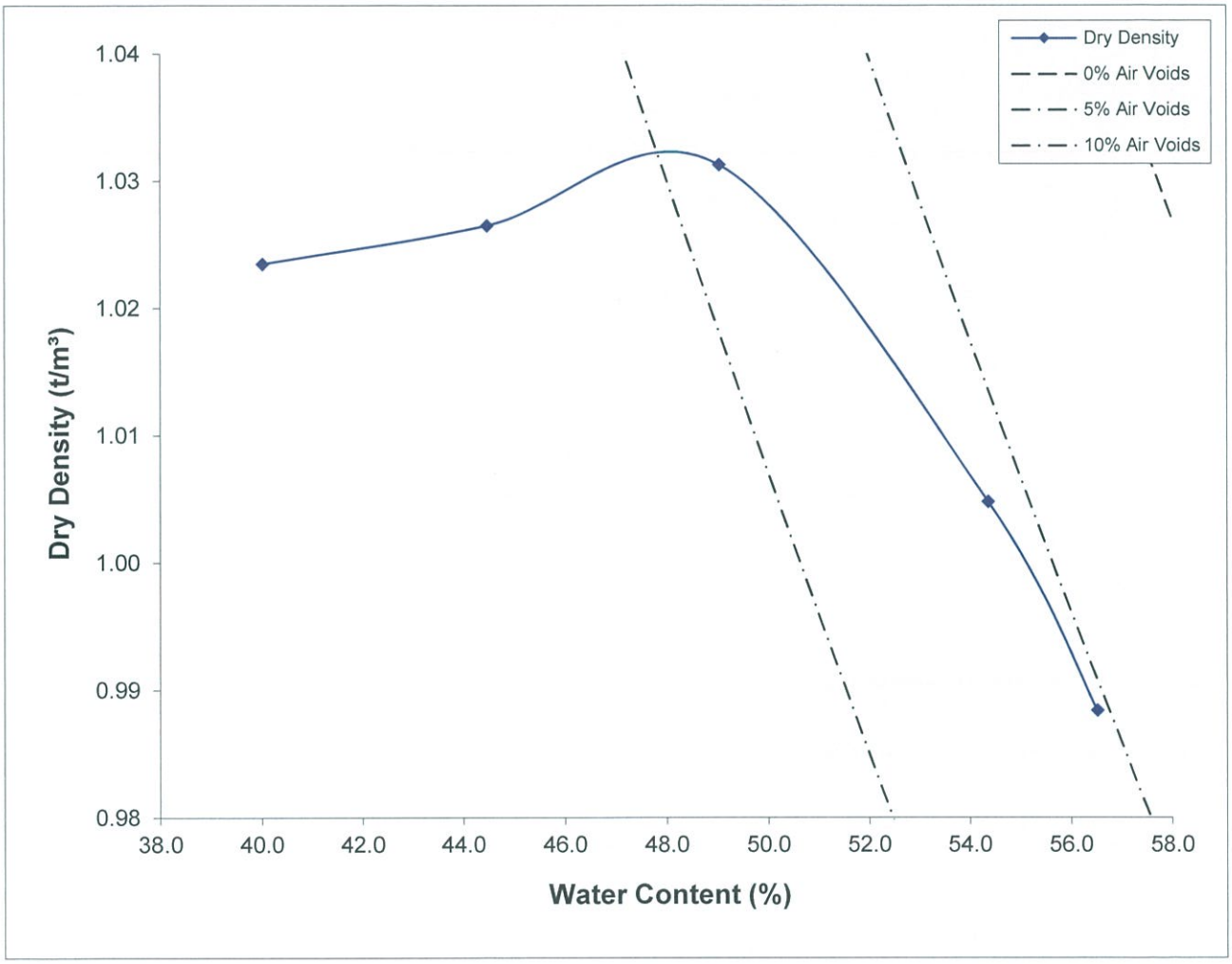
IANZ ACCREDITED LABORATORY

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:	*9th 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.*

STEVENSON

STEVENSON CONSTRUCTION MATERIALS LIMITED
Private Bag 94000, Manukau City, Auckland 2241
www.stevenson.co.nz

Test Number: *172768* Report Number: *28876T*

Date of Issue: *30th November 2017*

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

T A WHITMORE
IANZ APPROVED SIGNATORY

IANZ ACCREDITED LABORATORY

All tests reported 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:	*8th 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

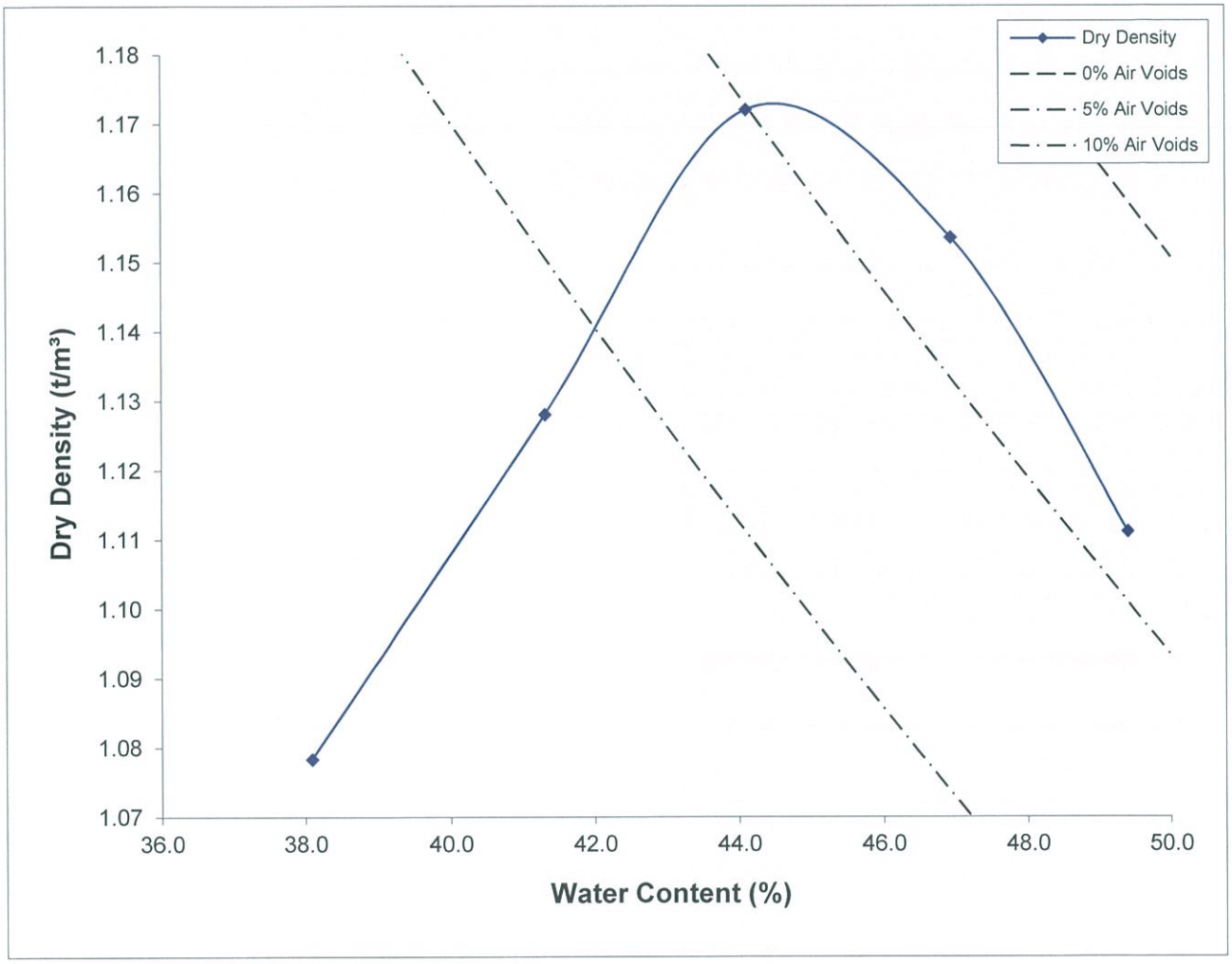
		Result
Compaction effort		***NZ Standard Compaction***
Sample condition		***Soaked***
Surcharge mass	*(kg)*	***6.7***
Period of Soaking	*(Days)*	***4***
Compacted dry density	*(t/m³)*	***1.18***
Compacted water content	*(%)*	***44.1***
Soaked water content	*(%)*	***46.6***
Swell	*(%)*	***0.0***
Rate 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:	*8th 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.*

STEVENSON

STEVENSON CONSTRUCTION MATERIALS LIMITED
Private Bag 94000, Manukau City, Auckland 2241
www.stevenson.co.nz

Test Number: *172769* Report Number: *28803T – Amendment One*

Date of Issue: *5th December 2017*

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* *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 2017*
Date 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.*

for STEVENSON CONSTRUCTION MATERIALS LTD

T A WHITMORE
IANZ APPROVED SIGNATORY

IANZ ACCREDITED LABORATORY

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

STEVENSON

STEVENSON CONSTRUCTION MATERIALS LIMITED
Private Bag 94000, Manukau City, Auckland 2241
www.stevenson.co.nz

Test Number: *172770* Report Number: *28877T*

Date of Issue: *30th November 2017*

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: ***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.

for STEVENSON CONSTRUCTION MATERIALS LTD

T A WHITMORE
IANZ APPROVED SIGNATORY

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's 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:	*7th 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.

CALIFORNIAN BEARING RATIO

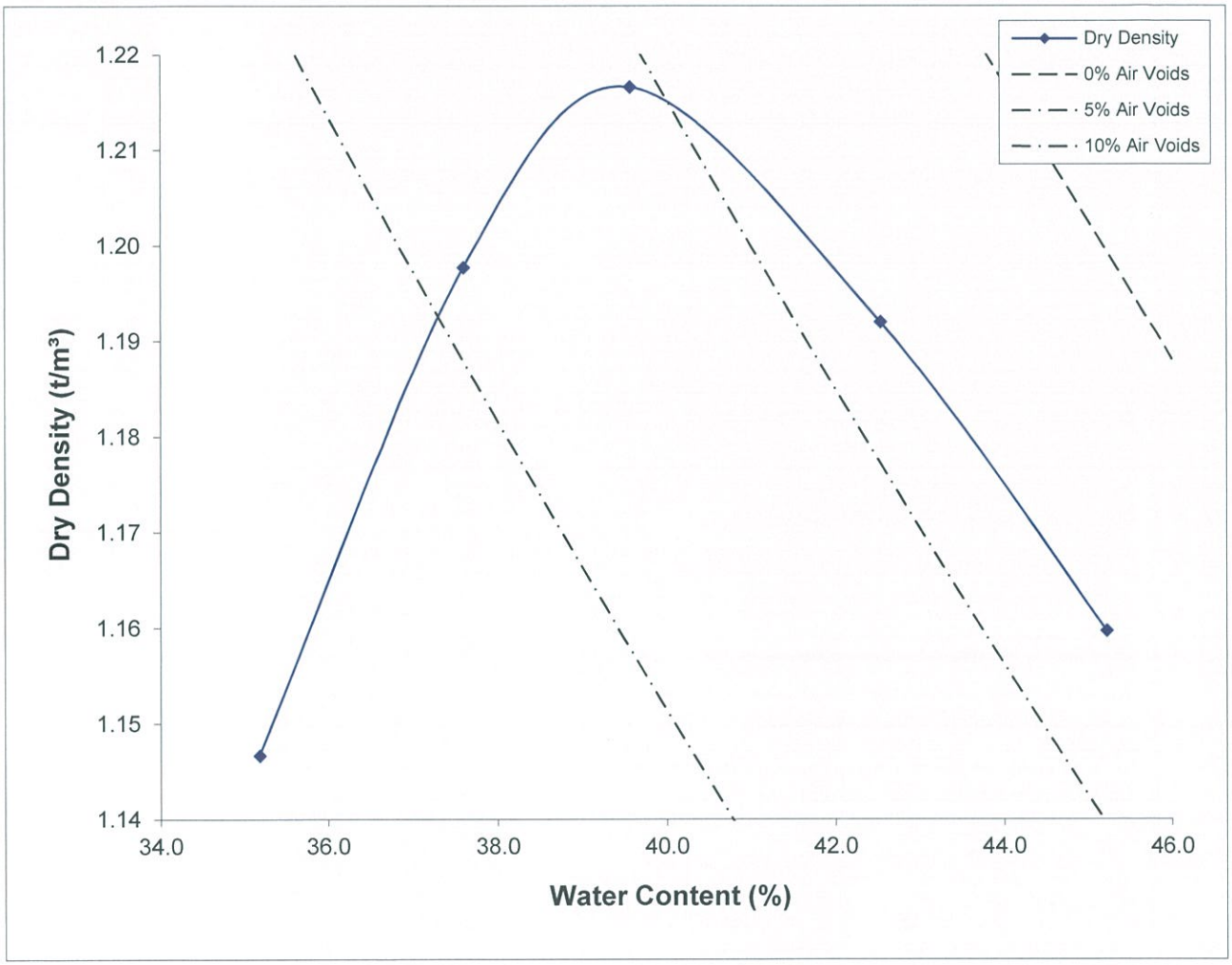
		Result
Compaction effort		***NZ Standard Compaction***
Sample condition		***Soaked***
Surcharge mass	*(kg)*	***6.7***
Period of Soaking	*(Days)*	***4***
Compacted dry density	*(t/m³)*	***1.22***
Compacted water content	*(%)*	***38.7***
Soaked water content	*(%)*	***41.5***
Swell	*(%)*	***1.2***
Rate 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:	*7th 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.*

STEVENSON

STEVENSON CONSTRUCTION MATERIALS LIMITED
Private Bag 94000, Manukau City, Auckland 2241
www.stevenson.co.nz

Test Number: *172772* Report Number: *28858T*

Date of Issue: *28th November 2017*

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.

for STEVENSON CONSTRUCTION MATERIALS LTD

T A WHITMORE
IANZ APPROVED SIGNATORY

IANZ ACCREDITED LABORATORY

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

TEST RESULTS

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

CALIFORNIAN BEARING RATIO

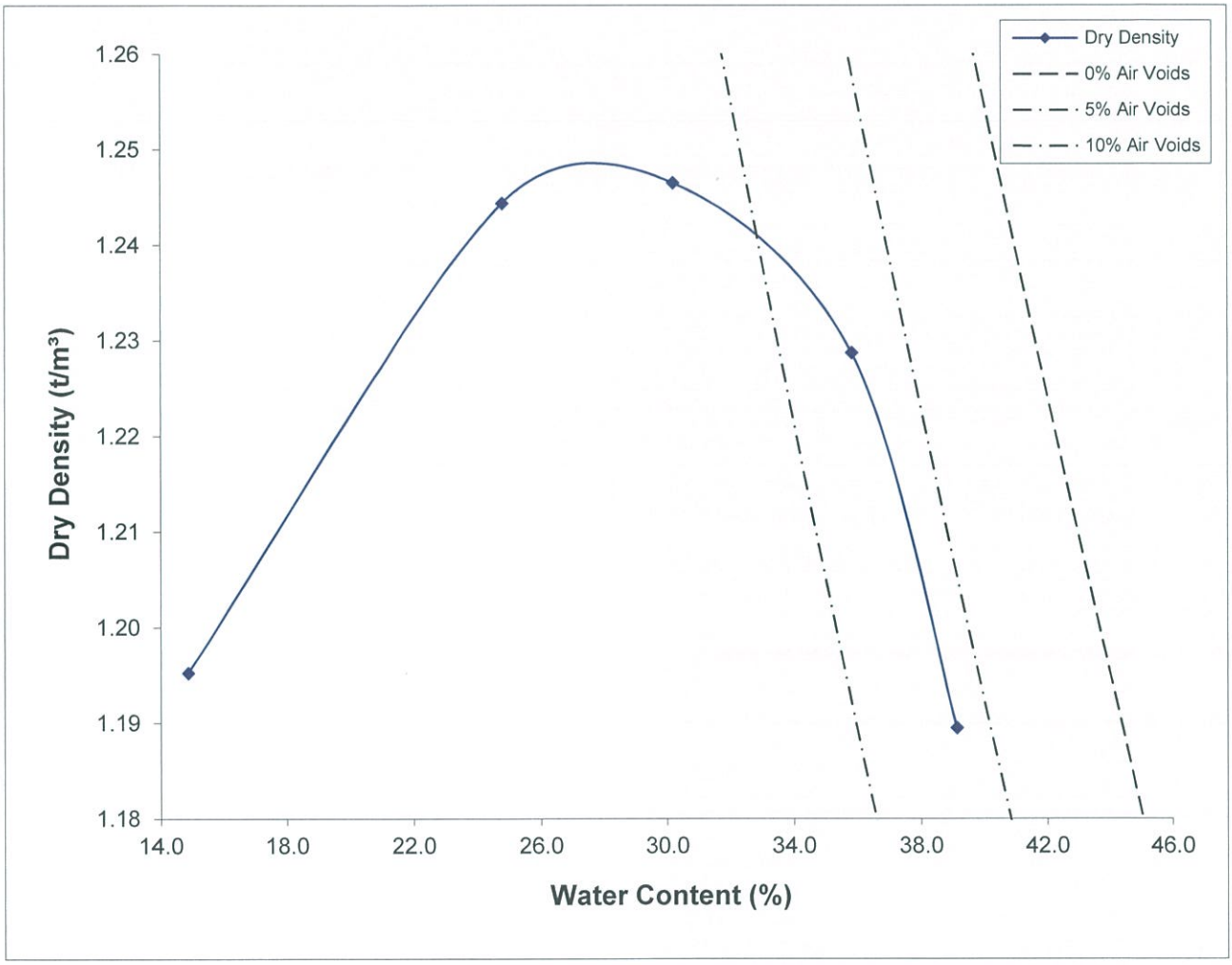
		Result
Compaction effort		***NZ Standard Compaction***
Sample condition		***Soaked***
Surcharge mass	*(kg)*	***6.7***
Period of Soaking	*(Days)*	***4***
Compacted dry density	*(t/m³)*	***1.24***
Compacted water content	*(%)*	***29.7***
Soaked water content	*(%)*	***35.3***
Swell	*(%)*	***0.0***
Rate 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:	*8th 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.*

STEVENSON

STEVENSON CONSTRUCTION MATERIALS LIMITED
Private Bag 94000, Manukau City, Auckland 2241
www.stevenson.co.nz

Test Number: 172773 Report Number: 28856T

Date of Issue: 23rd November 2017

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* *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 2017*
Date 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.*

for STEVENSON CONSTRUCTION MATERIALS LTD

T A WHITMORE
IANZ APPROVED SIGNATORY

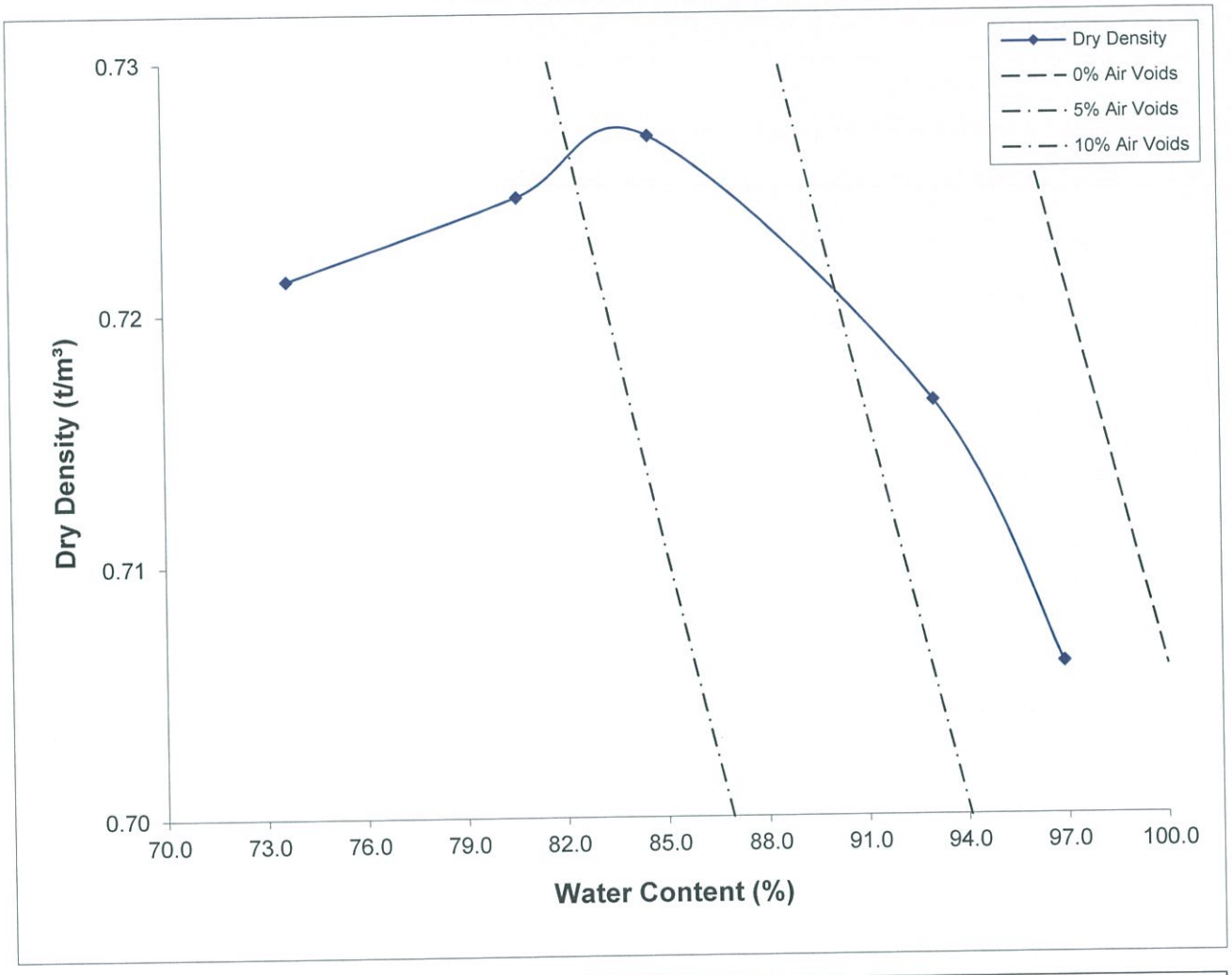
IANZ ACCREDITED LABORATORY

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

TEST RESULTS

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

STEVENSON

STEVENSON CONSTRUCTION MATERIALS LIMITED
Private Bag 94000, Manukau City, Auckland 2241
www.stevenson.co.nz

Test Number: *172774* Report Number: *28859T – Amendment One*

Date of Issue: *5th December 2017*

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* *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 (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.

for STEVENSON CONSTRUCTION MATERIALS LTD

T A WHITMORE
IANZ APPROVED SIGNATORY

IANZ ACCREDITED LABORATORY

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

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:	*7th November 2017*
Job:	*Lakeside Developments*	Reference No.:	*4036*

CALIFORNIAN BEARING RATIO

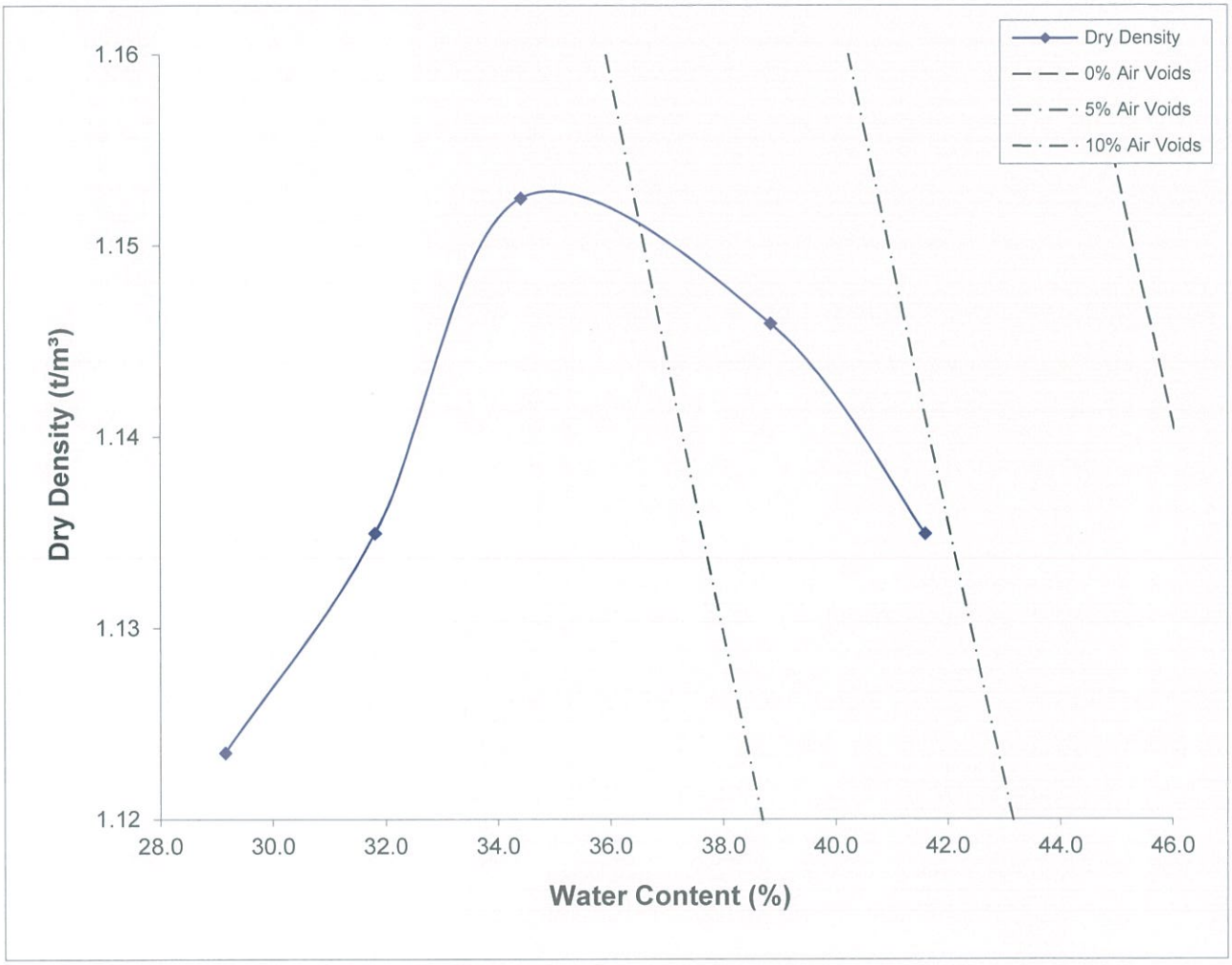
		Result
Compaction effort		***NZ Standard Compaction***
Sample condition		***Soaked***
Surcharge mass	*(kg)*	***6.7***
Period of Soaking	*(Days)*	***4***
Compacted dry density	*(t/m³)*	***1.16***
Compacted water content	*(%)*	***39.4***
Soaked water content	*(%)*	***42.5***
Swell	*(%)*	***0.0***
Rate 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:	*7th 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.*

STEVENSON

STEVENSON CONSTRUCTION MATERIALS LIMITED
Private Bag 94000, Manukau City, Auckland 2241
www.stevenson.co.nz

Test Number: *172775* Report Number: *28860T*

Date of Issue: *28th November 2017*

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

T A WHITMORE
IANZ APPROVED SIGNATORY

IANZ ACCREDITED LABORATORY

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

TEST RESULTS

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

CALIFORNIAN BEARING RATIO

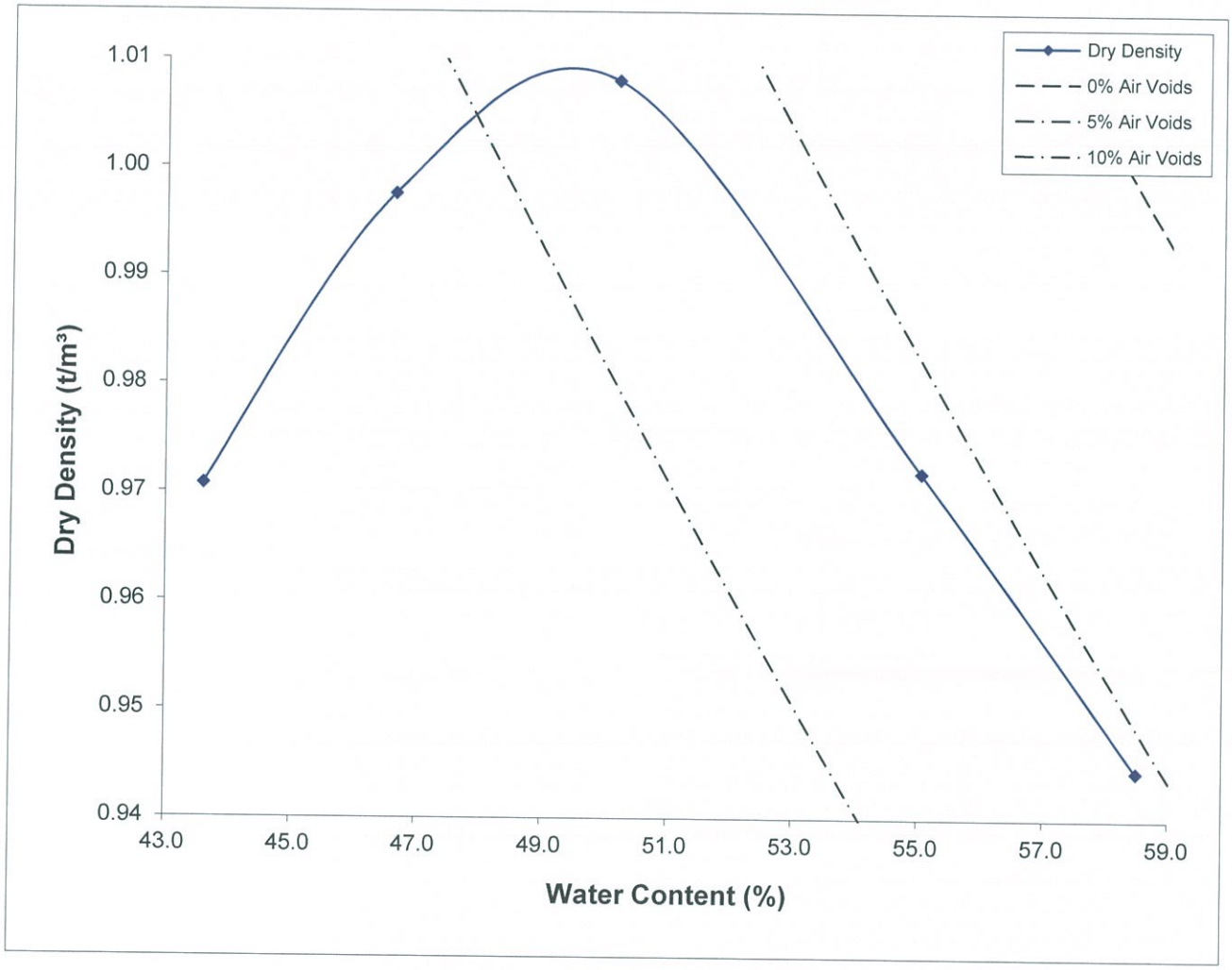
		Result
Compaction effort		***NZ Standard Compaction***
Sample condition		***Soaked***
Surcharge mass	*(kg)*	***6.7***
Period of Soaking	*(Days)*	***4***
Compacted dry density	*(t/m³)*	***1.00***
Compacted water content	*(%)*	***51.2***
Soaked water content	*(%)*	***47.8***
Swell	*(%)*	***-0.2***
Rate 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:	*7th 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 %
1.01	*50.0*	*2.40*	*31.1*

Water Content	**(%)**	*43.6*	*46.7*	*50.2*	*55.0*	*58.5*
Dry Density	**(t/m³)**	*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.*

STEVENSON

STEVENSON CONSTRUCTION MATERIALS LIMITED
Private Bag 94000, Manukau City, Auckland 2241
www.stevenson.co.nz

Test Number: 172776 Report Number: 28878T

Date of Issue: 30th November 2017

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.

for STEVENSON CONSTRUCTION MATERIALS LTD

T A WHITMORE
IANZ APPROVED SIGNATORY

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance 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:	*7th 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

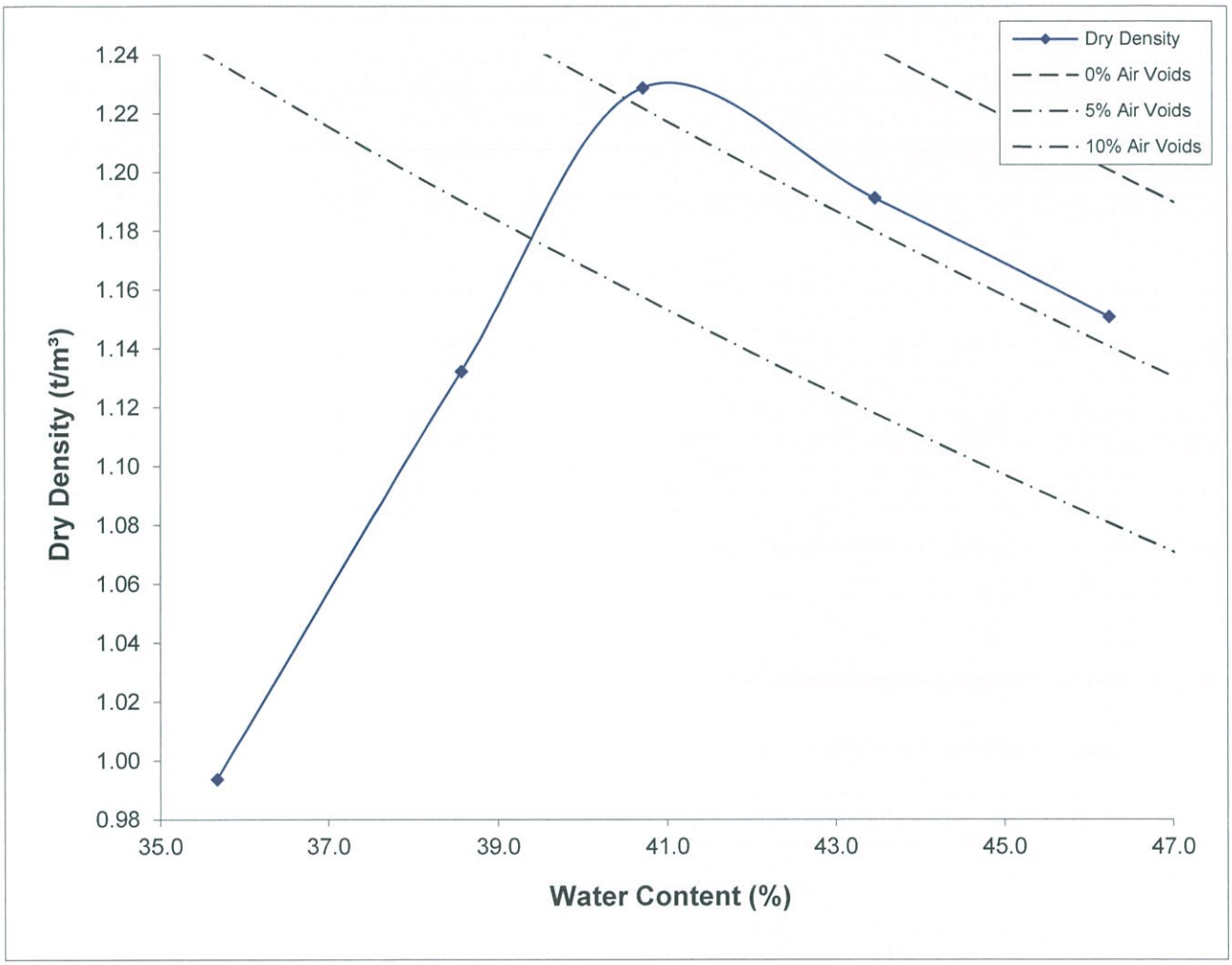
		Result
Compaction effort		***NZ Standard Compaction***
Sample condition		***Soaked***
Surcharge mass	*(kg)*	***6.7***
Period of Soaking	*(Days)*	***4***
Compacted dry density	*(t/m³)*	***1.24***
Compacted water content	*(%)*	***40.6***
Soaked water content	*(%)*	***41.8***
Swell	*(%)*	***0.0***
Rate 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:	*7th 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.

STEVENSON

STEVENSON CONSTRUCTION MATERIALS LIMITED
Private Bag 94000, Manukau City, Auckland 2241
www.stevenson.co.nz

Test Number: 172777 Report Number: 28861T

Date of Issue: 28th November 2017

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

IANZ ACCREDITED LABORATORY

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

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:	*7th November 2017*
Job:	*Lakeside Developments*	Reference No.:	*4036*

CALIFORNIAN BEARING RATIO

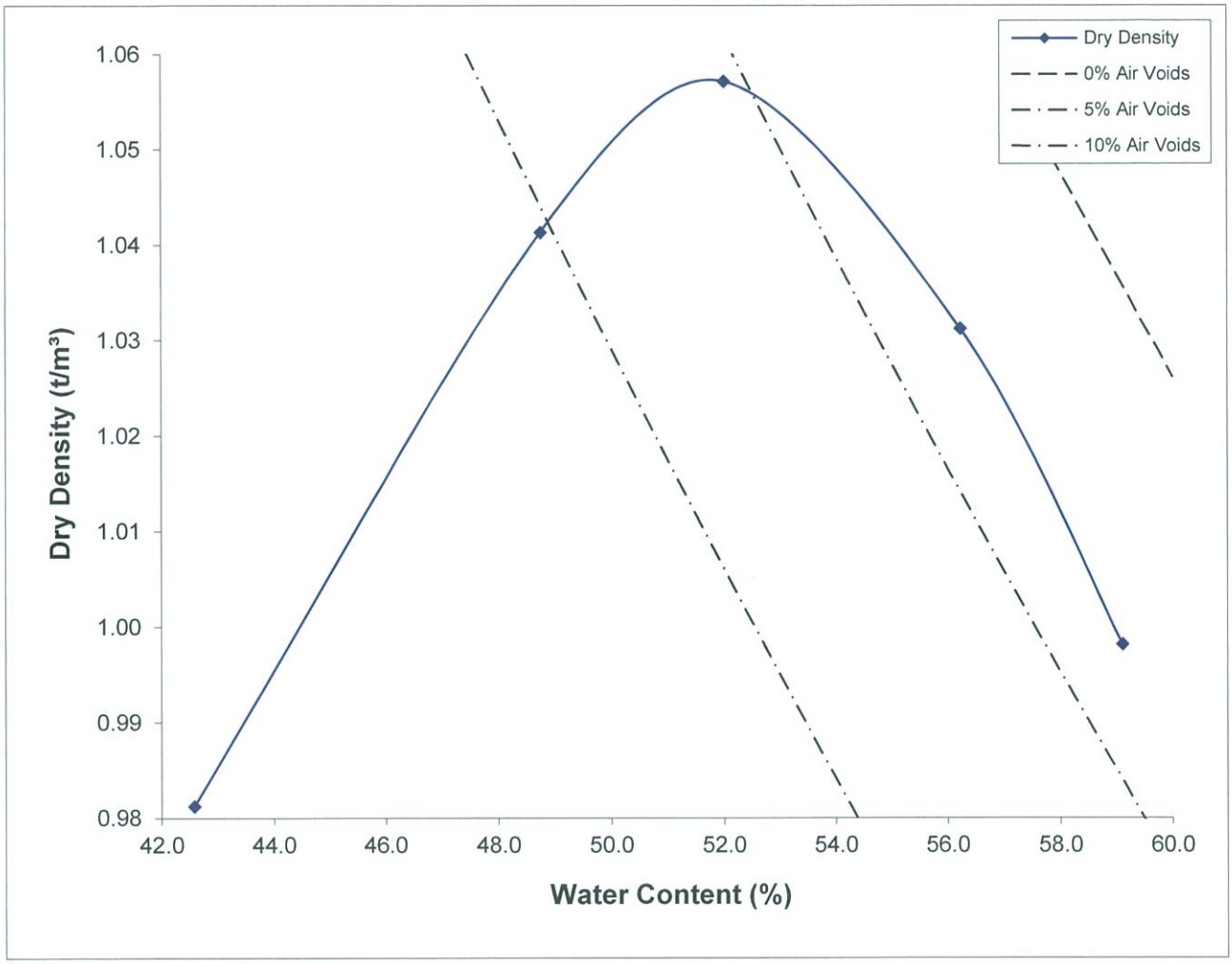
		Result
Compaction effort		***NZ Standard Compaction***
Sample condition		***Soaked***
Surcharge mass	*(kg)*	***6.7***
Period of Soaking	*(Days)*	***4***
Compacted dry density	*(t/m³)*	***1.00***
Compacted water content	*(%)*	***51.8***
Soaked water content	*(%)*	***57.2***
Swell	*(%)*	***0.2***
Rate 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:	*7th 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.*

STEVENSON CONSTRUCTION MATERIALS LIMITED
Private Bag 94000, Manukau City, Auckland 2241
www.stevenson.co.nz

Test Number: 172778 Report Number: 28804T

Date of Issue: 23rd November 2017

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* *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 2017*
Date 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

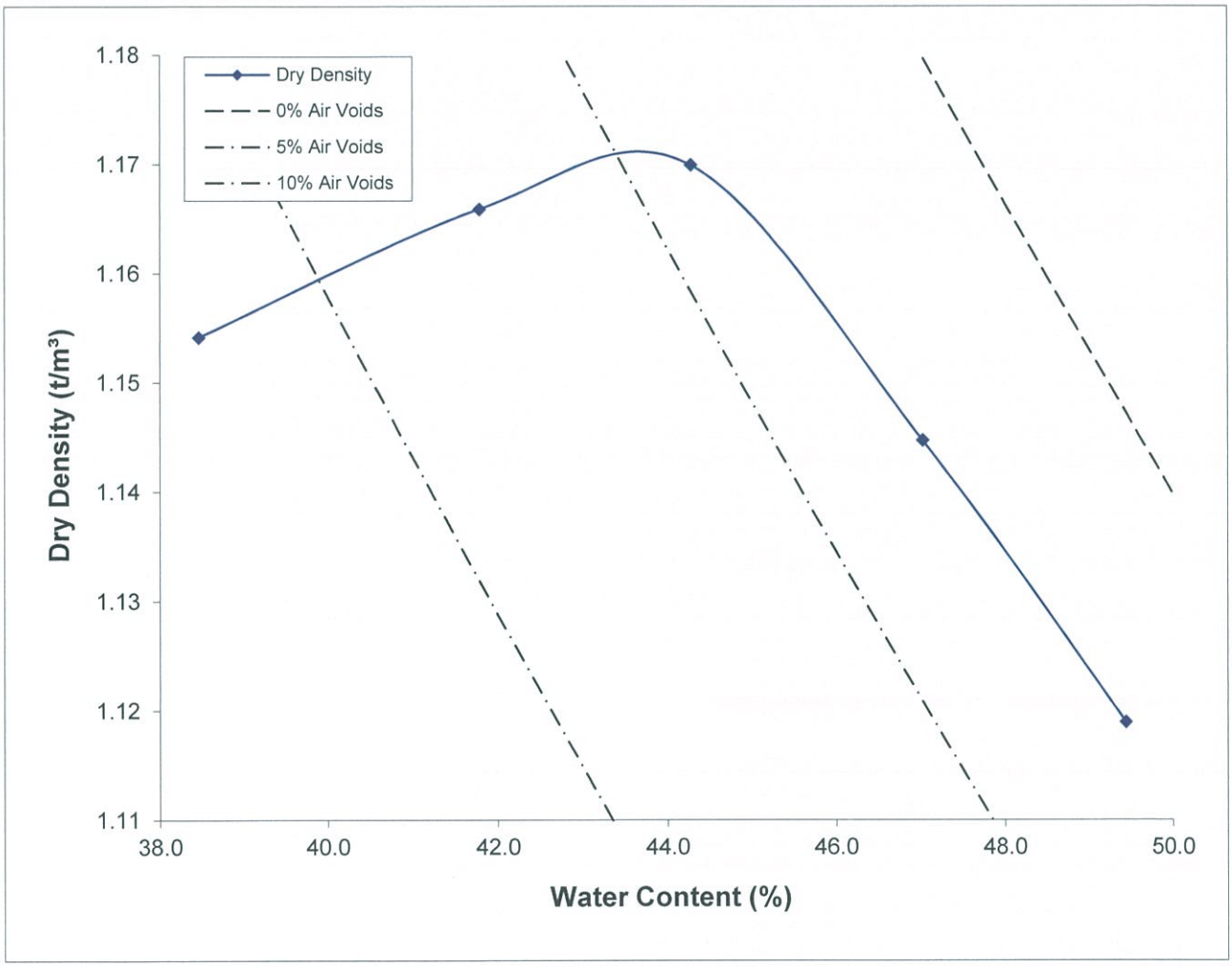
IANZ ACCREDITED LABORATORY

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

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:	*8th 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.*

STEVENSON

STEVENSON CONSTRUCTION MATERIALS LIMITED
Private Bag 94000, Manukau City, Auckland 2241
www.stevenson.co.nz

Test Number: *172780* Report Number: *28805T*

Date of Issue: *23rd November 2017*

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

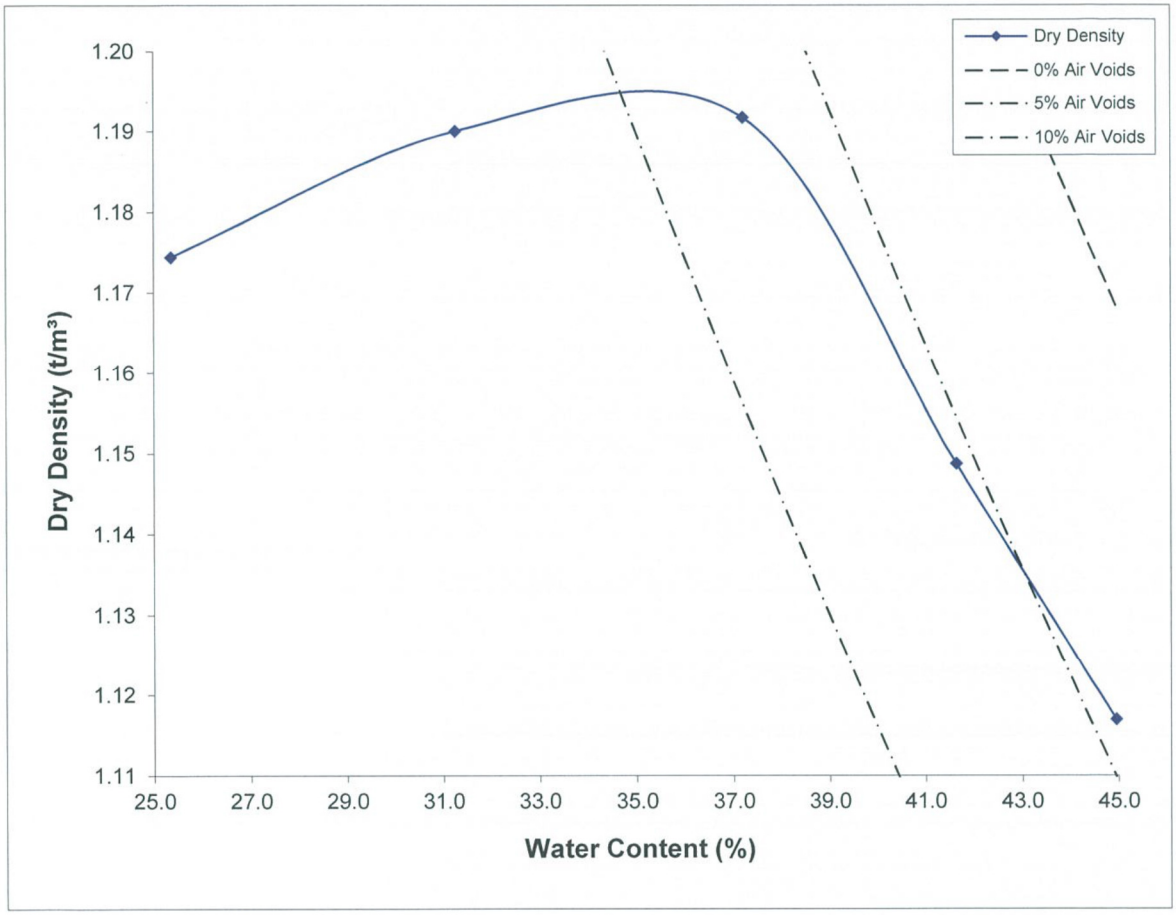
IANZ ACCREDITED LABORATORY

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:	*9th 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 %
1.19	*37.0*	*2.46*	*35.5*

Water Content (%)	*25.3*	*31.3*	*37.2*	*41.6*	*44.9*
Dry Density (t/m³)	*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

WSP | OPUS

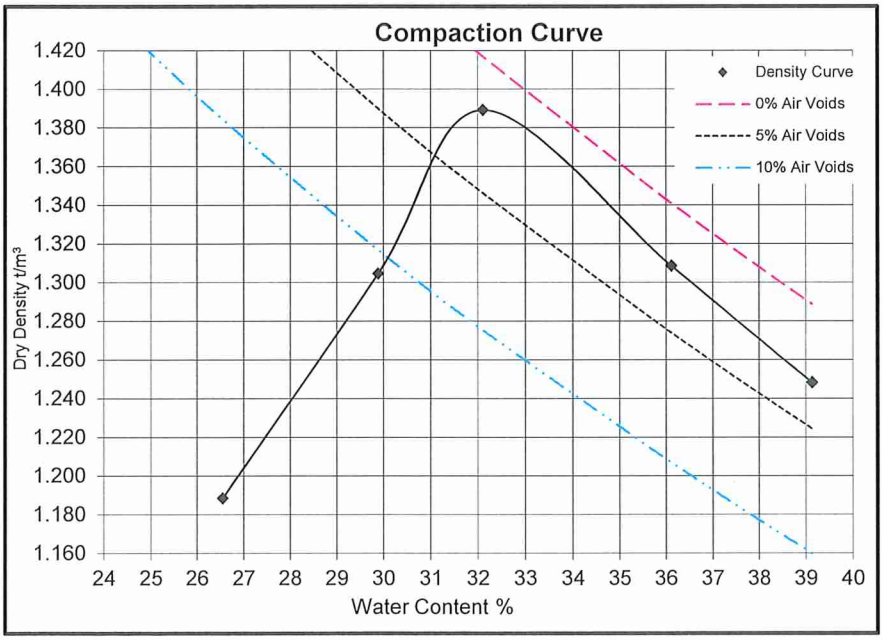
Project :	**Lakeside Developments**
Location :	**Lakeside Developments**
Client :	**CMW (NZ) Limited**
Contractor :	-
Sampled by :	**Client**
Date sampled :	**Unknown**
Sampling method :	**Bulk Sample (as received)**
Sample description :	**SILT with some clay**
Sample condition :	**As received**
Solid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

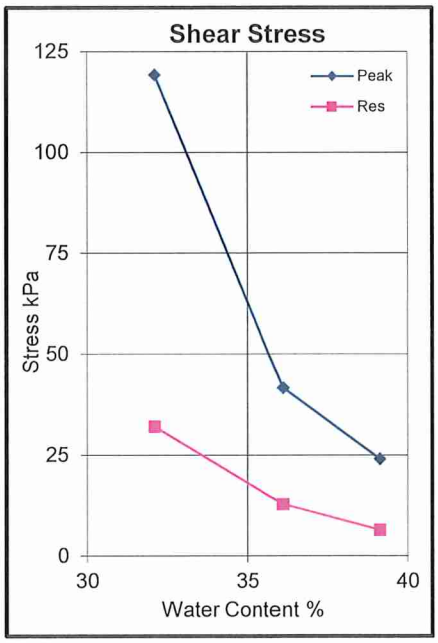
Project No :	**2-68014.00**
Lab Ref No :	**HA3889_1_MDD**
Client Ref No :	**HAM2018-0106**

Test Results

Maximum dry density		1.39	t/m³	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/m³	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/m³	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
Date reported : 04/02/19

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full

IANZ Approved Signatory

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

IANZ ACCREDITED LABORATORY

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

WSP Opus
Hamilton Laboratory
Quality Management Systems Certified to ISO 9001

Fox Street
Private Bag 3057, Waikato Mail Centre,
Hamilton 3240, New Zealand

Telephone +64 7 856 2870
Website www.wsp-opus.co.nz

DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

WSP | OPUS

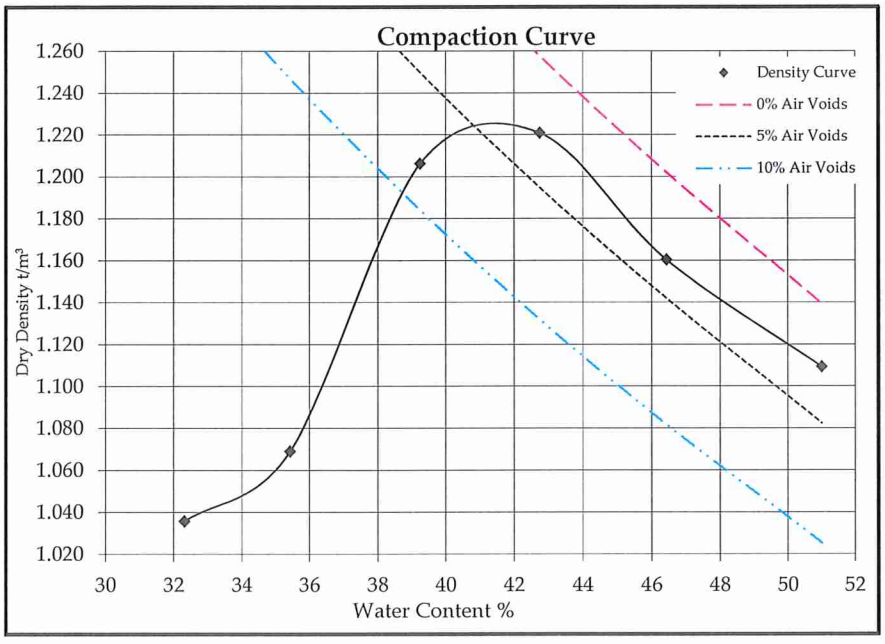
Project :	**Lakeside**
Location :	**Lakeside**
Client :	**CMW (NZ) Limited**
Contractor :	**-**
Sampled by :	**Client**
Date sampled :	**Unknown**
Sampling method :	**Bulk Sample (As received)**
Sample description :	**CLAY (Ash mix)**
Sample condition :	**As received**
Solid density :	**2.72 t/m³ (Tested)**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

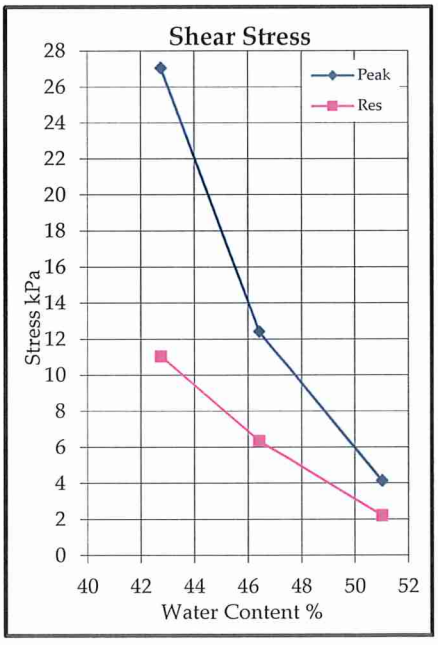
Project No :	**2-68014.00**
Lab Ref No :	**HA4413_MDD**
Client Ref No :	**HAM2018-0106**

Test Results

Maximum dry density	1.22 t/m³		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/m³	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/m³	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
Date reported : 20/05/19

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full

IANZ Approved Signatory

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

IANZ ACCREDITED LABORATORY

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

WSP Opus
Hamilton Laboratory
Quality Management Systems Certified to ISO 9001

Fox Street
Private Bag 3057, Waikato Mail Centre,
Hamilton 3240, New Zealand

Telephone +64 7 856 2870
Website www.wsp-opus.co.nz

SOLID DENSITY OF SOIL
TEST REPORT

Project :	Earthworks
Location :	Stockpile
Client :	Lakeside Developments c/o CMW Geosciences
Contractor :	-
Sampled by :	CMW Geosciences
Date sampled :	15/11/19
Sampling method :	Bulk Sample (as received)
Sample condition :	As received

Project No :	2-68014.00
Lab Ref No :	HA5292_SD
Client Ref No :	HAM2019-0062

Stage 1A Imported Material

Test Results

Lab Ref No :	HA5292
Location ID :	Stockpile
Sample Depth (m) :	Unknown
Soil Fraction Tested :	Whole
Sample History :	Natural
Solid Particle Density (t/m^3) :	2.72
Sample Description:	CLAY

Test Methods		Notes
Solid Density :	NZS 4402 : 1986 Test 2.7.2	

Date tested : 22/11/19
Date reported : 25/11/19

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 25/11/19

IANZ ACCREDITED LABORATORY

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

WSP Opus
Hamilton Laboratory
Quality Management Systems Certified to ISO 9001

Fox Street
Private Bag 3057, Waikato Mail Centre,
Hamilton 3240, New Zealand

Telephone +64 7 856 2870
Website

DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

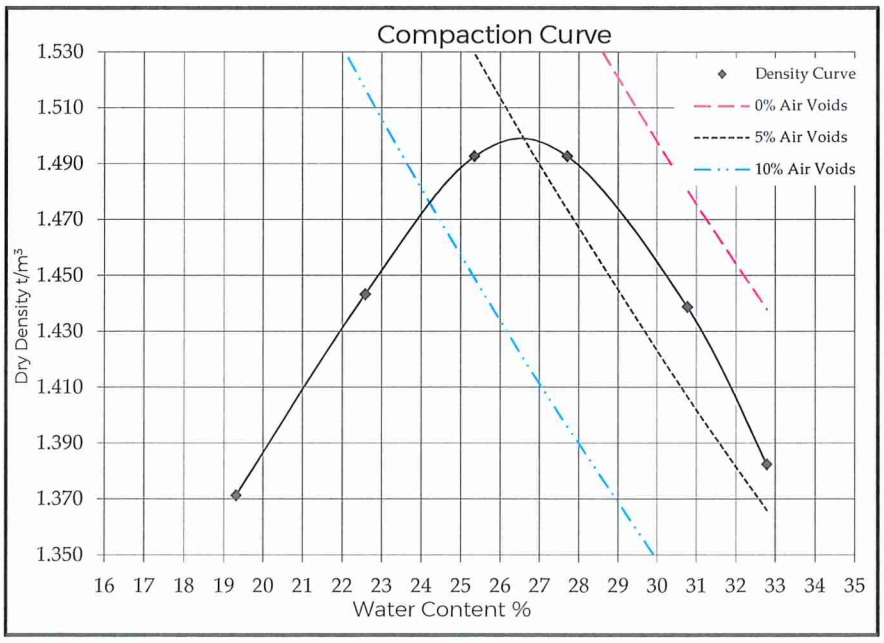
Project :	Earthworks
Location :	Stockpile
Client :	Lakeside Developments c/o CMW Geosciences
Contractor :	-
Sampled by :	CMW Geosciences
Date sampled :	15/11/2019
Sampling method :	As received (Bulk Sample)
Sample description :	CLAY
Sample condition :	As received
Solid density :	2.72 t/m³ (Tested)
Source:	Wards Quarry

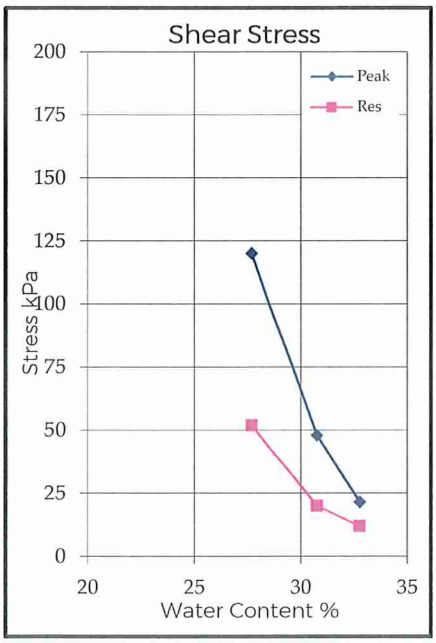
Project No :	2-68014.00
Lab Ref No :	HA5292_MDD
Client Ref No :	HAM2019-0062

Stage 1A Imported Material

Test Results							
Maximum dry density	1.50 t/m³			Natural water content	25.3 %		
Optimum water content	26.5 %			Fraction tested	All Passing 19mm sieve		

Sample ID		-120	-60	Nat	60	120	180	
Bulk density	t/m³	1.636	1.769	1.871	1.906	1.881	1.836	
Water content	%	19.3	22.6	25.3	27.7	30.8	32.8	
Dry density	t/m³	1.371	1.443	1.493	1.493	1.439	1.382	
Sample condition		V. Stiff Moist	V. Stiff Moist	Stiff Moist	Firm Moist	Soft Moist	V. Soft Wet	
Peak stress	kPa	UTP	UTP	>192	120	48	22	
Remoulded stre	kPa	UTP	UTP	>192	52	20	12	





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 : 22/11/19
Date reported : 25/11/19

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 25/11/19

IANZ ACCREDITED LABORATORY

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

WSP
Hamilton (Fox St)
Quality Management Systems Certified to ISO 9001

4 Fox Street
Private Bag 3057, Waikato Mail Centre, 3240,
Hamilton, New Zealand

Telephone +64 7 856 2870
Website www.wsp.com/nz

PLASTICITY INDEX FOR SOILS
TEST REPORT

Project :	Earthworks
Location :	Stockpile
Client :	Lakeside Developments c/o CMW Geosciences
Contractor :	-
Sampled by :	CMW Geosciences
Date received :	18/11/2019
Sampling method :	As received (Bulk sample)
Sample condition :	As received

Project No :	2-68014.00
Lab Ref No :	HA5333_PI
Client Ref No :	HAM2019-0062

Stage 1A Imported Material

Test Results

Lab Ref No :	HA5333_PI
Location ID :	Stockpile
Sample Depth (m) :	N/A
Soil Fraction Tested :	-425um
Liquid Limit :	52
Plastic Limit :	28
Plasticity Index :	24
Natural Water Content (%) :	25.0
Sample description :	CLAY

Test Methods		Notes
Water Content	NZS 4402 : 1986, Test 2.1	1. Unable to form groove and/or sample slipping in bowl.
Liquid Limit	NZS 4402 : 1986, Test 2.2	2. Unable to roll to specified dimensions.(Sandy sample)
Plastic Limit	NZS 4402 : 1986, Test 2.3	3. N.P. denotes Non Plastic
Plasticity Index	NZS 4402 : 1986, Test 2.4	

Date tested : 03/12/19
Date reported : 09/12/19

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 09/12/19

WSP
Hamilton Laboratory
Quality Management Systems Certified to ISO 9001
4 Fox Street
Private Bag 3057
Hamilton, New Zealand
Telephone +64 7 856 2870
Website www.wsp.com/nz

LINEAR SHRINKAGE FOR SOILS TEST REPORT

Project :	Earthworks
Location :	Stockpile
Client :	Lakeside developments c/o CMW Geosciences
Contractor :	-
Sampled by :	Client
Date received :	18/11/19
Sampling method :	As received (Bulk sample)
Sample condition :	As received

Project No :	2-68014.00
Lab Ref No :	HA5333_LS
Client Ref No :	HAM2019-0062

Stage 1A Imported Material

Test Results

Lab Ref No :	HA5333_LS
Location ID :	Stockpile
Sample Depth (m) :	N/A
Soil Fraction Tested :	-425um
Blows at LS Point:	22
Water Content at LS Point (%):	53.0
Linear Shrinkage (%) :	12
Water Content (%):	25.0
Sample Description:	CLAY

Test Methods		Notes
Water Content	NZS 4402 : 1986, Test 2.1	
Linear Shrinkage	NZS 4402 : 1986, Test 2.6	

Date tested : 03/12/19
Date reported : 09/12/19

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 09/12/19

IANZ ACCREDITED LABORATORY

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

WSP Opus
Hamilton Laboratory
Quality Management Systems Certified to ISO 9001

Fox Street
Private Bag 3057, Waikato Mail Centre,
Hamilton 3240, New Zealand

Telephone +64 7 856 2870
Website

Winstone Aggregates | Auckland Laboratory

Test Report

CUSTOMER	Winstone Aggregates		
CLIENT REFERENCE			
CUSTOMER ADDRESS	PO Box 17 195, Greenlane, Auckland		
SOURCE	WA Pukekawa Quarry	REASON FOR TEST	Load-out Face
PRODUCT NAME	Sand3		
SPECIFICATION	Sand3 Pukekawa Oct-14	STOCKPILE ID	Not Applicable
SAMPLING METHOD	NZS4407:2015, Section 2.4.6.3.2	CONDITION RECEIVED	Natural
SAMPLE DATE	22/8/2019	DATE RECEIVED	22/8/2019
SAMPLED BY	Georgia Robinson	**SAMPLE ID**	AKL19-2912
SAMPLED FROM	WA Pukekawa Quarry	**REPORT ID**	118114

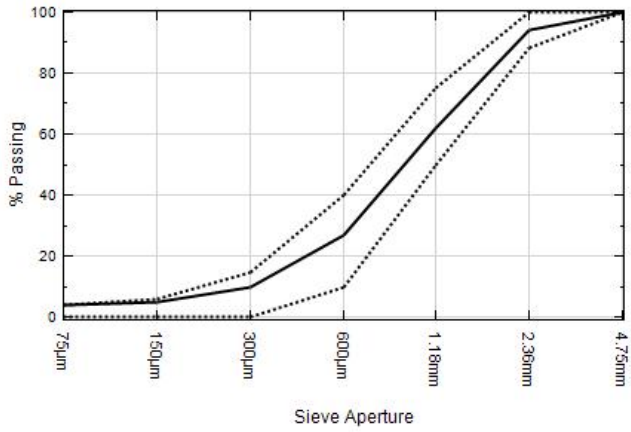
TEST METHODS

Tests	Test Finish Date	Test Notes
Fineness Modulus NZS3111:1986 test 6.5.2	23/8/2019	Lot 110-112 Imported Sand
Sieve Analysis NZS3111:1986 test 6	23/8/2019	

TEST RESULTS

SIEVE ANALYSIS			
Sieve Aperture	% Passing	Specified Min	Specified Max
4.75mm	100	100	100
2.36mm	94	88	100
1.18mm	62	50	75
600µm	27	10	40
300µm	10	0	15
150µm	5	0	6
75µm	4	0	4

Test	Unit	Result	Specified Min	Specified Max
Fineness Modulus		3.02	-	-



COMMENTS

Approved By:

IANZ ACCREDITED LABORATORY

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

Tovo Takau **Approved Signatory** **Date Issued:** 25/8/2019

Winstone Aggregates A Division of Fletcher Concrete and Infrastructure Limited
PHONE +09 299 5991 · FAX +09 297 7814 · SITE ADDRESS 489 Hunua Road, Papakura, Auckland, 2110
POSTAL ADDRESS PO Box 17-195, Greenlane, Auckland, 1546 · WEB www.winstoneaggregates.co.nz

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 80,000m^3 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: Earth Fill Quality Control Data

LF11 Rev.8 Soil Field Density NDM Direct Transmission with VSS Report (Cohesvie 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.

IANZ ACCREDITED LABORATORY — 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	130	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	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	209	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	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	176	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	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	139	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	191	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	171	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	162	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	171	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	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	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	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+	171+	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	185+	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	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	159	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+	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	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	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	201	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	UTP	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	70										No sample taken. See N36 for retest
	N25	Refer to Fill Test Location Plan	-	CLAY	1911	1911	105	55	70	64	74										No sample taken. See N37 for retest
	N26	Refer to Fill Test Location Plan	-	CLAY	1911	1911	111	119	102	125	114										No sample taken. See N30 for retest
	N27	Refer to Fill Test Location Plan	-	CLAY	1911	1911	102	99	116	113	108										No sample taken. See N31 for retest

** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m^3 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.

IANZ ACCREDITED LABORATORY — 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 (%) *	
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
	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
11/12/2018	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	
	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	
12/12/2018	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	
	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	
13/12/2018	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
	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	
17/12/2018	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	
	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	
18/12/2018	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	
	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	
19/12/2018	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	

** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m^3 are not accredited and are outside the laboratories scope of accreditation.

Created By:	JLM	Date:	12/12/2018
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:	HAM2018-0106LAC 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.

IANZ ACCREDITED LABORATORY — 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/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m³) *	Oven Dry Density (t/m³)	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	
	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	
7/01/2019	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	
	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	
8/01/2019	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	
	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	
10/01/2019	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	
	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	
11/01/2019	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	

** 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: RP Date: 04/01/2019
Checked By: JLM Date: 15/01/2019
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:	HAM2018-0106LAD 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.

IANZ ACCREDITED LABORATORY — 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/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m³) *	Oven Dry Density (t/m³)	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	See N131 for retest
	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	

** 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
Checked By: JLM Date: 14/05/2019
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:	HAM2018-0106LAE 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.

IANZ ACCREDITED LABORATORY — 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/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m³) *	Oven Dry Density (t/m³)	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	

** 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: 1/02/2019
Checked By: JLM Date: 14/05/2019
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:	HAM2018-0106LAF 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.

IANZ ACCREDITED LABORATORY — 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 (%) *	
11/02/2019	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	

** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m^3 are not accredited and are outside the laboratories scope of accreditation.

Created By: JLM Date: 12/02/2019
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 (Cohesvie 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.

IANZ ACCREDITED LABORATORY — 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/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m³) *	Oven Dry Density (t/m³)	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	204+	UTP	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	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	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	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	UTP	1.72	1.28	34.2	8	300	33.2	2.62	1.30	8	

** 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: 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 (Cohesvie 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.

IANZ ACCREDITED LABORATORY — 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	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	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	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	
	N183	Refer to Fill Test Location Plan	16.3	Sandy CLAY	1911	1911	UTP	UTP	UTP	UTP	UTP	1.82	1.35	35.3	1	300	29.5	2.62	1.40	5	
4/03/2019	N184	Refer to Fill Test Location Plan	7.3	CLAY, some Silt and Sand	2532	2532	UTP	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	UTP	1.76	1.25	41.5	1	300	45.0	2.62	1.22	-1	Retest of N166 + 167
	N186	Refer to Fill Test Location Plan	7.6	CLAY, some Silt and Sand	2532	2532	UTP	UTP	UTP	UTP	UTP	1.77	1.33	33.4	5	300	34.1	2.62	1.32	5	Retest of N166 + 167
5/03/2019	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	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	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	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	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	UTP	1.81	1.45	24.8	8	300	32.1	2.62	1.38	4	Retest of N192

** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m^3 are not accredited and are outside the laboratories scope of accreditation.

Created By: JLM Date: 4/03/2019
Checked By: JLM Date: 15/05/2019
Authorised Signatory: AC Date: 30/05/2019

LF11 Rev.8 Soil Field Density NDM Direct Transmission with VSS Report (Cohesvie 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.

IANZ ACCREDITED LABORATORY — 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/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m³) *	Oven Dry Density (t/m³)	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
	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	
25/03/2019	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

** 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: 12/03/2019
Checked By: JLM Date: 15/05/2019
Authorised Signatory: AC Date: 30/05/2019

LF11 Rev.8 Soil Field Density NDM Direct Transmission with VSS Report (Cohesvie 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.

IANZ ACCREDITED LABORATORY — 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
3/04/2019	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	
	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	
4/04/2019	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	
	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	
5/04/2019	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	
	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	
	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
8/04/2019	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
	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	
10/04/2019	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	

** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m^3 are not accredited and are outside the laboratories scope of accreditation.

Created By: JLM Date: 3/04/2019
Checked By: JLM Date: 15/05/2019
Authorised Signatory: AC Date: 30/05/2019

LF11 Rev.8 Soil Field Density NDM Direct Transmission with VSS Report (Cohesvie 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.

IANZ ACCREDITED LABORATORY — 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/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m³) *	Oven Dry Density (t/m³)	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	

** 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.

IANZ ACCREDITED LABORATORY — 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/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Solid Density (t/m³) *	Oven Dry Density (t/m³)	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	
	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.
2/05/2019	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
	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	
3/05/2019	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	

** 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.

IANZ ACCREDITED LABORATORY — 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+	UTP	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	

** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m^3 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.

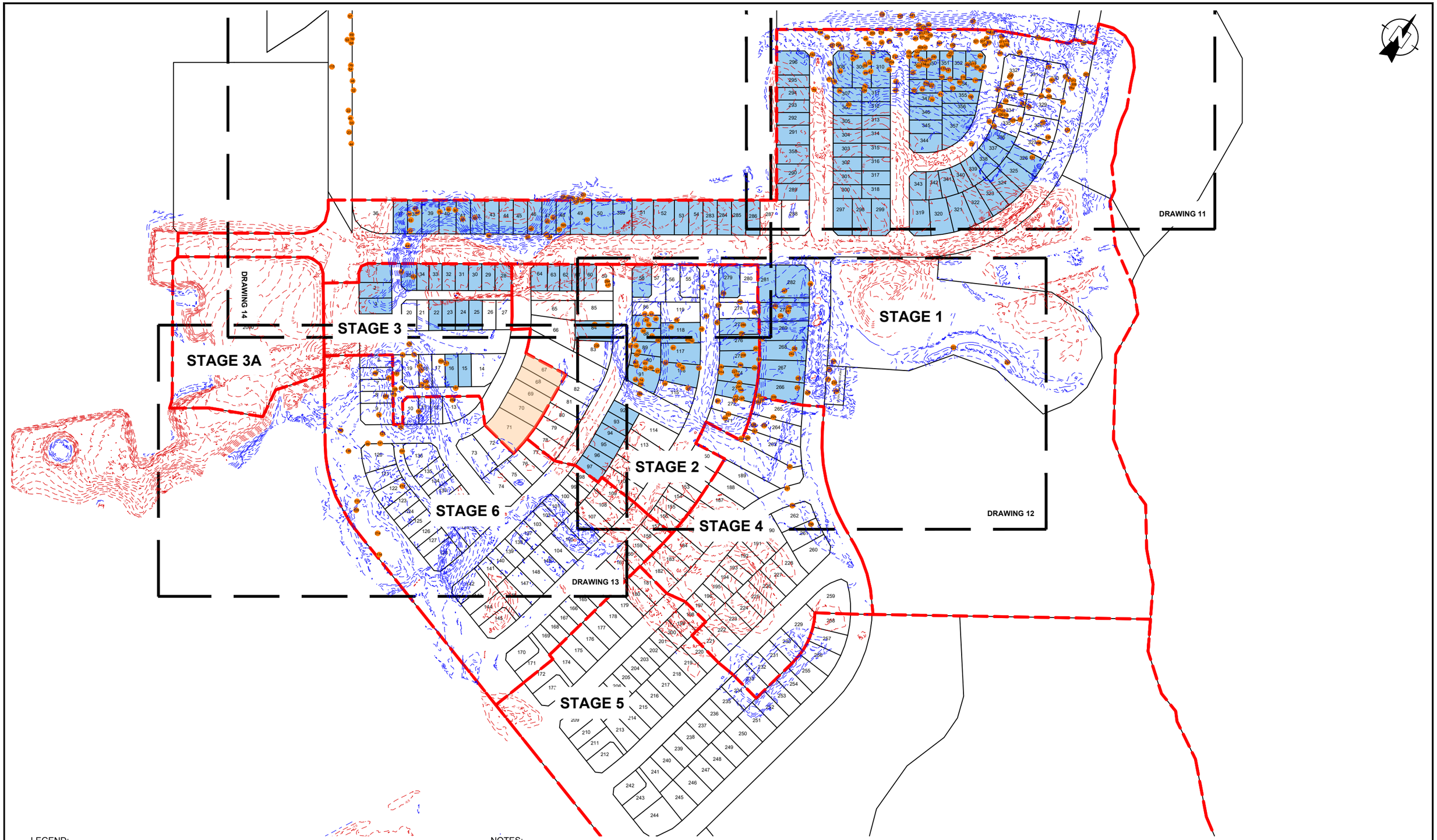
IANZ ACCREDITED LABORATORY — Tests indicated as not accredited are outside the scope of the laboratory's accreditation

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/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth	Oven Water Content (%)	Solid Density (t/m³) *	Oven Dry Density (t/m³)	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	

** 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:

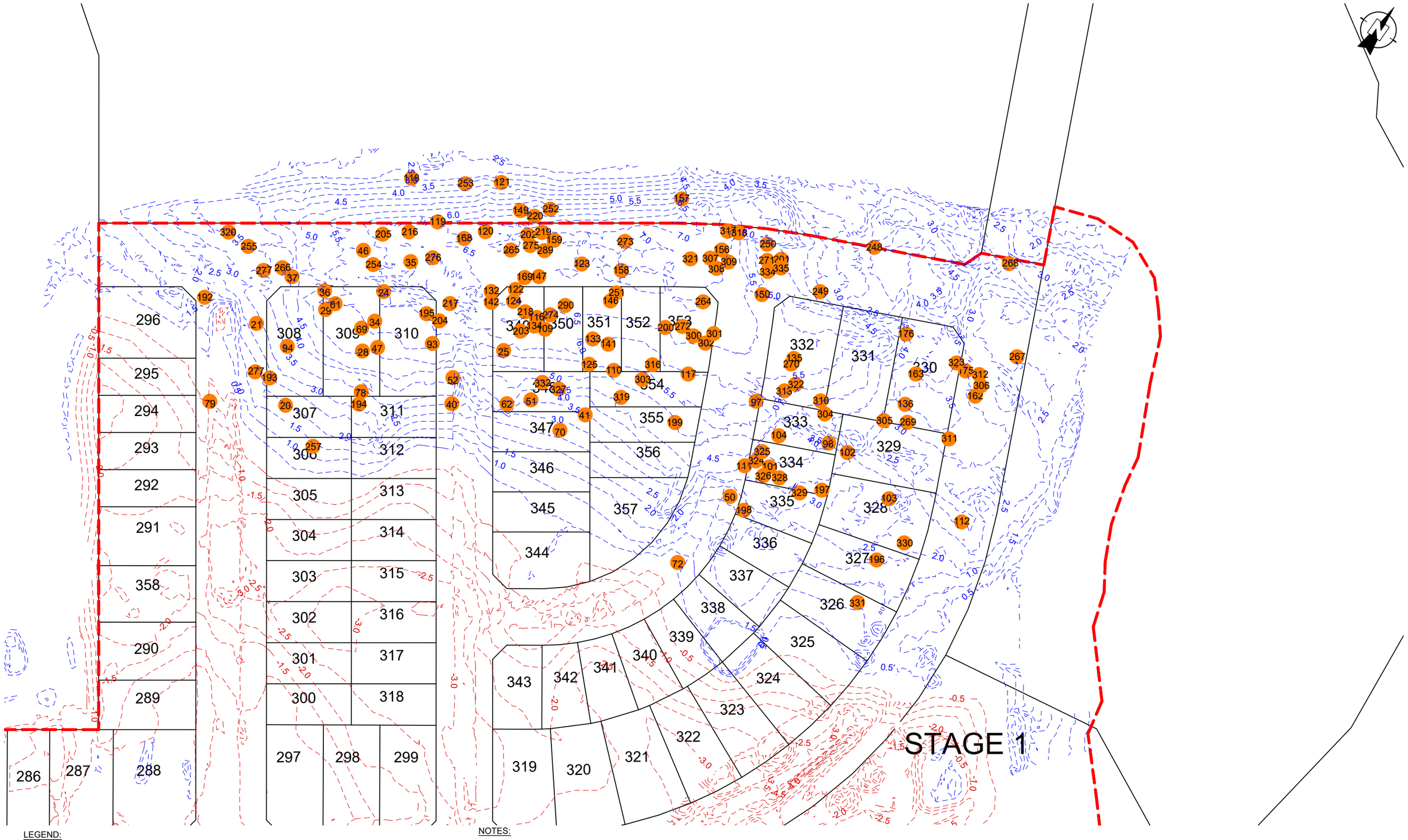
- STAGE BOUNDARY
- SHOW HOMES AREA PREVIOUSLY REPORTED ON
- LOTS COVERED BY GCR REPORT RE. HAM2018-106AM REV 1
- CUT CONTOURS
- FILL CONTOURS
- 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION

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.

CMW Geosciences

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



LEGEND:

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

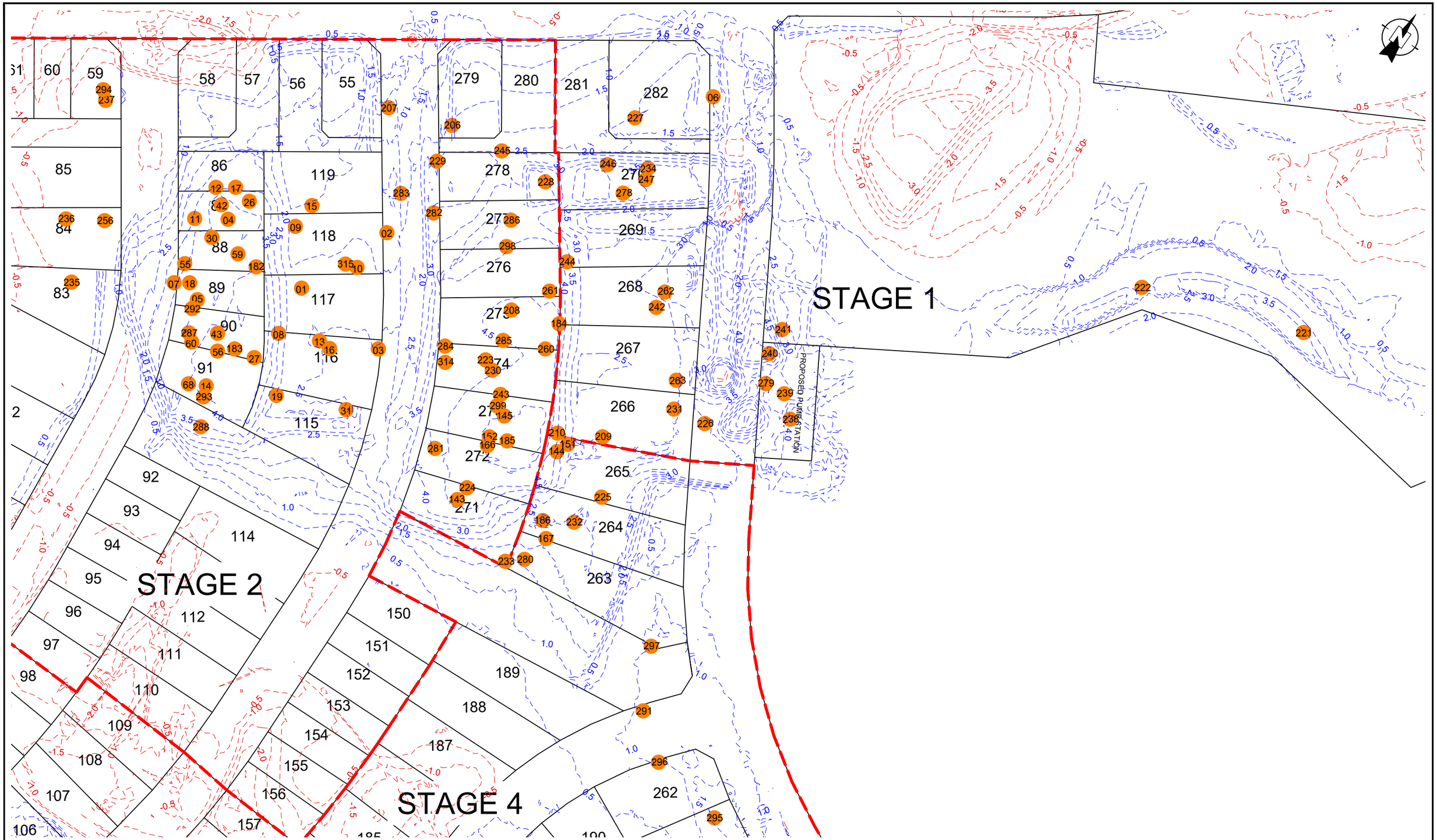
NOTES:

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.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

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



LEGEND:

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

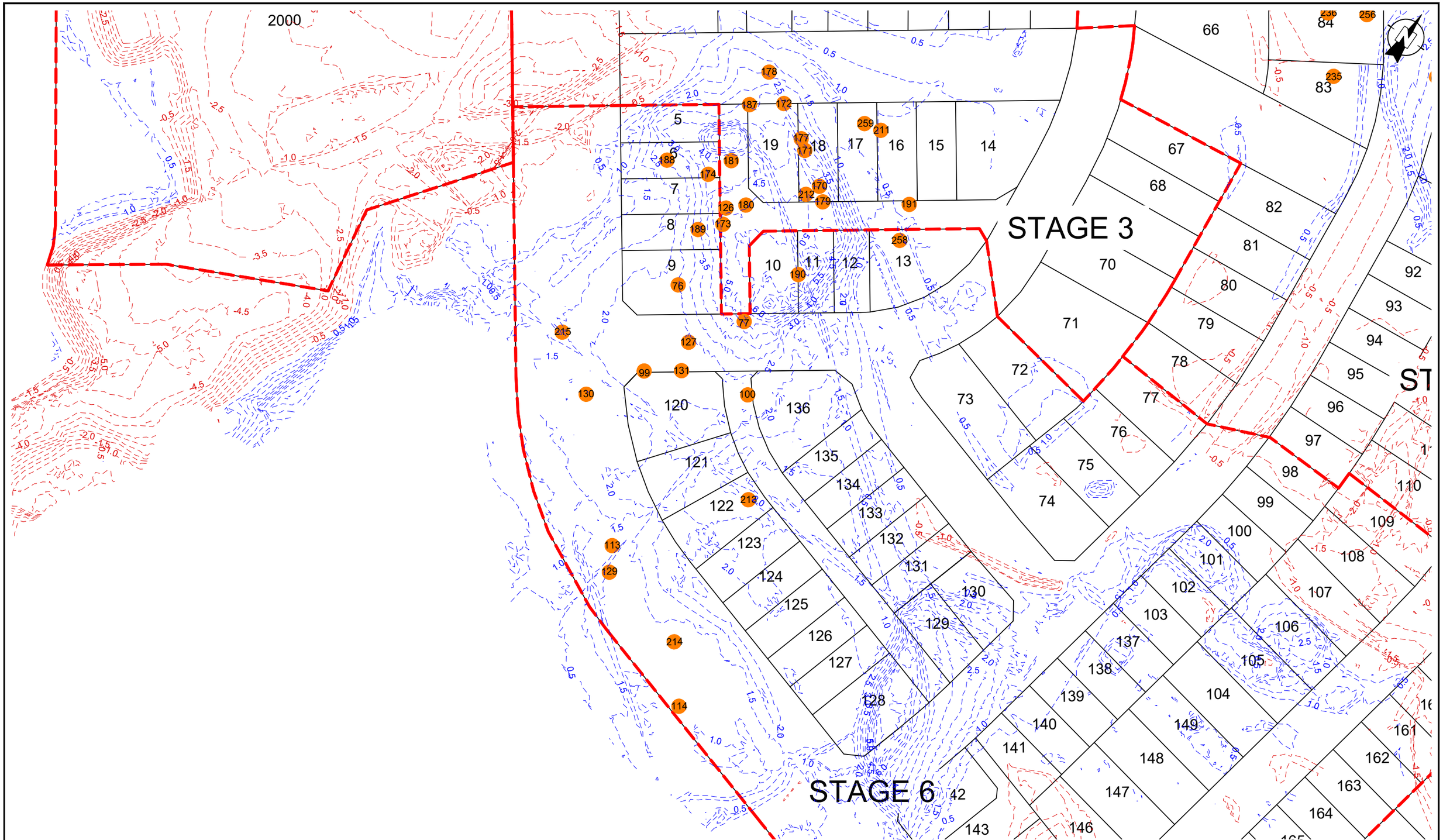
NOTES:

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.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

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



LEGEND:

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

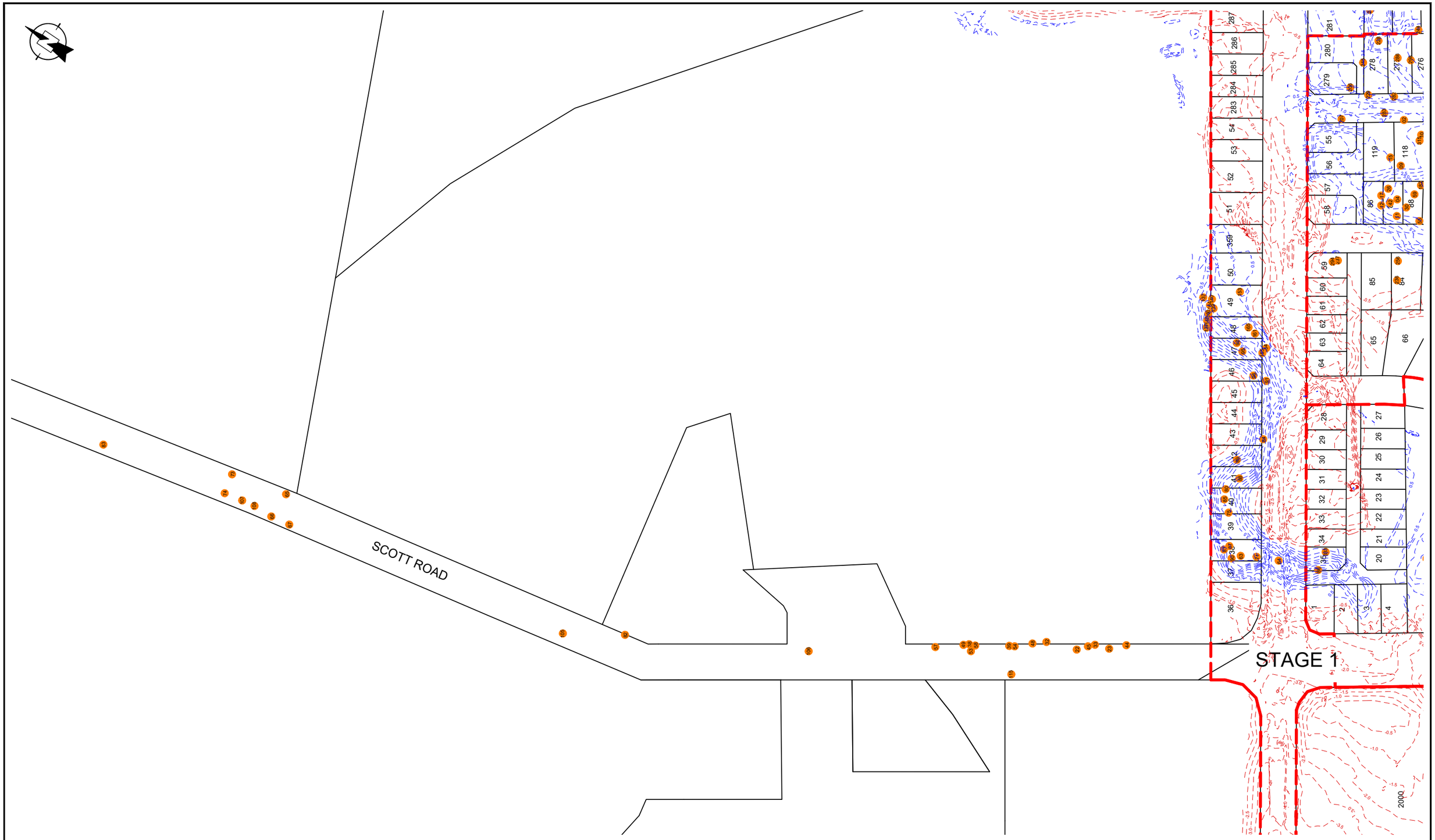
NOTES:

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.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

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

1:2000 0 20 40 60 80 100 m

CMW Geosciences

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

LF11 Rev.10 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:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAA Rev.0
Report Date:	11/12/2019
Client:	Lakeside Developments (2017) Limited
Client Address:	

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

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

IANZ ACCREDITED LABORATORY — 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*	Solid Density (t/m³) *	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/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m³)	Calculated Air Voids (%) *	
23/09/2019	N1	Lot 27	-	CLAY	2.70	1914	1914	122	122	119	215	145	1.73	1.17	47.0	1	300	42.4	1.21	4	
	N2	Lot 26	-	CLAY	2.70	1914	1914	UTP	UTP	UTP	UTP	UTP	1.71	1.18	45.7	3	300	43.0	1.20	4	
22/10/2019	N3	Stage 4	0.5m lift	CLAY	2.70	1911	1911	154	139	169	157	155	1.85	1.41	31.4	4	300	24.3	1.49	9	
	N4	Stage 4	0.5m lift	CLAY	2.70	1911	1911	UTP	UTP	UTP	182	182+	1.88	1.44	30.1	3	300	28.6	1.46	4	
29/10/2019	N5	Stage 6	-	Clayey SILT	2.62	2087	2087	179	237+	213	UTP	210+	1.79	1.26	42.0	-1	300	37.7	1.30	1	
	N6	Stage 6	-	CLAY	2.70	2087	2087	UTP	UTP	UTP	UTP	UTP	1.82	1.32	38.1	1	300	33.7	1.36	4	
	N7	Stage 4	-	CLAY	2.70	2087	2087	UTP	227	UTP	UTP	227+	1.76	1.25	40.3	3	200	32.5	1.33	8	
	N8	Stage 4	-	CLAY	2.70	2087	2087	UTP	UTP	UTP	UTP	UTP	1.82	1.35	34.5	3	300	27.0	1.43	8	
	N9	Stage 1	-	CLAY	2.70	2087	2087	UTP	UTP	UTP	UTP	UTP	2.04	1.72	18.0	5	300	26.2	1.61	-2	
30/10/2019	N10	Stage 1A	-	CLAY	2.70	2560	2560	123	191	164	UTP	159+	1.72	1.25	37.6	7	300	36.5	1.26	7	
	N11	Stage 1A	-	CLAY	2.70	2560	2560	UTP	142	UTP	UTP	142+	1.77	1.34	31.9	7	250	27.2	1.39	11	See N15 for retest.
31/10/2019	N12	Stage 4	-	CLAY	2.70	2560	2560	UTP	UTP	UTP	UTP	UTP	1.82	1.31	39.4	0	300	34.1	1.36	3	
	N13	Stage 4	-	CLAY	2.70	2560	2560	UTP	UTP	UTP	191+	191+	1.78	1.27	40.1	2	300	35.5	1.32	5	
	N14	Stage 1A	-	CLAY	2.70	2560	2560	68	109	139	109	106									No sample taken. See N16 for retest.
	N15	Stage 1A	-	CLAY	2.70	2560	2560	191+	131	142	104	142	1.88	1.37	37.0	-1	300	37.2	1.37	-2	Retest of N11.

** 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: 14/10/2019
Checked By: JLM Date: 11/12/2019
Authorised Signatory: AWDC Date: 16/12/2019

LF11 Rev.12 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:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAB Rev.0
Report Date:	11/12/2019
Client:	Lakeside Developments (2017) Limited
Client Address:	

Test Methods: NZS 4402 1986 Test 2.1; NZS 4407 2015 Test 3.1; NZS 4407 2015 Test 4.2; NZS 4407 2015 Test 4.3; NZGS:August 2001

Notes: Solid Density: Assumed; Solid Density Data Source: N/A; Testing Locations Selected By: CMW Field Staff; ① Blade size of 19mm used.

IANZ ACCREDITED LABORATORY — 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*	Solid Density (t/m³) *	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/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m³)	Oven Calculated Air Voids (%) *	
1/11/2019	N16	Stage 1A	-	CLAY	2.70	2087	2087	173	135	149	176	158	1.68	1.19	41.2	7	300	31.8	1.28	12	Retest of N14.
	N17	Stage 1A	-	CLAY	2.70	2087	2087	186	203	122	237+	187+	1.85	1.40	32.7	3	300	30.1	1.42	4	
	N18	Stage 1A	-	CLAY	2.70	2087	2087	223	223	UTP	UTP	223+	1.78	1.27	39.6	3	300	33.1	1.33	6	
	N19	Stage 1A	-	CLAY	2.70	2087	2087	UTP	UTP	UTP	UTP	UTP	1.96	1.47	33.6	-4	300	27.4	1.54	1	
	N20	Stage 1A	-	CLAY	2.70	2087	2087	119	149	UTP	166	145+	1.87	1.39	33.9	1	300	28.0	1.46	5	
4/11/2019	N21	Stage 1A	-	CLAY	2.70	2087	2087	51	68	76	81	69									No sample taken. See N27 for retest.
	N22	Stage 1A	-	CLAY	2.70	2087	2087	237+	UTP	UTP	217	227+	1.89	1.44	31.4	2	300	30.5	1.45	2	
	N23	Stage 4	-	Clayey SILT	2.62	2087	2087	UTP	UTP	210	UTP	210+	1.79	1.35	32.3	5	300	34.5	1.33	3	
	N24	Stage 4	-	CLAY	2.70	2087	2087	UTP	UTP	UTP	UTP	UTP	1.86	1.37	35.8	0	300	41.0	1.32	-3	
7/11/2019	N25	Stage 1A	-	CLAY	2.62	2560	2560	150	164	156	191	165	1.84	1.41	30.6	3	300	21.1	1.52	10	
	N26	Stage 1A	-	CLAY	2.70	2560	2560	137	139	112	131	130	1.88	1.42	32.6	1	300	30.3	1.44	3	
	N27	Stage 1A	-	CLAY	2.62	2560	2560	UTP	UTP	UTP	150	150+	1.85	1.42	30.2	3	300	26.7	1.46	5	Retest of N21.
	N28	Stage 4	-	CLAY	2.70	2560	2560	191	191	UTP	UTP	191+	1.81	1.36	32.3	5	300	33.8	1.35	4	
	N29	Stage 4	-	CLAY	2.70	2560	2560	191	191	UTP	UTP	191+	1.80	1.32	35.9	3	300	34.8	1.34	4	
13/11/2019	N30	Stage 4	-	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	UTP	1.83	1.33	37.3	1	300	32.8	1.38	4	
	N31	Stage 4	-	CLAY	2.62	2349	2349	UTP	UTP	140	160	150+	1.76	1.33	32.2	6	300	32.3	1.33	6	
	N32	Stage 4	-	CLAY	2.70	2349	2349	204+	204+	UTP	UTP	204+	1.80	1.30	39.0	1	300	38.2	1.30	2	
	N33	Stage 4	-	CLAY	2.70	2349	2349	204	204	204	204	204	1.84	1.37	34.3	2	300	31.4	1.40	4	
	N34	Stage 1A	-	CLAY	2.70	2349	2349	UTP	175	160	172	169+	1.86	1.41	31.7	3	300	27.9	1.45	6	
	N35	Stage 1A	-	CLAY	2.62	2349	2349	102	58	55	131	87	1.87	1.45	29.0	2	300	33.1	1.41	0	See N36 for retest.
21/11/2019	N36	Stage 1A	-	CLAY	2.70	1785	1785	202	199	202	202	201	1.83	1.42	29.5	6	300	27.3	1.44	7	Retest of N35.
	N37	Stage 1A	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	202	202+	1.88	1.44	30.3	3	300	28.7	1.46	4	
	N38	Stage 5	-	CLAY	2.70	1785	1785	UTP	187	173	UTP	180+	1.82	1.30	39.3	0	300	31.8	1.38	5	
	N39	Stage 5	-	CLAY	2.70	1785	1785	144	144	115	118	130	1.75	1.18	47.7	0	300	47.3	1.19	0	
22/11/2019	N40	Stage 5	-	CLAY	2.70	1785	1785	202	121	187	133	161	1.86	1.34	38.5	-1	300	41.4	1.31	-3	
	N41	Stage 5 - DEB	-	CLAY	2.70	1785	1785	121	202	202	UTP	175+	1.85	1.36	36.2	0	300	29.6	1.43	5	
	N42	Stage 5	-	CLAY	2.70	1785	1785	147	147	UTP	138	144+	1.82	1.36	33.2	4	300	29.8	1.40	6	

** 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: 13/11/2019
Checked By: JLM Date: 11/12/2019
Authorised Signatory: AWDC Date: 16/12/2019

LF11 Rev.12 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:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAC Rev.0
Report Date:	11/12/2019
Client:	Lakeside Developments (2017) Limited
Client Address:	

Test Methods: NZS 4402 1986 Test 2.1; NZS 4407 2015 Test 3.1; NZS 4407 2015 Test 4.2; NZS 4407 2015 Test 4.3; NZGS:August 2001

Notes: ① Blade size of 19mm used.

Solid Density: Assumed
Solid Density Data Source: N/A
Testing Locations Selected By: CMW Field Staff

IANZ ACCREDITED LABORATORY — 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*	Solid Density (t/m³) *	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/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m³)	Oven Calculated Air Voids (%) *	
25/11/2019	N43	Stage 2	-	CLAY	2.70	1785	1785	164	138	173	167	161	1.78	1.27	40.0	2	300	37.9	1.29	3	
	N44	Stage 4	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	202	202+	1.87	1.35	38.9	-2	300	31.1	1.43	3	
	N45	Stage 5	-	CLAY	2.62	1785	1785	UTP	UTP	UTP	UTP	UTP	1.65	1.13	45.7	5	300	40.6	1.17	8	
	N46	Stage 5	-	CLAY	2.70	1785	1785	46	104	130	118	100	1.75	1.28	36.5	6	300	34.7	1.30	7	See N52 for retest.
	N47	Stage 5	-	CLAY	2.70	1785	1785	124	121	63	75	96	1.85	1.40	32.7	3	300	30.1	1.42	4	See N51 for retest.
	N48	Stage 6	-	CLAY	2.62	1785	1785	UTP	UTP	202+	202+	202+	1.83	1.40	30.8	3	300	24.5	1.47	8	
	N49	Stage 6	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	UTP	1.87	1.42	31.8	2	300	23.6	1.51	8	
	N50	Stage 6	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	UTP	1.86	1.44	29.6	4	300	24.9	1.49	8	
26/11/2019	N51	Stage 5	-	CLAY	2.62	1785	1785	121	173	164	144	151	1.82	1.33	36.5	1	300	22.5	1.48	10	Retets of N47.
	N52	Stage 5	-	CLAY	2.62	1785	1785	UTP	UTP	UTP	UTP	UTP	1.73	1.25	38.5	4	300	31.0	1.32	9	Retest of N46.
27/11/2019	N53	Stage 5	-	CLAY	2.62	1785	1785	UTP	UTP	202+	202+	202+	1.79	1.34	33.4	4	300	31.3	1.36	5	
	N54	Stage 5	-	CLAY	2.62	1785	1785	202+	202+	202+	UTP	202+	1.74	1.28	36.4	5	300	31.6	1.32	8	
	N55	Stage 5	-	CLAY	2.62	1785	1785	UTP	UTP	UTP	UTP	UTP	1.85	1.39	33.3	1	300	21.1	1.53	9	
	N56	Stage 5	-	CLAY	2.62	1785	1785	202+	202+	202+	202+	202+	1.72	1.24	38.2	5	300	38.3	1.24	5	
28/11/2019	N57	Stage 6	-	CLAY	2.70	1785	1785	202	UTP	UTP	UTP	202+	1.90	1.47	29.2	3	300	22.9	1.54	8	
	N58	Stage 6	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	UTP	1.90	1.47	29.1	3	300	21.5	1.56	9	
	N59	Stage 6	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	UTP	1.87	1.48	26.2	6	300	21.3	1.54	10	
	N60	Stage 5	-	CLAY	2.70	1785	1785	130	138	159	150	144	1.89	1.44	31.1	2	300	39.3	1.35	-3	
	N61	Stage 5	-	CLAY	2.70	1785	1785	58	159	202	63	121	1.75	1.29	35.4	6	300	27.3	1.38	11	
29/11/2019	N62	Stage 4	-	CLAY	2.62	1785	1785	UTP	UTP	144	150	147+	1.76	1.32	33.8	5	300	31.2	1.34	7	
	N63	Stage 4	-	CLAY	2.62	1785	1785	UTP	UTP	182	202+	192+	1.76	1.31	33.8	5	300	30.2	1.35	8	
	N64	Stage 5	-	CLAY	2.70	1785	1785	43	61	86	52	61	1.84	1.39	32.8	3	300	26.7	1.45	7	Retest of N61.
	N65	Stage 1A	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	202	202+	1.92	1.56	22.8	7	300	23.0	1.56	6	
2/12/2019	N66	Stage 5	-	CLAY	2.70	1785	1785	173	159	164	UTP	165+	1.83	1.39	31.3	5	300	25.9	1.45	9	Retest of N64.
	N67	Stage 5	-	CLAY	2.70	1785	1785	173	173	164	159	167	1.89	1.44	31.2	1	300	28.7	1.47	3	
	N68	Stage 4	-	CLAY	2.62	1785	1785	202	UTP	202	202	202+	1.78	1.31	35.4	3	300	35.4	1.31	3	
	N69	Stage 4	-	CLAY	2.62	1785	1785	190	187	190	193	190	1.77	1.33	32.5	6	300	29.9	1.36	8	
	N70	Stage 1A	-	CLAY	2.72	1785	1785	202	173	UTP	202	192+	2.00	1.68	18.8	6	300	19.9	1.67	6	

** 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: 9/12/2019
Checked By: JLM Date: 11/12/2019
Authorised Signatory: AWDC Date: 16/12/2019

LF11 Rev.12 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:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAD Rev.0
Report Date:	11/12/2019
Client:	Lakeside Developments (2017) Limited
Client Address:	

Test Methods: NZS 4402 1986 Test 2.1; NZS 4407 2015 Test 3.1; NZS 4407 2015 Test 4.2; NZS 4407 2015 Test 4.3; NZGS:August 2001

Notes: Solid Density: Assumed; Solid Density Data Source: N/A; Testing Locations Selected By: CMW Field Staff; ① Blade size of 19mm used.

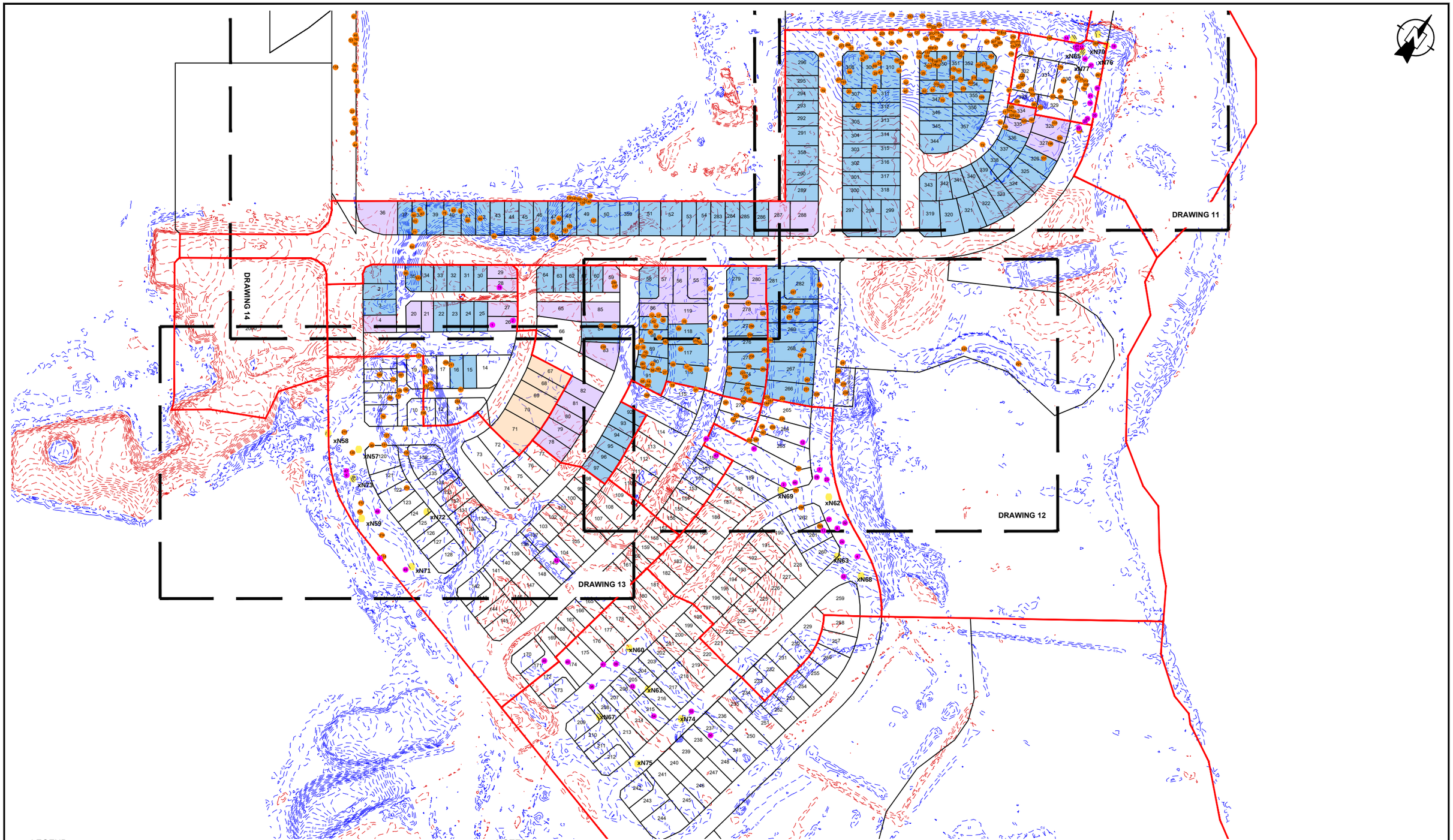
IANZ ACCREDITED LABORATORY — Tests indicated as not accredited are outside the scope of the laboratory's accreditation

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

Date Sampled	Sample No.	Test Location*		Soil Description*	Solid Density (t/m³) *	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/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m³)	Oven Calculated Air Voids (%) *	
5/12/2019	N71	Stage 6	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	UTP	1.92	1.52	26.0	4	300	23.7	1.55	6	
	N72	Stage 6	-	CLAY	2.70	1785	1785	184	UTP	UTP	UTP	184+	1.81	1.32	37.4	2	300	32.6	1.37	5	
	N73	Stage 6	-	CLAY	2.70	1785	1785	144	UTP	144	UTP	144+	1.93	1.56	23.6	6	300	20.5	1.60	8	
	N74	Stage 5	-	CLAY	2.70	1785	1785	202	202	202	UTP	202+	1.79	1.27	40.9	1	300	37.0	1.30	3	
	N75	Stage 5	-	CLAY	2.70	1785	1785	147	202	UTP	138	162+	1.77	1.26	39.8	3	300	29.1	1.37	10	
	N76	Stage 1A	-	CLAY	2.72	1785	1785	UTP	UTP	UTP	UTP	UTP	2.05	1.84	11.6	11	300	12.5	1.82	10	
	N77	Stage 1A	-	CLAY	2.72	1785	1785	UTP	UTP	UTP	UTP	UTP	2.10	1.86	12.6	8	300	12.8	1.86	8	
9/12/2019	N78	Lot 28/29	-	CLAY	2.62	1785	1785	130	138	144	202	154	1.62	1.03	56.9	2	300	40.7	1.15	10	
11/12/2019	N79	Lot 59	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	UTP	1.85	1.36	35.7	1	300	25.3	1.48	8	Retest of N294 from HAM2018-0106

** 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: 11/12/2019
Checked By: JLM Date: 16/12/2019
Authorised Signatory: AWDC Date: 16/12/2019



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.

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: KJR	DRAWING: 10
		REVISION: A	SCALE: 1:3000
TITLE: FILL TEST LOCATION SITE PLAN A		DATE: 09.12.19	SHEET: A3 L

LF11 Rev.12 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:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAE Rev.0
Report Date:	6/03/2020
Client:	Lakeside Developments (2017) Limited
Client Address:	

Test Methods: NZS 4402 1986 Test 2.1; NZS 4407 2015 Test 3.1; NZS 4407 2015 Test 4.2; NZS 4407 2015 Test 4.3; NZGS:August 2001

Notes: ① Blade size of 19mm used.

Solid Density: Assumed
Solid Density Data Source: N/A
Testing Locations Selected By: CMW Field Staff

IANZ ACCREDITED LABORATORY — 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*	Solid Density (t/m³) *	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments
		Location	RL/Details			Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m³)	Oven Calculated Air Voids (%) *	
10/12/2019	N80	Stage 5	12.1	CLAY	2.62	1785	1785	UTP	202	190	159	184+	1.79	1.26	41.7	-1	300	38.8	1.29	1	
	N81	Stage 5	7.5	CLAY	2.62	1785	1785	UTP	UTP	UTP	UTP	202+	1.84	1.42	28.9	4	300	24.9	1.47	7	
	N82	Stage 4	9	CLAY	2.62	1785	1785	UTP	UTP	202	UTP	202+	1.81	1.36	33.0	3	300	30.3	1.39	5	
11/12/2019	N83	Stage 6	12.6	CLAY	2.70	1785	1785	202	202	UTP	UTP	202+	1.95	1.57	24.3	4	300	20.8	1.62	7	
	N84	Stage 6	13.8	CLAY	2.70	1785	1785	159	118	124	150	138	1.91	1.53	24.5	6	300	25.2	1.52	5	
	N85	Stage 6	15.3	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	202+	1.93	1.53	26.2	3	300	25.3	1.54	4	
	N86	Stage 6	13.6	CLAY	2.70	1785	1785	46	58	84	84	68	1.75	1.23	41.9	3	300	45.3	1.20	1	
	N87	Stage 6	-	CLAY	2.70	1785	1785	202	UTP	UTP	UTP	202	1.86	1.32	40.5	-3	300	39.1	1.34	-2	
	N88	Stage 5	-	CLAY	2.70	1785	1785	190	202	202	202	199	1.80	1.30	38.4	2	300				No sample taken
12/12/2019	N89	Stage 4	14.1	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	202+	1.76	1.40	25.9	12	300	21.0	1.45	16	See N90
13/12/2019	N90	Stage 4	-	CLAY	2.70	1785	1785	UTP	202	202	UTP	202+	1.79	1.36	31.9	7	300	31.8	1.36	7	Retest of N89
	N91	Stage 4	13.4	CLAY	2.70	1785	1785	199	202	202	202	201	1.85	1.42	30.0	5	300	31.5	1.40	4	
	N92	Stage 4	13.3	CLAY	2.70	1785	1785	190	202	187	182	190	1.87	1.41	32.3	2	300	31.4	1.42	3	
	N93	Stage 5	10.8	CLAY	2.70	1785	1785	159	202	190	202	188	1.86	1.38	35.1	1	300	32.9	1.40	2	
	N94	Stage 5	9.3	CLAY	2.70	1785	1785	202	202	202	UTP	202+	1.89	1.45	30.1	2	300	28.8	1.47	3	
	N95	Stage 5	8.2	CLAY	2.70	1785	1785	202	202	202	202	202	1.82	1.34	36.5	2	300	44.0	1.27	-3	
30/12/2019	N96	Stage 4	8.7	CLAY	2.62	1911	1911	UTP	UTP	UTP	UTP	215+	1.82	1.41	29.3	5	300	23.2	1.48	9	
	N97	Stage 4	8.8	CLAY	2.62	1911	1911	UTP	UTP	UTP	UTP	215+	1.86	1.44	29.0	3	300	20.8	1.54	9	
3/01/2020	N98	Stage 4	-	CLAY	2.62	1911	1911	215+	UTP	UTP	UTP	215+	1.83	1.38	32.2	3	250	28.4	1.42	5	
	N99	Stage 4	-	CLAY	2.70	1911	1911	154	77	74	62	92									
	N100	Stage 4	-	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.69	1.29	30.7	13	200	22.1	1.38	18	See N126
	N101	Stage 5	-	CLAY	2.70	1911	1911	215+	UTP	123	UTP	169+	1.77	1.27	39.5	3	250	32.8	1.33	7	See N107
	N102	Stage 5	8	CLAY	2.62	1911	1911	215+	UTP	UTP	UTP	215+	1.72	1.32	30.3	10	250	26.6	1.35	12	See N108
	N103	Stage 5	-	CLAY	2.62	1911	1911	113	154	179	139	146	1.77	1.33	33.0	5	200	28.6	1.38	8	See N109
	N104	Stage 6	15.3	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.65	1.31	25.5	18	200	16.9	1.41	24	See N110
	N105	Stage 6	11.1	CLAY	2.70	1911	1911	200	UTP	UTP	UTP	200+	1.77	1.42	25.2	12	250	22.0	1.45	14	See N111
	N106	Stage 6	11.4	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.83	1.45	26.3	8	250	26.7	1.45	8	See N112

** 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: WPJ Date: 10/01/2020
Checked By: JLM Date: 9/03/2020
Authorised Signatory: AC Date: 2/04/2020

LF11 Rev.12 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:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAF Rev.0
Report Date:	6/03/2020
Client:	Lakeside Developments (2017) Limited
Client Address:	

Test Methods: NZS 4402 1986 Test 2.1; NZS 4407 2015 Test 3.1; NZS 4407 2015 Test 4.2; NZS 4407 2015 Test 4.3; NZGS:August 2001

Notes: Solid Density: Assumed; Solid Density Data Source: N/A; Testing Locations Selected By: CMW Field Staff; ① Blade size of 19mm used.

IANZ ACCREDITED LABORATORY — 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*	Solid Density (t/m³) *	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments
		Location	RL/Details			Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m³)	Oven Calculated Air Voids (%) *	
6/01/2020	N107	Stage 4	7.5	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	204+	1.66	1.35	22.4	20	300	21.3	1.36	20	Retest of N101, See 116
	N108	Stage 4	7.4	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	204+	1.80	1.49	20.7	14	300	21.0	1.49	14	Retest of N102, See 125
	N109	Stage 5	7.2	CLAY	2.70	2349	2349	UTP	204+	134	160	166+	1.81	1.34	35.5	3	300	28.2	1.41	8	Retest of N103
	N110	Stage 6	11.7	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	204+	1.88	1.52	23.2	8	300	21.1	1.55	10	Retest of N104, See N113
	N111	Stage 6	11.6	CLAY	2.70	2349	2349	UTP	UTP	UTP	204	204+	1.84	1.47	25.5	8	300	27.1	1.45	7	Retest of N105, See N115
	N112	Stage 6	15.0	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	204+	1.81	1.41	28.6	8	300	25.4	1.44	10	Retest of N106, See N120
7/01/2020	N113	Stage 6	12.0	Clayey SILT	2.62	2532	2532	UTP	UTP	UTP	UTP	205+	1.74	1.33	30.7	8	300	30.7	1.33	9	Retest of N110, See N114
	N114	Stage 6	12.0	Clayey SILT	2.62	2532	2532	UTP	UTP	UTP	UTP	205+	1.78	1.35	31.4	6	300	31.8	1.35	6	Retest of N113
	N115	Stage 6	14.0	Clayey SILT	2.62	2532	2532	UTP	UTP	UTP	UTP	205+	1.73	1.28	35.6	6	300	32.1	1.31	8	Retest of N111, See N127
8/01/2020	N116	Stage 4	7.3	Clayey SILT	2.62	2532	2532	UTP	UTP	205+	UTP	205+	1.64	1.31	25.3	17	300	23.3	1.33	18	Retest of N107, See N124
	N117	Stage 5	7.6	Clayey SILT	2.62	2532	2532	161	205+	UTP	164	177+	1.73	1.20	44.2	1	300	46.3	1.18	0	
	N118	Stage 5	7.4	Clayey SILT	2.62	2532	2532	UTP	UTP	UTP	UTP	205+	1.76	1.29	36.7	4	300	30.5	1.35	7	
	N119	Stage 6	14.1	Clayey SILT	2.62	2532	2532	UTP	UTP	UTP	UTP	205+	1.82	1.42	28.3	6	300	26.4	1.44	7	
	N120	Stage 6	15.2	Clayey SILT	2.62	2532	2532	UTP	UTP	UTP	UTP	205+	1.71	1.28	33.6	8	300	33.7	1.28	8	Retest of N112, See N127
	N121	Stage 6	17.0	Clayey SILT	2.62	2532	2532	UTP	UTP	UTP	UTP	205+	1.80	1.47	22.6	11	300	16.3	1.55	16	See N128
	N122	Stage 6	15.6	Clayey SILT	2.62	2532	2532	UTP	UTP	UTP	UTP	205+	1.81	1.44	26.4	7	300	24.9	1.45	8	
	N123	Stage 6	14.7	Clayey SILT	2.62	2532	2532	UTP	UTP	UTP	UTP	205+	1.71	1.27	35.1	7	300	32.6	1.29	9	
9/01/2020	N124	Stage 4	-	CLAY	2.70	2349	2349	149	204	190	UTP	181+	1.83	1.37	33.3	4	300	24.9	1.46	10	Retest of N116
	N125	Stage 4	-	CLAY	2.70	2349	2349	190	204	190	204	197	1.76	1.36	29.5	10	300	27.5	1.38	11	Retest of N108, See N138
	N126	Stage 4	-	CLAY	2.70	2349	2349	204	UTP	UTP	UTP	204+	1.74	1.36	28.5	11	300	24.4	1.40	14	Retest of N100, See N137
	N127	Stage 6	-	CLAY	2.70	2349	2349	204	UTP	UTP	UTP	204+	1.84	1.42	29.7	5	300	26.1	1.46	8	Retest of N120
	N128	Stage 6	-	CLAY	2.70	2349	2349	204	204	UTP	UTP	204+	1.85	1.33	39.4	-2	300	35.6	1.37	1	Retest of N121
	N129	Stage 5	-	CLAY	2.70	2349	2349	204	204	204	204	204	1.84	1.34	37.3	0	300	34.5	1.37	2	
	N130	Stage 5	-	CLAY	2.70	2349	2349	175	149	204	160	172	1.78	1.34	33.1	6	300	28.0	1.39	9	
	N131	Stage 5	-	CLAY	2.70	2349	2349	175	76	134	32	104	1.75	1.29	35.3	7	300	34.7	1.30	7	See N135
	N132	Stage 5	-	CLAY	2.70	2349	2349	175	204	UTP	UTP	190+	1.85	1.40	31.8	4	300	32.4	1.39	3	
	N133	Stage 4	-	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	204+	1.65	1.28	28.9	15	300	21.3	1.36	21	See N142

** 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: WPJ Date: 13/01/2020
Checked By: JLM Date: 9/03/2020
Authorised Signatory: AC Date: 2/04/2020

LF11 Rev.12 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:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAG Rev.0
Report Date:	6/03/2020
Client:	Lakeside Developments (2017) Limited
Client Address:	

Test Methods: NZS 4402 1986 Test 2.1; NZS 4407 2015 Test 3.1; NZS 4407 2015 Test 4.2; NZS 4407 2015 Test 4.3; NZGS:August 2001

Notes: Solid Density: Assumed; Solid Density Data Source: N/A; Testing Locations Selected By: CMW Field Staff; ① Blade size of 19mm used.

IANZ ACCREDITED LABORATORY — 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*	Solid Density (t/m³) *	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments
		Location	RL/Details			Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m³)	Oven Calculated Air Voids (%) *	
10/01/2020	N134	Stage 5	-	CLAY	2.70	2532	2532	134	205	175	140	164	1.78	1.20	48.5	-2	300	54.0	1.16	-5	
	N135	Stage 5	-	CLAY	2.70	2532	2532	205	205	UTP	UTP	205+	1.63	1.25	31.2	15.02	300				Retest of N131, See N149 No sample taken
	N136	Stage 1A	-	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.86	1.53	21.8	10	300	24.4	1.50	8	
	N137	Stage 4	-	CLAY	2.70	2532	2532	UTP	205	205	205	205+	1.81	1.38	30.8	6	300	27.9	1.41	8	Retest of N126, See N153
	N138	Stage 4	-	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.75	1.37	28.2	11	300	25.1	1.40	13	Retest of N125, See N258
13/01/2020	N139	Stage 1A	4.8	Imported CLAY	2.72	2532	2532	UTP	UTP	UTP	UTP	205+	1.87	1.45	28.3	5	300	24.3	1.50	8	
	N140	Stage 1A	4.5	Imported CLAY	2.72	2532	2532	UTP	UTP	UTP	UTP	205+	1.80	1.49	20.5	15	300	25.2	1.44	11	See N148
	N141	Stage 6	15.1	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.94	1.50	28.9	1	300	26.6	1.53	3	
	N142	Stage 4	-	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.65	1.28	28.3	16	300	24.4	1.32	19	Retest of N133, See N154
	N143	Stage 6	16.9	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.73	1.30	33.3	8	300	34.7	1.29	8	
	N144	Stage 6	15.3	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.86	1.46	27.4	6	300	23.8	1.50	9	
	N145	Stage 6	13.9	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.82	1.39	30.8	6	300	24.5	1.46	10	
	N146	Stage 6	12.6	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.85	1.38	33.8	2	300	30.2	1.42	5	
	N147	Stage 6	12.0	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.94	1.51	28.8	1	300	23.1	1.58	5	
	N148	Stage 1A	-	Imported CLAY	2.72	2532	2532	UTP	UTP	UTP	UTP	205+	1.91	1.52	25.6	5	300	26.2	1.51	5	Retest of N140
14/01/2020	N149	Stage 5	7.8	CLAY	2.62	2532	2532	205	205	76	105	148	1.83	1.40	31.2	3	300	28.5	1.43	5	Retest of 135, See N161
	N150	Stage 5	8.0	CLAY	2.62	2532	2532	UTP	UTP	UTP	UTP	205+	1.83	1.36	34.7	1	300	30.5	1.40	4	
	N151	Stage 5	7.9	CLAY	2.62	2532	2532	UTP	UTP	UTP	UTP	205+	1.75	1.20	46.2	-1	300	36.0	1.29	4	
15/01/2020	N152	Stage 6	5.9	Clayey SILT	2.62	2349	2349	UTP	204	UTP	204	204+	1.83	1.35	35.2	1	250	36.0	1.35	0	
	N153	Stage 4	5.3	Clayey SILT	2.62	2349	2349	UTP	204	175	172	184	1.81	1.41	28.5	6	300	29.6	1.39	6	Retest of N137
	N154	Stage 5	5.9	Clayey SILT	2.62	2349	2349	UTP	UTP	UTP	UTP	204+	1.78	1.39	27.9	8	100	28.9	1.38	7	Retest of N142
16/01/2020	N155	Stage 1A	-	Imported CLAY	2.72	2532	2532	175	158	175	UTP	169+	1.91	1.53	24.8	6	300	28.9	1.48	3	
	N156	Stage 1A	-	Imported CLAY	2.72	2532	2532	175	205	205	205	198	1.90	1.52	24.6	6	300	28.9	1.47	3	

** 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: WPJ Date: 22/01/2020
Checked By: JLM Date: 9/03/2020
Authorised Signatory: AC Date: 2/04/2020

LF11 Rev.12 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:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAH Rev.0
Report Date:	6/03/2020
Client:	Lakeside Developments (2017) Limited
Client Address:	

Test Methods: NZS 4402 1986 Test 2.1; NZS 4407 2015 Test 3.1; NZS 4407 2015 Test 4.2; NZS 4407 2015 Test 4.3; NZGS:August 2001

Notes: Solid Density: Assumed; Solid Density Data Source: N/A; Testing Locations Selected By: CMW Field Staff; ① Blade size of 19mm used.

IANZ ACCREDITED LABORATORY — 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*	Solid Density (t/m³) *	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments
		Location	RL/Details			Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m³)	Oven Calculated Air Voids (%) *	
17/01/2020	N157	Stage 6	-	CLAY	2.70	1785	1785	118	173	170	173	159	1.82	1.34	35.3	3	300	29.1	1.41	7	
	N158	Stage 6	16.8	CLAY	2.70	1785	1785	182	202	104	147	159	1.86	1.41	32.1	3	300	30.3	1.43	4	
	N159	Stage 6	15.1	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	202+	1.91	1.47	29.3	2	300	26.1	1.51	5	
	N160	Stage 6	14.8	CLAY	2.70	1785	1785	202	UTP	UTP	UTP	202+	1.80	1.29	39.2	2	300	32.6	1.35	6	
	N161	Stage 5	-	CLAY	2.70	1785	1785	147	150	202	124	156	1.85	1.39	32.9	3	300	24.9	1.48	8	Retest of N149
20/01/2020	N162	Stage 6	16.7	CLAY	2.70	2532	2532	76	85	91	94	87									See N173
	N163	Stage 6	16.7	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.78	1.33	33.4	6	300	30.8	1.36	8	
	N164	Stage 6	-	CLAY	2.70	2532	2532	UTP	UTP	205+	205+	205+	1.79	1.34	33.8	5	300	33.7	1.34	5	
	N165	Stage 1A	-	Imported CLAY	2.72	2532	2532	UTP	UTP	UTP	UTP	205+	2.05	1.77	16.1	7	300	17.0	1.75	6	
	N166	Stage 1A	-	Imported CLAY	2.72	2532	2532	UTP	UTP	UTP	UTP	205+	2.05	1.76	16.3	7	300	21.3	1.69	2	
21/01/2020	N167	Stage 5	-	CLAY	2.70	1785	1785	61	133	124	110	107	1.72	1.27	35.3	8	300	40.9	1.22	5	See N179. Lot 220
	N168	Stage 5	-	CLAY	2.70	1785	1785	75	61	124	135	99	1.71	1.21	40.8	5	300	34.4	1.27	9	See N187, N188. Lot 220
22/01/2020	N169	Stage 1A	7.3	Imported CLAY	2.72	2532	2532	UTP	UTP	UTP	UTP	205+	2.01	1.75	14.4	10	300	16.8	1.72	8	See N177
	N170	Stage 1A	6.2	Imported CLAY	2.72	2532	2532	UTP	UTP	UTP	UTP	205+	2.02	1.72	17.5	7	300	19.1	1.70	5	
	N171	Stage 6	14.9	CLAY	2.70	2532	2532	205	205	140	137	172	1.79	1.34	33.4	5	300	30.3	1.37	8	
	N172	Stage 6	14.5	CLAY	2.70	2532	2532	205	140	149	175	167	1.77	1.32	33.6	6	300	32.1	1.34	7	
24/01/2020	N173	Stage 6	-	CLAY	2.70	2532	2532	134	149	175	172	158	1.79	1.34	33.5	5	300	30.3	1.37	7	Retest of N162
	N174	Stage 6	16.7	CLAY	2.70	2532	2532	193	205	205	205	202	1.80	1.36	32.3	5	300	30.8	1.38	6	
	N175	Stage 6	14.5	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.82	1.39	30.4	6	300	25.7	1.45	9	
	N176	Stage 6	16.8	CLAY	2.70	2532	2532	205	190	UTP	UTP	198+	1.84	1.41	30.4	5	300	28.6	1.43	6	
	N177	Stage 1A	-	Imported CLAY	2.72	2532	2532	205	205	UTP	UTP	205+	2.02	1.72	17.7	6	300	17.7	1.72	6	Retest of N169
	N178	Stage 1A	7.5	Imported CLAY	2.72	2532	2532	205	205	205	202	204	1.95	1.61	21.2	7	300	23.1	1.58	5	
	N179	Stage 5	-	CLAY	2.70	2532	2532	61	205	105	105	119	1.75	1.30	34.3	7	300	33.0	1.31	8	Retest of N167, See N188
28/01/2020	N180	Stage 1A	7.4	Imported CLAY	2.72	2560	2560	UTP	UTP	UTP	UTP	191+	2.04	1.73	18.0	5	300	16.6	1.75	7	
	N181	Stage 1A	7.3	Imported CLAY	2.72	2560	2560	UTP	UTP	UTP	UTP	191+	1.97	1.67	18.0	9	300	16.6	1.69	10	

** 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: WPJ Date: 20/01/2020
Checked By: JLM Date: 12/03/2020
Authorised Signatory: AC Date: 2/04/2020

LF11 Rev.12 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:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAI Rev.0
Report Date:	6/03/2020
Client:	Lakeside Developments (2017) Limited
Client Address:	

Test Methods: NZS 4402 1986 Test 2.1; NZS 4407 2015 Test 3.1; NZS 4407 2015 Test 4.2; NZS 4407 2015 Test 4.3; NZGS:August 2001

Notes: ① Blade size of 19mm used.

Solid Density: Assumed
Solid Density Data Source: N/A
Testing Locations Selected By: CMW Field Staff

IANZ ACCREDITED LABORATORY — 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*	Solid Density (t/m³) *	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments
		Location	RL/Details			Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m³)	Oven Calculated Air Voids (%) *	
29/01/2020	N182	Stage 6	17.9	CLAY	2.70	1911	1911	215	UTP	215	215	215+	1.79	1.34	33.6	5	300	31.0	1.37	7	
	N183	Stage 6	16.2	CLAY	2.70	1911	1911	215	215	215	215	215	1.77	1.31	35.0	5	300	30.8	1.36	8	
	N184	Stage 6	15.8	CLAY	2.70	1911	1911	169	172	157	185	171	1.79	1.33	34.2	5	300	28.7	1.39	9	See N201 for retest
	N185	Stage 6	13.9	CLAY	2.70	1911	1911	UTP	UTP	157	151	154+	1.80	1.41	28.0	8	300	34.8	1.34	4	
	N186	Stage 5	13.8	CLAY	2.70	1911	1911	215	215	215	215	215	1.77	1.30	36.8	4	300	30.3	1.36	8	See N194 for retest
	N187	Stage 5	-	CLAY	2.70	1911	1911	126	132	157	215	158	1.76	1.24	41.8	2	200	35.4	1.30	6	Retest of N168. Lot 220
	N188	Stage 5	-	CLAY	2.70	1911	1911	46	43	86	55	58									Retest of N179. Lot 220. No sample taken
31/01/2020	N189	Stage 4	6.2	CLAY	2.70	2349	2349	216	UTP	UTP	UTP	216+	1.82	1.38	32.0	5	300	30.9	1.39	5	
	N190	Stage 4	7.3	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.79	1.33	34.1	5	300	29.7	1.38	8	
	N191	Stage 4	7.0	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.82	1.36	33.6	4	300	29.9	1.40	6	
	N192	Stage 1A	7.3	Imported CLAY	2.72	2349	2349	185	185	216	188	194	1.92	1.56	23.2	6	300	28.4	1.50	2	
	N193	Stage 1A	7.2	Imported CLAY	2.72	2349	2349	157	161	216	151	171	1.92	1.54	24.7	5	300	25.7	1.53	5	
	N194	Stage 6	14.8	CLAY	2.70	2349	2349	198	188	191	216	198	1.76	1.31	34.8	6	300	33.1	1.33	7	Retest of N186
	N195	Stage 6	17.6	CLAY	2.62	2349	2349	130	185	216	148	170	1.80	1.38	30.1	6	300	27.8	1.41	7	
	N196	Stage 6	18.1	CLAY	2.62	2349	2349	133	216	UTP	157	169+	1.75	1.28	36.4	4	300	44.6	1.21	0	
	N197	Stage 6	-	CLAY	2.70	2349	2349	117	71	133	80	100									See N199
3/02/2020	N198	Stage 5	15.6	CLAY	2.70	2349	2349	170	UTP	UTP	UTP	170+	1.77	1.35	30.8	8	300	23.2	1.44	13	See N209
	N199	Stage 6	16.4	CLAY	2.70	2349	2349	80	74	96	127	94									See N256
	N200	Stage 6	18.4	CLAY	2.70	2349	2349	170	185	157	167	170	1.61	1.23	30.3	17	300	22.2	1.31	22	See N215
	N201	Stage 6	18.1	CLAY	2.70	2349	2349	56	127	68	71	81									Retest of N184, See N208
4/02/2020	N202	Stage 1A	7.5	Imported CLAY	2.72	2349	2349	216+	216+	201	157	198+	1.92	1.55	23.3	7	300	26.1	1.52	4	See N229
	N203	Stage 1A	7.9	Imported CLAY	2.72	2349	2349	216	213	216	216	215	1.93	1.56	24.2	5	300	27.9	1.51	2	
	N204	Stage 4	5.8	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.63	1.14	42.6	9	300	39.0	1.17	11	See N210
	N205	Stage 4	5.3	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.69	1.29	31.2	12	300	32.1	1.28	11	See N211
	N206	Stage 4	5.2	CLAY	2.70	2349	2349	49	185	UTP	UTP	117+	1.83	1.46	25.2	9	300	22.8	1.49	11	See N212
	N207	Stage 4	6.5	CLAY	2.70	2349	2349	216	139	UTP	216	190+	1.80	1.31	37.1	3	300	27.1	1.42	9	See N227
	N208	Stage 6	-	CLAY	2.70	2349	2349	216	201	216	216	212	1.87	1.44	29.3	4	300	26.0	1.48	7	Retest of N201
	N209	Stage 5	-	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.85	1.46	26.3	7	300	25.6	1.47	8	Retest of N198

** 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: WPJ Date: 5/02/2020
Checked By: JLM Date: 9/03/2020
Authorised Signatory: AC Date: 2/04/2020

LF11 Rev.12 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:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAJ Rev.0
Report Date:	6/03/2020
Client:	Lakeside Developments (2017) Limited
Client Address:	

Test Methods: NZS 4402 1986 Test 2.1; NZS 4407 2015 Test 3.1; NZS 4407 2015 Test 4.2; NZS 4407 2015 Test 4.3; NZGS:August 2001

Notes: Solid Density: Assumed; Solid Density Data Source: N/A; Testing Locations Selected By: CMW Field Staff; ① Blade size of 19mm used.

IANZ ACCREDITED LABORATORY — 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*	Solid Density (t/m³) *	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments
		Location	RL/Details			Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m³)	Oven Calculated Air Voids (%) *	
10/02/2020	N210	Stage 4	5.7	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.80	1.36	33.0	5	300	26.9	1.42	9	Retest of N204, See N219 & N224
	N211	Stage 4	5.3	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.70	1.32	28.9	13	300	29.6	1.31	13	Retest of N205, See N223
	N212	Stage 4	5.7	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.88	1.42	32.4	2	300	30.2	1.44	3	Retest of N206
	N213	Stage 4	-	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.64	1.12	45.7	7	300	36.7	1.20	12	See N220
	N214	Stage 4	-	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.92	1.55	24.1	5	300	21.9	1.57	7	
	N215	Stage 6	18.3	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.72	1.37	25.4	15	300	21.1	1.42	18	Retest of N200, See N257
	N216	Stage 6	17.9	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.86	1.39	33.7	2	300	26.0	1.47	7	
	N217	Stage 1A	8.0	Imported CLAY	2.72	2349	2349	216	UTP	UTP	UTP	216+	1.96	1.55	26.1	2	300	23.4	1.59	5	
	N218	Stage 1A	7.9	Imported CLAY	2.72	2349	2349	93	80	216	90	120	1.87	1.48	26.5	6	300	29.4	1.45	4	
11/02/2020	N219	Stage 4	5.4	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.74	1.34	29.8	10	300	25.0	1.39	13	Retest of N211, See N226
	N220	Stage 4	7.1	CLAY	2.70	2349	2349	216	UTP	216	UTP	216+	1.72	1.19	44.5	3	300	37.7	1.25	7	Retest of N213
	N221	Stage 4	6.9	CLAY	2.70	2349	2349	124	142	114	154	134	1.77	1.29	37.9	4	300	35.0	1.31	5	
	N222	Stage 4	5.9	CLAY	2.70	2349	2349	UTP	UTP	UTP	UTP	216+	1.76	1.29	36.6	5	300	31.2	1.34	9	
13/02/2020	N223	Stage 4	-	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.69	1.12	50.6	2	300	40.5	1.20	7	Retest of N211
	N224	Stage 4	5.9	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.85	1.45	27.8	6	300	24.1	1.49	9	Retest of N210
	N225	Stage 4	7.8	CLAY	2.70	1911	1911	215	215	215	215	215	1.77	1.26	41.0	2	300	39.5	1.27	3	
	N226	Stage 4	7.6	CLAY	2.70	1911	1911	200	215	215	215	211	1.75	1.18	48.1	0	300	35.5	1.29	7	Retest of N219
	N227	Stage 4	5.7	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.94	1.57	24.1	4	300	23.0	1.58	5	Retest of N207
	N228	Stage 4	6.3	CLAY	2.70	1911	1911	215	215	UTP	UTP	215+	1.77	1.23	43.9	0	300	37.5	1.29	4	
	N229	Stage 1A	-	Imported CLAY	2.72	1911	1911	200	197	215	157	192	1.88	1.50	25.2	7	300	22.2	1.54	9	Retest of N202
14/02/2020	N230	Stage 4	8.0	CLAY	2.70	1911	1911	215	215	215	UTP	215+	1.77	1.28	38.4	3	300	32.1	1.34	7	
	N231	Stage 1A	8.3	Imported CLAY	2.72	1911	1911	UTP	UTP	UTP	UTP	215+	1.89	1.53	23.9	7	300	22.1	1.55	9	
	N232	Stage 1A	7.8	Imported CLAY	2.72	1911	1911	215	215	215	UTP	215+	1.92	1.58	21.8	8	300	23.0	1.56	7	
17/02/2020	N233	Stage 4	8.0	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.68	1.18	42.0	6	300	32.5	1.27	12	See N237
	N234	Stage 4	8.2	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.83	1.34	36.9	1	300	33.5	1.37	3	
	N235	Stage 3	18.5	CLAY	2.70	1911	1911	215	UTP	215	UTP	215+	1.67	1.16	43.4	7	300	41.6	1.18	8	
	N236	Stage 3	17.7	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.79	1.32	36.1	4	300	29.7	1.38	8	

** 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: WPJ Date: 20/01/2020
Checked By: JLM Date: 12/03/2020
Authorised Signatory: AC Date: 2/04/2020

LF11 Rev.12 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:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAK Rev.0
Report Date:	12/03/2020
Client:	Lakeside Developments (2017) Limited
Client Address:	

Test Methods: NZS 4402 1986 Test 2.1; NZS 4407 2015 Test 3.1; NZS 4407 2015 Test 4.2; NZS 4407 2015 Test 4.3; NZGS:August 2001

Notes: Solid Density: Assumed; Solid Density Data Source: N/A; Testing Locations Selected By: CMW Field Staff; ① Blade size of 19mm used.

IANZ ACCREDITED LABORATORY — 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*	Solid Density (t/m³) *	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments
		Location	RL/Details			Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m³)	Oven Calculated Air Voids (%) *	
18/02/2020	N237	Stage 4	7.900	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.82	1.29	40.5	0	300	36.4	1.33	2	Retest of N233
	N238	Stage 3	18.100	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.75	1.24	41.1	3	300	34.3	1.30	7	
	N239	Stage 3	18.800	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.80	1.27	41.2	0	300	29.9	1.38	7	
19/02/2020	N240	Stage 6	18.700	CLAY	2.62	1911	1911	215	215	215	215	215	1.78	1.35	31.4	6	300	30.9	1.36	6	
	N241	Stage 6	17.600	CLAY	2.70	1911	1911	108	55	126	68	89									See N245
	N242	Stage 6	16.400	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.89	1.44	31.3	2	300	23.7	1.53	7	
	N243	Stage 6	19.100	CLAY	2.70	1911	1911	169	215	UTP	151	178+	1.74	1.28	35.9	6	300	32.0	1.32	9	
	N244	Stage 6	18.600	CLAY	2.70	1911	1911	215	212	215	188	208	1.69	1.14	47.8	3	300	44.1	1.17	5	
20/02/2020	N245	Stage 6	-	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.61	1.06	52.1	6	300	42.6	1.13	10	Retest of N241, See N249
	N246	Stage 6	19.100	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.75	1.30	34.8	7	300	31.0	1.33	9	See N250
21/02/2020	N247	Stage 6	15.900	CLAY	2.70	1911	1911	197	UTP	UTP	166	182+	1.79	1.32	35.9	4	300	31.9	1.36	6	
24/02/2020	N248	Stage 1A	8.600	Imported CLAY	2.72	1911	1911	UTP	UTP	UTP	UTP	215+	1.92	1.50	27.8	3	300	25.9	1.52	4	
25/02/2020	N249	Stage 6	-	CLAY	2.70	1911	1911	185	188	215	157	186	1.78	1.29	37.9	3	300	33.3	1.34	6	Retest of N245
	N250	Stage 6	-	CLAY	2.70	1911	1911	215	UTP	142	166	174+	1.82	1.25	45.2	-3	300	37.9	1.32	1	Retest of N246
27/02/2020	N251	Stage 6	18.200	CLAY	2.70	1911	1911	215	215	215	215	215+	1.76	1.27	38.3	4	300	31.9	1.34	8	
	N252	Stage 6	16.100	CLAY	2.70	1911	1911	197	157	111	105	143	1.71	1.26	35.7	8	300	37.7	1.24	7	See N255
	N253	Stage 6	15.700	CLAY	2.70	1911	1911	215	215	215	215	215+	1.85	1.39	32.8	3	300	31.7	1.40	4	
28/02/2020	N254	Stage 6	19.967	CLAY	2.70	1911	1911	203	215	UTP	UTP	209+	1.78	1.26	40.6	2	300	35.8	1.31	5	
	N255	Stage 6	16.100	CLAY	2.70	1911	1911	215	182	185	203	196	1.71	1.23	39.2	7	300	30.3	1.31	12	Retest of N252, See N260
	N256	Stage 6	16.400	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.86	1.41	32.3	2	300	25.2	1.49	8	Retest of N199
	N257	Stage 4	18.300	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.80	1.35	33.5	5	300	24.2	1.45	11	Retest of N215
	N258	Stage 4	7.400	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.79	1.37	30.7	7	300	28.8	1.39	8	Retest of N138
2/03/2020	N259	Stage 6	-	CLAY	2.70	1911	1911	157	65	58	95	94	1.46	1.08	35.9	22	300	31.6	1.11	24	See N261
	N260	Stage 6	-	CLAY	2.70	1911	1911	215	157	151	182	176	1.75	1.23	42.1	2	300	33.7	1.31	7	Retest of N255
5/03/2020	N261	Stage 6	20.699	CLAY	2.70	1911	1911	UTP	215	UTP	UTP	215+	1.78	1.31	36.4	4	300	27.7	1.40	10	Retest of N259
	N262	Stage 6	16.710	CLAY	2.70	1911	1911	UTP	215	209	UTP	212+	1.80	1.40	29.2	8	300	25.4	1.44	10	
	N263	Stage 6	14.606	CLAY	2.70	1911	1911	UTP	215	215	215	215+	1.74	1.25	38.6	5	300	38.0	1.26	5	

** 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:	WPJ	Date:	27/02/2020
Checked By:	JLM	Date:	12/03/2020
Authorised Signatory:	AC	Date:	2/04/2020

LF14 Rev.12 Dynamic Cone Penetration (DCP) Test Report

NZS 4402: 1988 Test 6.5.2

Project:	Lakeside 19/20
Project No:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAL Rev.0
Test Date:	9/12/2019
Tested By:	AS
Client:	Lakeside Developments Ltd
Client Address:	

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

Testing Locations Selected By: CMW Field Staff

IANZ ACCREDITED LABORATORY — Tests indicated as not accredited are outside the scope of the laboratory's accreditation

*** Equivalent CBR Values are not accredited and are outside the scope of the laboratory's accreditation**

Test No	S1		S2		S2 Cont.		S3		S3 Cont.	
Test Location	Lot 112 Undercut		Lot 111 Undercut		Lot 111 Undercut (1.0m-2.0m)		Lot 110 Undercut		Lot 110 Undercut (1.0m-2.0m)	
Chainage & Offset	-		-		-		-		-	
Material & Layer	SAND		SAND		SAND		SAND		SAND	
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	2	4	2	4	3	6	1	2	1	2
100 - 200	3	6	2	4	3	6	2	4	2	4
200 - 300	4	8	4	8	4	8	3	6	3	6
300 - 400	5	10	5	10	4	8	4	8	1	2
400 - 500	4	8	5	10	4	8	3	6	2	4
500 - 600	4	8	5	10	3	6	2	4		
600 - 700	4	8	5	10			2	4		
700 - 800	5	10	4	8			2	4		
800 - 900			4	8			2	4		
900 - 1000			3	6			1	2		

Test No										
Test Location										
Chainage & Offset										
Material & Layer										
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100										
100 - 200										
200 - 300										
300 - 400										
400 - 500										
500 - 600										
600 - 700										
700 - 800										
800 - 900										
900 - 1000										

Created by:	AS	Date:	3/03/2020
Checked by:	JLM	Date:	9/03/2020
Authorised Signatory:	AC	Date:	2/04/2020

*Equivalent CBR values calculated using AUSTROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils, and are relevant to fine grained cohesive soils only.

LF14 Rev.12 Dynamic Cone Penetration (DCP) Test Report

NZS 4402: 1988 Test 6.5.2

Project:	Lakeside 19/20
Project No:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAM Rev.0
Test Date:	10/01/2020
Tested By:	AS
Client:	Lakeside Developments Ltd
Client Address:	

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

Testing Locations Selected By: CMW Field Staff

IANZ ACCREDITED LABORATORY — Tests indicated as not accredited are outside the scope of the laboratory's accreditation

*** Equivalent CBR Values are not accredited and are outside the scope of the laboratory's accreditation**

Test No	S4 (retest of S3)		S4 Cont.		S5 (retest of S2)					
Test Location	Lot 110 Undercut		Lot 110 Undercut(1.0m-2.0m)		Lot 111 Undercut					
Chainage & Offset	-		-		-					
Material & Layer	SAND		SAND		SAND					
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	1	2	3	6	1	2				
100 - 200	3	6	1	2	1	2				
200 - 300	4	8	2	4	3	6				
300 - 400	3	6	3	6	5	10				
400 - 500	3	6			3	6				
500 - 600	7	15			4	8				
600 - 700	5	10			5	10				
700 - 800	6	13			6	13				
800 - 900	4	8			6	13				
900 - 1000	4	8								

Test No										
Test Location										
Chainage & Offset										
Material & Layer										
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100										
100 - 200										
200 - 300										
300 - 400										
400 - 500										
500 - 600										
600 - 700										
700 - 800										
800 - 900										
900 - 1000										

Created by:	AS	Date:	3/03/2020
Checked by:	JLM	Date:	9/03/2020
Authorised Signatory:	AC	Date:	2/04/2020

*Equivalent CBR values calculated using AUSTROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils, and are relevant to fine grained cohesive soils only.

LF14 Rev.12 Dynamic Cone Penetration (DCP) Test Report

NZS 4402: 1988 Test 6.5.2

Project:	Lakeside 19/20
Project No:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAN Rev.0
Test Date:	14/01/2020
Tested By:	AS
Client:	Lakeside Developments Ltd
Client Address:	

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

Testing Locations Selected By: CMW Field Staff

IANZ ACCREDITED LABORATORY — Tests indicated as not accredited are outside the scope of the laboratory's accreditation

*** Equivalent CBR Values are not accredited and are outside the scope of the laboratory's accreditation**

Test No	S6 (retest of S5)		S6 Cont.		S7 (retest of S4)		S7 Cont.		S8 (retest of S1)	
Test Location	Lot 111 Undercut		Lot 111 Undercut (1.0m-2.0m)		Lot 110 Undercut		Lot 110 Undercut (1.0m-2.0m)		Lot 112 Undercut	
Chainage & Offset	-		-		-		-		-	
Material & Layer	SAND		SAND		SAND		SAND		SAND	
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	1	2	3	6	2	4	4	8	1	2
100 - 200	4	8	2	4	3	6	4	8	2	4
200 - 300	3	6	1	2	3	6	5	10	3	6
300 - 400	3	6	1	2	3	6	5	10	3	6
400 - 500	3	6	2	4	4	8	2	4	4	8
500 - 600	3	6			4	8			4	8
600 - 700	5	10			5	10			2	4
700 - 800	4	8			5	10			2	4
800 - 900	3	6			5	10			3	6
900 - 1000	3	6			5	10				

Test No										
Test Location										
Chainage & Offset										
Material & Layer										
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100										
100 - 200										
200 - 300										
300 - 400										
400 - 500										
500 - 600										
600 - 700										
700 - 800										
800 - 900										
900 - 1000										

Created by:	AS	Date:	4/03/2020
Checked by:	JLM	Date:	9/03/2020
Authorised Signatory:	AC	Date:	2/04/2020

*Equivalent CBR values calculated using AUSTROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils, and are relevant to fine grained cohesive soils only.

LF14 Rev.12 Dynamic Cone Penetration (DCP) Test Report

NZS 4402: 1988 Test 6.5.2

Project:	Lakeside 19/20
Project No:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAO Rev.0
Test Date:	24/01/2020
Tested By:	AS
Client:	Lakeside Developments Ltd
Client Address:	

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

Testing Locations Selected By: CMW Field Staff

IANZ ACCREDITED LABORATORY — Tests indicated as not accredited are outside the scope of the laboratory's accreditation

*** Equivalent CBR Values are not accredited and are outside the scope of the laboratory's accreditation**

Test No	S9 (retest of S8)		S10 (retest of S6)		S10 Cont.		S11 (retest of S7)			
Test Location	Lot 112 Undercut		Lot 111 Undercut		Lot 111 Undercut (Below 1m)		Lot 110 Undercut			
Chainage & Offset	-		-		-		-			
Material & Layer	SAND		SAND		SAND		SAND (incomplete backfill)			
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	4	8	4	8	5	10	3	6		
100 - 200	7	15	6	13	5	10	3	6		
200 - 300	6	13	5	10	5	10	5	10		
300 - 400	5	10	5	10	3	6	5	10		
400 - 500	6	13	7	15	4	8	5	10		
500 - 600	6	13	8	18			5	10		
600 - 700	6	13	11	20+			5	10		
700 - 800	5	10	9	20			5	10		
800 - 900	3	6	7	15			3	6		
900 - 1000			8	18						

Test No										
Test Location										
Chainage & Offset										
Material & Layer										
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100										
100 - 200										
200 - 300										
300 - 400										
400 - 500										
500 - 600										
600 - 700										
700 - 800										
800 - 900										
900 - 1000										

Created by:	AS	Date:	4/03/2020
Checked by:	JLM	Date:	9/03/2020
Authorised Signatory:	AC	Date:	2/04/2020

*Equivalent CBR values calculated using AUSTROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils, and are relevant to fine grained cohesive soils only.

LF14 Rev.12 Dynamic Cone Penetration (DCP) Test Report

NZS 4402: 1988 Test 6.5.2

Project:	Lakeside 19/20
Project No:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAP Rev.0
Test Date:	26/02/2020
Tested By:	AS
Client:	Lakeside Developments Ltd
Client Address:	

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

Testing Locations Selected By: CMW Field Staff

IANZ ACCREDITED LABORATORY — Tests indicated as not accredited are outside the scope of the laboratory's accreditation

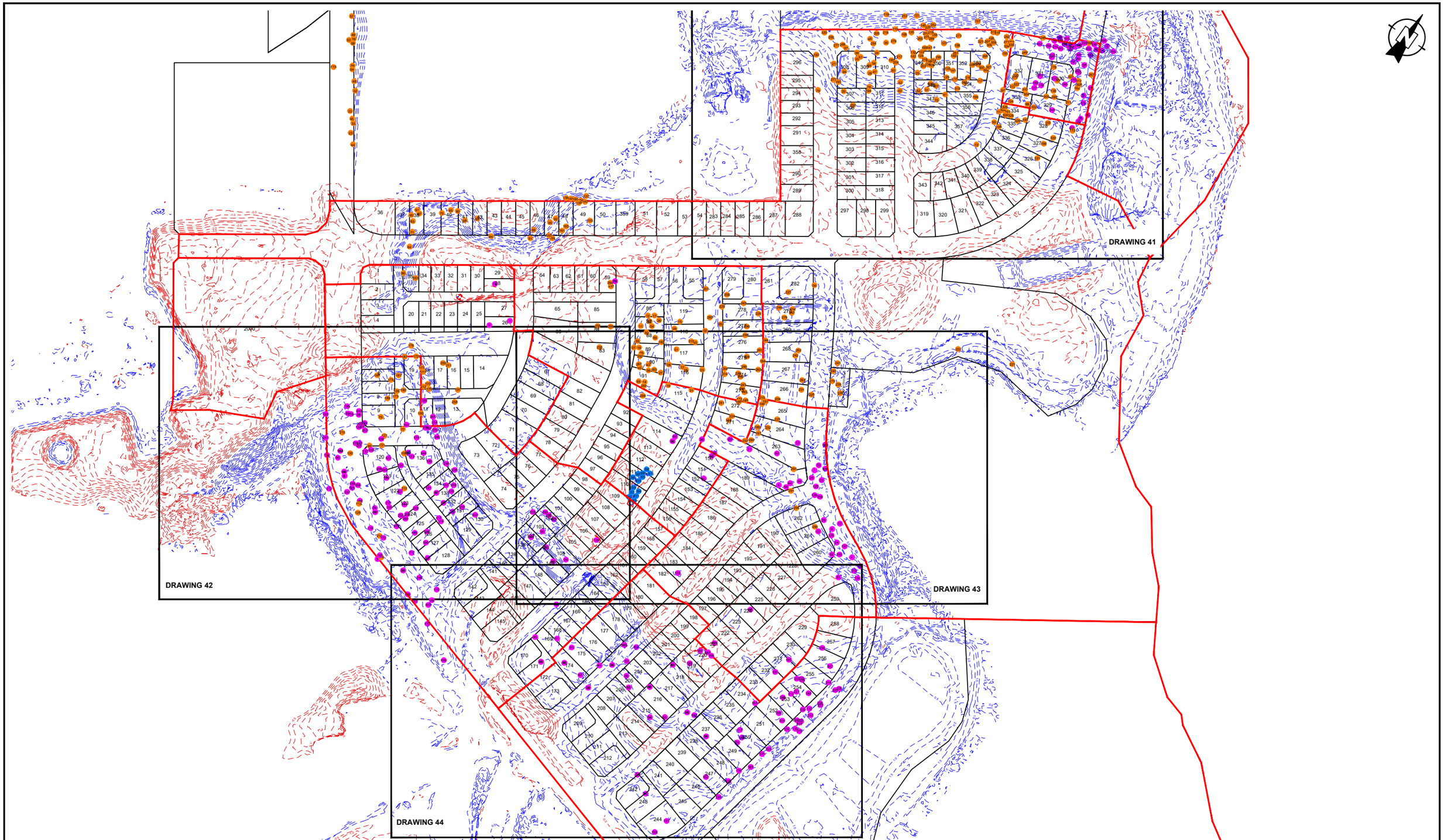
*** Equivalent CBR Values are not accredited and are outside the scope of the laboratory's accreditation**

Test No	S12 (retest of S11)		S13 (retest of S12)		S13 Cont.					
Test Location	Lot 110 Undercut (incomplete)		Lot 110 Undercut		Lot 110 Undercut (1.0m-2.0m)					
Chainage & Offset	-		-		-					
Material & Layer	SAND		SAND		SAND					
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	2	4	3	6	5	10				
100 - 200	3	6	3	6	5	10				
200 - 300	4	8	5	10	5	10				
300 - 400	4	8	5	10	5	10				
400 - 500	5	10	5	10	3	6				
500 - 600	4	8	5	10						
600 - 700	4	8	5	10						
700 - 800			5	10						
800 - 900			5	10						
900 - 1000			5	10						

Test No										
Test Location										
Chainage & Offset										
Material & Layer										
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100										
100 - 200										
200 - 300										
300 - 400										
400 - 500										
500 - 600										
600 - 700										
700 - 800										
800 - 900										
900 - 1000										

Created by:	AS	Date:	4/03/2020
Checked by:	JLM	Date:	9/03/2020
Authorised Signatory:	AC	Date:	2/04/2020

*Equivalent CBR values calculated using AUSTROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils, and are relevant to fine grained cohesive soils only.



LEGEND:

- STAGE BOUNDARY
- CUT CONTOURS
- FILL CONTOURS
- 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2018/19 SEASON)
- 1 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2019/20 SEASON)
- S1 DYNAMIC CONE PENETROMETER (DCP) TEST LOCATION (2019/20 SEASON)

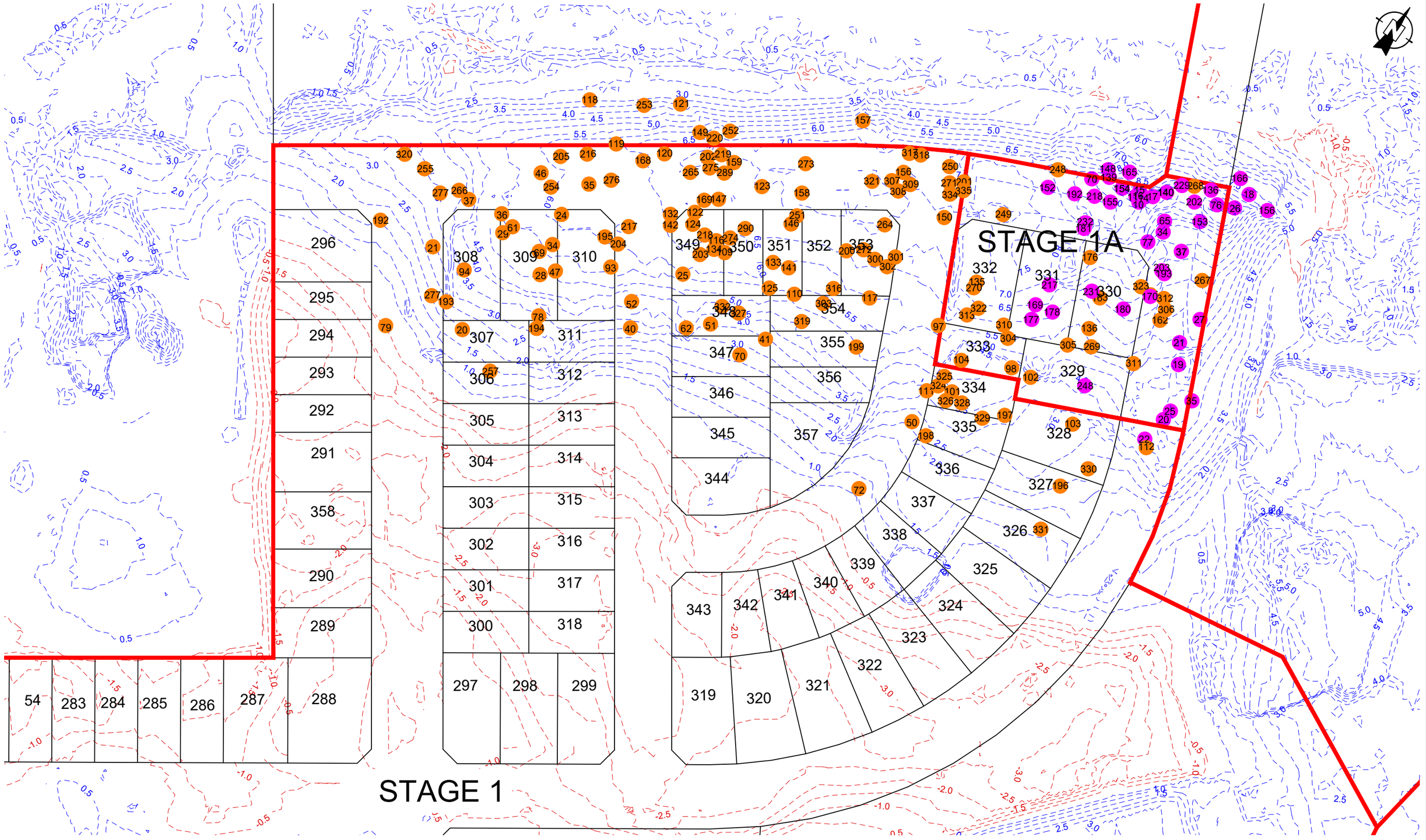
NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 17.03.2020 AND PROVIDED BY CANDOR3.
5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.

1:3000 0 30 60 90 120 150 m

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 40
		REVISION: 0	SCALE: 1:3000
TITLE: FILL TEST LOCATION SITE PLAN A		DATE: 31.03.2020	SHEET: A3 L



LEGEND:

- STAGE BOUNDARY
- CUT CONTOURS
- FILL CONTOURS
- 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2018/19 SEASON)
- 1 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2019/20 SEASON)
- S1 DYNAMIC CONE PENETROMETER (DCP) TEST LOCATION (2019/20 SEASON)

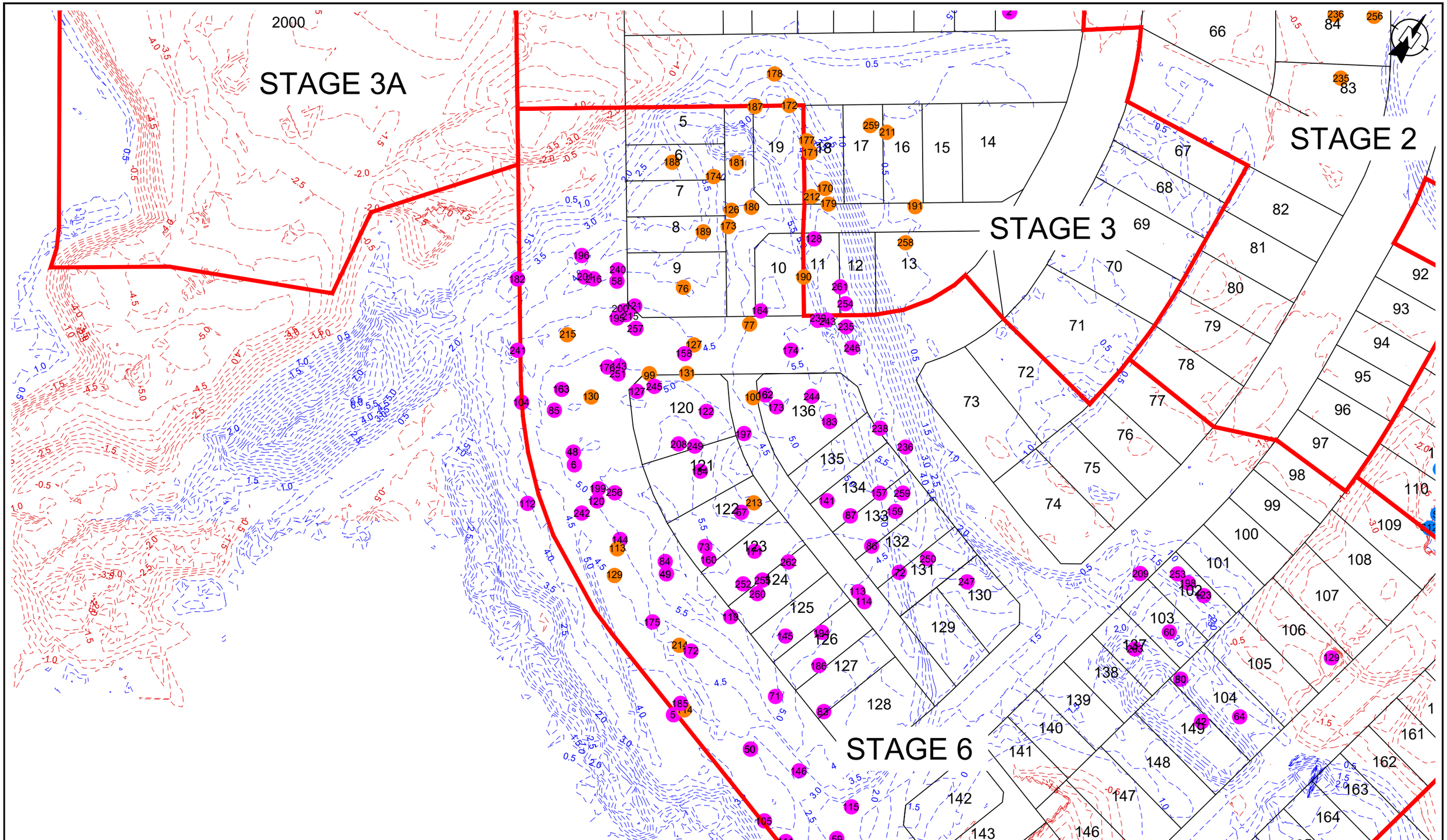
NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 17.03.2020 AND PROVIDED BY CANDOR3.
5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 41
		REVISION: 0	SCALE: 1:1000
TITLE: FILL TEST LOCATION SITE PLAN B		DATE: 31.03.2020	SHEET: A3 L



LEGEND:

- STAGE BOUNDARY
- CUT CONTOURS
- FILL CONTOURS
- 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2018/19 SEASON)
- 1 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2019/20 SEASON)
- S1 DYNAMIC CONE PENETROMETER (DCP) TEST LOCATION (2019/20 SEASON)

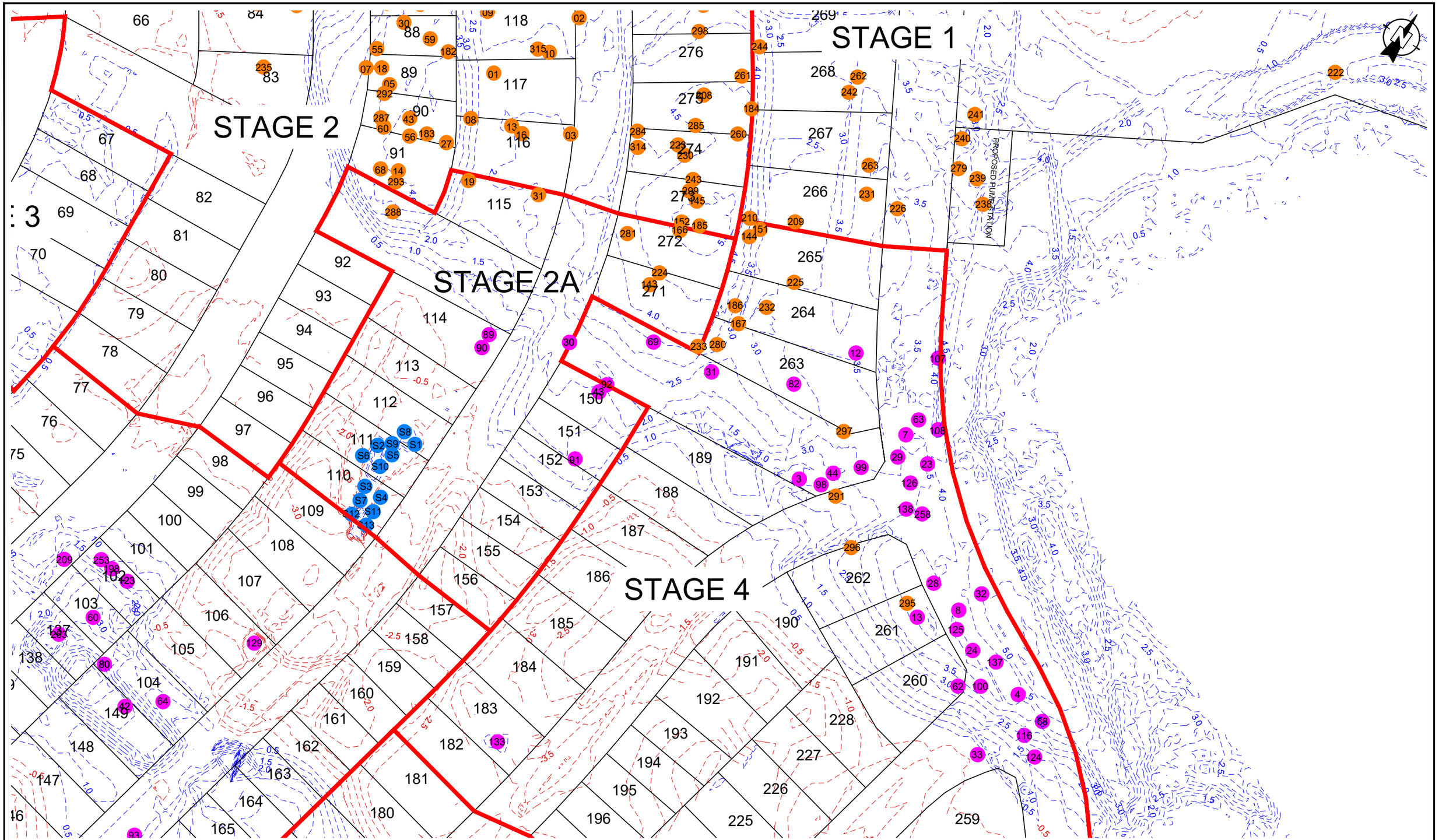
NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 17.03.2020 AND PROVIDED BY CANDOR3.
5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 42
		REVISION: 0	SCALE: 1:1000
TITLE: FILL TEST LOCATION SITE PLAN C		DATE: 31.03.2020	SHEET: A3 L



LEGEND:

- STAGE BOUNDARY
- CUT CONTOURS
- FILL CONTOURS
- 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2018/19 SEASON)
- 1 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2019/20 SEASON)
- S1 DYNAMIC CONE PENETROMETER (DCP) TEST LOCATION (2019/20 SEASON)

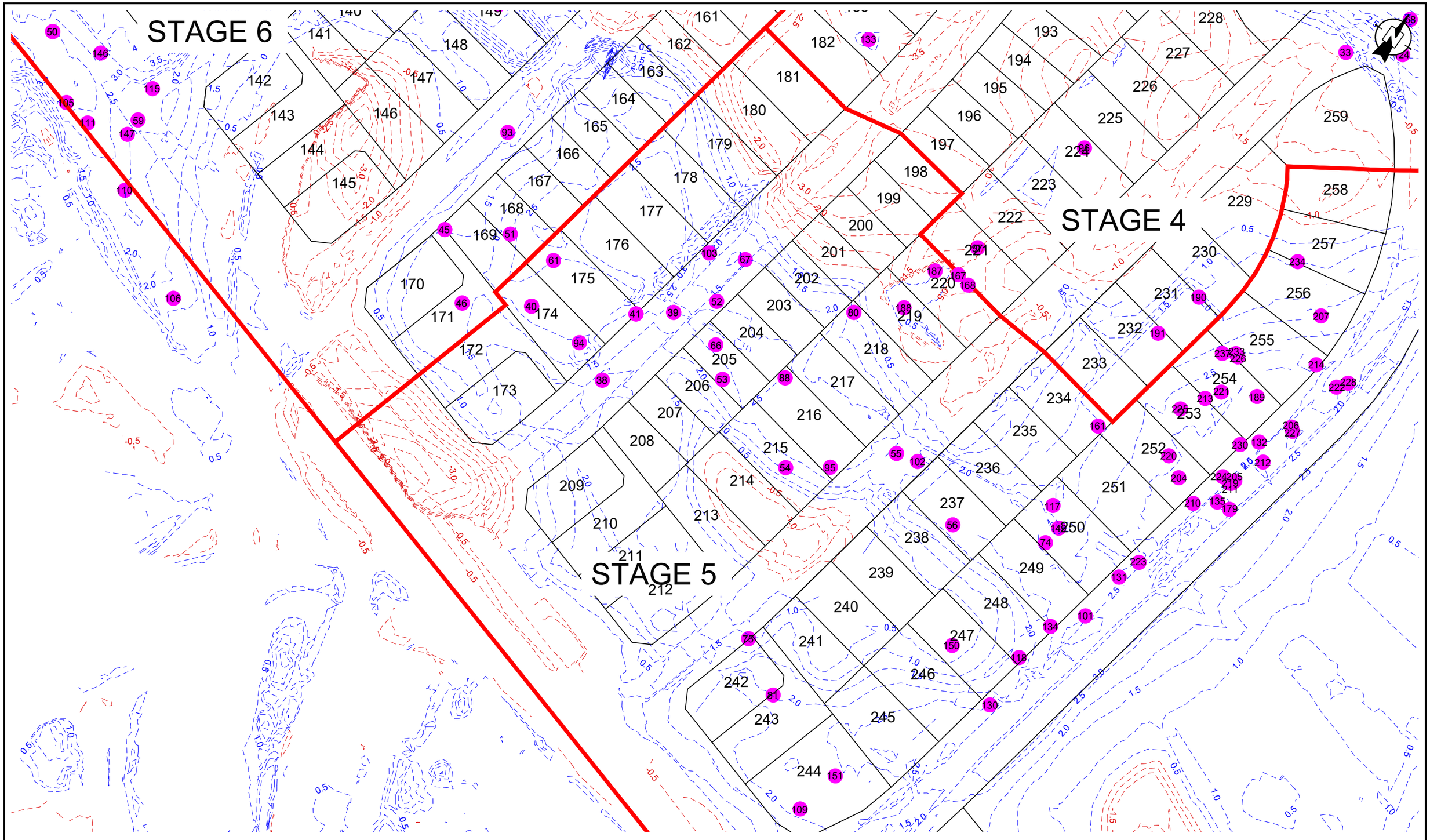
NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 17.03.2020 AND PROVIDED BY CANDOR3.
5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 43
		REVISION: 0	SCALE: 1:1000
TITLE: FILL TEST LOCATION SITE PLAN D		DATE: 31.03.2020	SHEET: A3 L



LEGEND:

- STAGE BOUNDARY
- CUT CONTOURS
- FILL CONTOURS
- 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2018/19 SEASON)
- 1 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2019/20 SEASON)
- S1 DYNAMIC CONE PENETROMETER (DCP) TEST LOCATION (2019/20 SEASON)

NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 17.03.2020 AND PROVIDED BY CANDOR3.
5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 44
		REVISION: 0	SCALE: 1:1000
TITLE: FILL TEST LOCATION SITE PLAN E		DATE: 31.03.2020	SHEET: A3 L

LF11 Rev.12 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:	HAM2019-0062
Location:	98 Scott Road, Te Kauwhata
Report No:	HAM2019-0062LAQ Rev.0
Report Date:	27/08/2020
Client:	Lakeside Developments (2017) Limited
Client Address:	

Test Methods: NZS 4402 1986 Test 2.1; NZS 4407 2015 Test 3.1; NZS 4407 2015 Test 4.2; NZS 4407 2015 Test 4.3; NZGS:August 2001

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

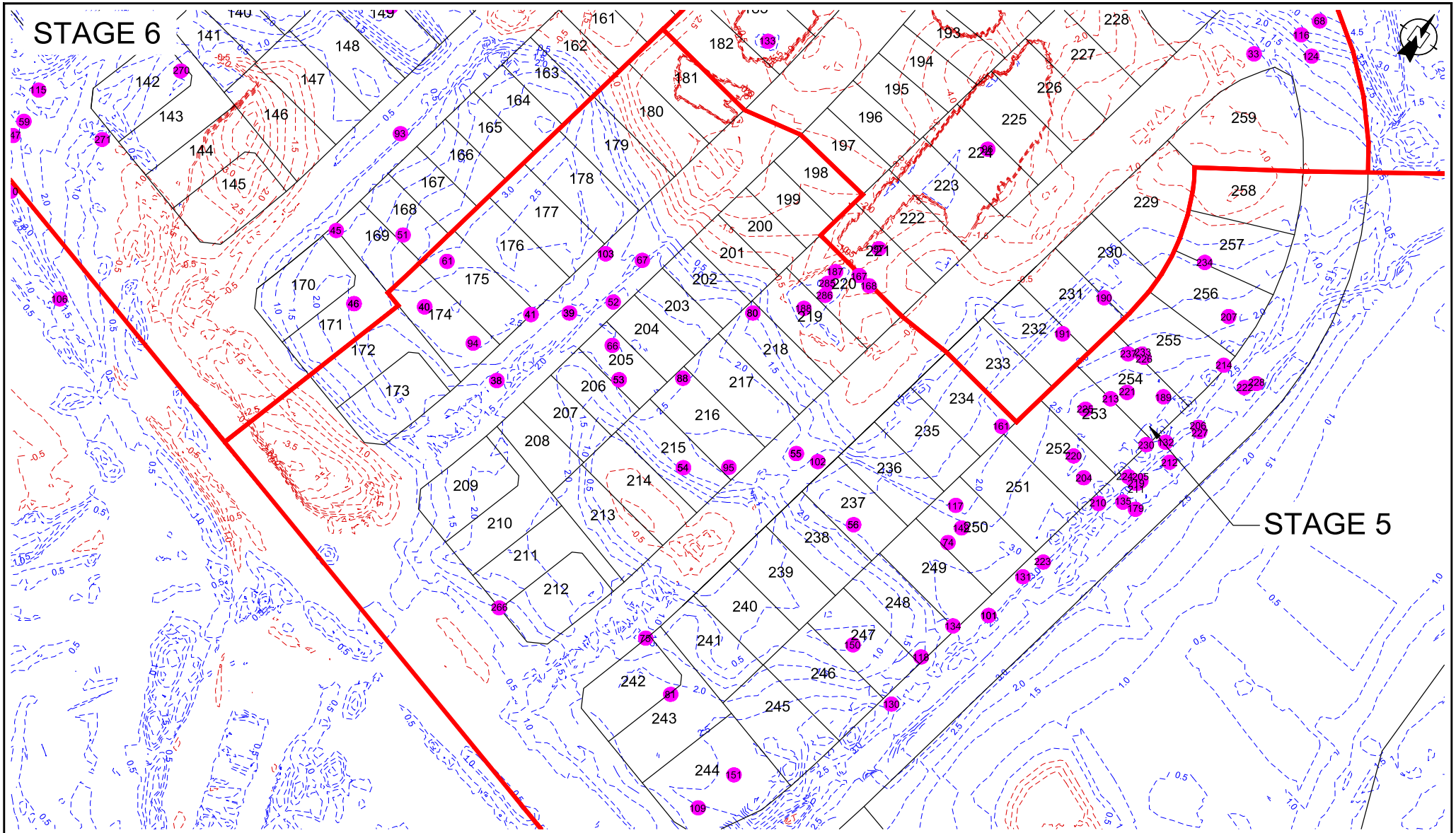
Test results indicated as not accredited are outside the scope of the laboratory's accreditation

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

Date Sampled	Sample No.	Test Location*		Soil Description*	Solid Density (t/m³) *	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments
		Location	RL/Details			Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m³)	Oven Calculated Air Voids (%) *	
6/03/2020	N266	Stage 5	-	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.64	1.12	46.1	7	300	42.6	1.15	9	
15/05/2020	N285	Stage 5	-	CLAY	2.70	1785	1785	202+	UTP	161	156	159+	1.73	1.23	40.2	5	300	29.1	1.34	12	Retest of N187
	N286	Stage 5	-	CLAY	2.70	1785	1785	UTP	202+	UTP	202+	202+	1.71	1.21	41.2	5	300	39.1	1.23	7	Retest of N188 & N285

** 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: WPJ Date: 21/04/2020
Checked By: JLM Date: 27/08/2020
Authorised Signatory: AWDC Date: 28/08/2020



LEGEND:

- STAGE BOUNDARY
- CUT CONTOURS
- FILL CONTOURS
- 11 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2018/19 SEASON)
- 1 NUCLEAR DENSITY METER (NDM) TEST LOCATION (2019/20 SEASON)
- S1 DYNAMIC CONE PENETROMETER (DCP) TEST LOCATION (2019/20 SEASON)

NOTES:

1. SUBDIVISION SCHEME PLAN & CUT/FILL CONTOURS PROVIDED BY CANDOR3.
2. STAGE BOUNDARIES AS DEPICTED ON CANDOR3 SCHEME PLAN STAGES 1 - 7 DATED 28.11.2019.
3. CUT/FILL CONTOURS ARE IN 0.5m INTERVALS.
4. CUT/FILL CONTOURS WITHIN COMPLETED LOTS DERIVED BY SURVEY DATA TO 03.06.2020 AND PROVIDED BY CANDOR3.
5. TEST LOCATIONS SURVEYED & PROVIDED BY ROSS REID CONTRACTORS LIMITED. WHERE TESTS WERE NOT SURVEYED LOCATION BASED OFF SITE PLAN.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		DRAWN: WPJ	PROJECT No: HAM2019-0062
PROJECT: LAKESIDE DEVELOPMENT, TE KAUWHATA		CHECKED: LYK	DRAWING: 57
		REVISION: 0	SCALE: 1:1000
TITLE: FILL TEST LOCATION SITE PLAN C		DATE: 26.08.2020	SHEET: A3 L

Appendix F: Post-Construction Hand Auger Borehole Logs

HAND AUGER BOREHOLE LOG - PCHA 172/173

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 14/01/2020
Borehole Location: Stage 5 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
	0.3	Peak = UTP				CL: CLAY: with minor sand; brown mottled grey orange. Low plasticity; sand, fine to course. (Fill)			
	0.6	Peak = UTP							
	0.9	Peak = UTP					M		
				1				H	
	1.2	Peak = UTP							
	1.6	Peak = >200kPa				ML: Clayey SILT: with trace sand; greyish brown. Low plasticity; sand; sand, fine to course. (Fill)			
						ML: Clayey SILT: white mottled brown and orange. Low plasticity. (Fill)	W		
	2.0	Peak = 134kPa Residual = 29kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 174

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 07/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434339.6mE; 740444.3mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		CL: CLAY: brown mottled orange. Low plasticity. (Fill)	D		
	0.6	Peak = UTP							
	0.9	Peak = UTP		1			M to W	H	
	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
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 175/176

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 07/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434341.0mE; 740462.5mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		CL: CLAY: light brown. Low plasticity. (Fill)	D		
	0.6	Peak = UTP							
	0.9	Peak = UTP							
				1		SP: Fine SAND: light grey. Poorly graded, subrounded. (Fill)		H	
	1.2	Peak = UTP				CL: CLAY: light brown mottled orange. Low plasticity. (Fill)	D to M		
	1.6	Peak = UTP							
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 177/178

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 07/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434344.3mE; 740489.5mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		CL: CLAY: light grey. Low plasticity. (Fill)	D	H	
	0.6	Peak = 102kPa						VSt	
	0.9	Peak = 102kPa		1		CH: CLAY: with some silt; light brown. High plasticity. (Fill)	W	VSt to H	
	1.2	Peak = UTP							
	1.6	Peak = UTP				CL: CLAY: brown mottled dark brown. Low plasticity. (Fill)	D		
	1.8	Peak = UTP				black. LIGNITE. (Whangamarino Formation)			
				2		Borehole terminated at 1.8 m			
				3					
				4					
				5					

Termination Reason: Equipment refusal
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 179/180

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 07/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434357.5mE; 740518.7mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
						OL: Organic SILT: light grey. Low plasticity. (Topsoil)	D		
	0.3	Peak = >200kPa Residual = 67kPa				CH: Silty CLAY: light grey mottled light orange. High plasticity. (Whangamarino Formation)	M	H	
	0.6	Peak = 131kPa							
	0.9	Peak = 117kPa Residual = 15kPa		1		MH: SILT: with some fine sand; light grey. High plasticity. (Whangamarino Formation)	W	VSt to H	
	1.2	Peak = 140kPa Residual = 44kPa							
	1.6	Peak = UTP				black. LIGNITE. (Whangamarino Formation)	M		
						Borehole terminated at 1.6 m			
				2					
				3					
				4					
				5					

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15

Termination Reason: Equipment refusal
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 181

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 18/12/2019
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		ML: SILT: grey. Low plasticity. (Whangamarino Formation)			1, 3, 4
	0.3	Peak = UTP				SM: Silty fine SAND: dark grey. Poorly graded. (Whangamarino Formation)	M	MD	4, 5, 5, 6, 7
						SP: Fine to medium SAND with some silt: grey. Poorly graded. (Whangamarino Formation)	M to W	D	7, 8
	1.0	Peak = UTP		1		ML: SILT: dark brown. Low plasticity. (Whangamarino Formation)		H	11, 8
						LIGNITE: (Whangamarino Formation)	D		8, 9, 12, 16, 20
						Borehole terminated at 1.3 m			
				2					
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1785 DCP No: 7
Remarks: Groundwater not encountered. Shear vane #1785

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 181 A

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 30/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: AS Scale: 1:25 Sheet 1 of 1
Position: 445238.3mE; 698732.3mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		CL: Silty CLAY: with trace fine gravel and some fine sand; light brown, mottled orange. Low plasticity. (Fill)	D	H	
							M to W		
	0.6	Peak = UTP				SP: Fine to medium SAND: grey mottled orange. Poorly graded, subrounded. (Whangamarino Formation)	W	MD to D	7
									7
	0.9	Peak = UTP							5
				1		SP: Fine SAND: grey. Poorly graded, subrounded. (Whangamarino Formation)			5
									3
	1.2	Peak = UTP							7
									14
	1.4	Peak = UTP				ML: Sandy SILT: grey mottled dark brown. Low plasticity; Sand, fine. (Whangamarino Formation)	S	H	
						Black, LIGNITE. (Whangamarino Formation)			
						Borehole terminated at 1.4 m			
				2					
				3					
				4					
				5					

Termination Reason: Refusal on hard lignite.
Shear Vane No: 1911 DCP No: 06
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 182

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 18/12/2019
Borehole Location: Stage 4 Logged by: LS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = 179kPa Residual = 58kPa		0		ML: Sandy SILT: light grey. Low plasticity; sand, fine. (Whangamarino Formation)	M	VSt to H	4
						ML: SILT: dark brown. High plasticity, moderately sensitive. (Whangamarino Formation)			3
									2
									3
	0.6	Peak = >200kPa Residual = 92kPa							3
									6
									6
									9
				1		SW: Fine to medium SAND with some silt: dark brownish grey. Well graded. (Whangamarino Formation)		VD	15
									15
									12
									12
									12
									10
						LIGNITE: (Whangamarino Formation)		H	15
									16
						Borehole terminated at 1.6 m			20
				2					
				3					
				4					
				5					

Termination Reason: Refusal on hard lignite
Shear Vane No: 1911 DCP No: 7
Remarks: Groundwater not encountered. Shear vane #1911

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 183

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 18/12/2019
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = 89kPa Residual = 23kPa		0		ML: SILT: yellowish grey. Low plasticity, Moderately sensitive. (Whangamarino Formation)		St	1 1 2 2 2
				1		SM: Silty fine SAND: dark grey. Poorly graded. (Whangamarino Formation)	M	MD to D	5 5 5 7 9 10
						LIGNITE: (Whangamarino Formation)	D	H	7 9 9 12 12 20
						Borehole terminated at 1.2 m			
				2					
				3					
				4					
				5					

Termination Reason: Refusal on hard lignite
Shear Vane No: 1785 DCP No: 7
Remarks: Groundwater not encountered. Shear vane #1785

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 184

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 18/12/2019
Borehole Location: Stage 4 Logged by: LS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		ML: SILT with minor sand: light grey, mottled orange brown. Low plasticity; sand, fine. (Whangamarino Formation)	M	L to MD	6
						SM: Silty fine SAND: grey. Uniformly graded. (Whangamarino Formation)			4
									3
									5
									5
									6
									6
									6
									7
									7
	1.0	Peak = UTP		1		ML: Sandy SILT: dark brown. Low plasticity; sand, fine. (Whangamarino Formation)		H	2
						SW: Fine to medium SAND with some silt: grey. Well graded. (Whangamarino Formation)		MD	4
	1.3	Peak = UTP				LIGNITE: (Whangamarino Formation)	D	H	6
	1.5	Peak = UTP				Borehole terminated at 1.5 m			8
									6
									13
									12
									12
									12
				2					
				3					
				4					
				5					

Termination Reason: Refusal on hard lignite
Shear Vane No: 1911 DCP No: 7
Remarks: Groundwater not encountered. Shear vane #1911

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 184A

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 29/01/2020
Borehole Location: Stage 4 Logged by: IP Checked by: AS Scale: 1:25 Sheet 1 of 1

Position: 434349.5mE; 740564.5mN Projection: Mount Eden
Datum: - Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		ML: Sandy SILT: with trace fine gravel; brownish orange, mottled grey. (Fill)	D to M		6, 4, 3
						SP: Fine SAND: grey, mottled orange. Poorly graded. (Whangamarino Formation)	M to W	MD	5, 5, 6, 6, 6
						SP: Fine SAND: light grey. Poorly graded. (Whangamarino Formation)	W to S		7, 7
				1		Borehole terminated at 1.0 m			
				2					
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: DCP No: 16
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 185

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 18/12/2019
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		SP: Fine SAND with some silt: grey. Poorly graded. (Whangamarino Formation)	M	MD to D	12, 6, 8, 7, 9, 10, 9
	0.7	Peak = 187kPa Residual = 3kPa				ML: SILT: black. Low plasticity. (Whangamarino Formation)		VSt	6, 10
				1		LIGNITE: (Whangamarino Formation)	D	H	8, 12, 8, 10, 9, 9, 11, 10, 16, 16
						Borehole terminated at 1.0 m			
				2					
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1785 DCP No: 7
Remarks: Groundwater not encountered. Shear vane #1785

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 186

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 18/12/2019
Borehole Location: Stage 4 Logged by: LS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		SM: Silty fine SAND: grey. Uniformly graded. (Whangamarino Formation)	M	L to MD	3
									3
									3
									3
									3
						... at 0.50m, becoming light grey.			2
									2
									5
						ML: SILT: black. Low plasticity. (Whangamarino Formation)		H	5
	1.0	Peak = UTP		1		LIGNITE: (Whangamarino Formation)	D		13
						Borehole terminated at 1.0 m			11
									10
									13
									14
									20
				2					
				3					
				4					
				5					

Termination Reason: Refusal on hard lignite
Shear Vane No: 1911 DCP No: 7
Remarks: Groundwater not encountered. Shear vane #1911

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 186A

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 29/01/2020
Borehole Location: Stage 4 Logged by: IP Checked by: AS Scale: 1:25 Sheet 1 of 1

Position: 445249.4mE; 698775.4mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		SP: Fine to medium SAND: grey. Poorly graded. (Whangamarino Formation)	D to M	MD	6, 7, 7, 6, 6, 8, 6, 6, 6
						SP: Fine SAND: dark greyish brown. Poorly graded. (Whangamarino Formation)	W		5
				1		SP: Medium to coarse SAND: dark grey. Poorly graded. (Whangamarino Formation)	S	MD	6, 9
						SP: Fine to medium SAND: with trace silt; grey. Poorly graded, subangular. (Whangamarino Formation)		D	10, 12, 13, 11, 7, 7, 10
				2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: DCP No: 16
Remarks: Groundwater not encountered.

HAND AUGER BOREHOLE LOG - PCHA 186 B

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 03/08/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434364.0mE; 740611.0mN Projection:
Datum: Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		OL: Organic SILT: No plasticity. (Topsoil)			2
						ML: Sandy SILT: grey. Low plasticity, Sand, fine. (Whangamarino Formation)		H	6, 9, 5, 7
						SW: Fine to medium SAND: with trace silt; brownish grey. Well graded. (Whangamarino Formation)			8, 5, 8, 7, 4
				1		... at 0.80m, Becoming brown.	M		6, 19
						... at 1.20m, Becoming grey.		MD to D	10, 10
						... at 1.40m, Becoming fine to coarse sand.			14, 10, 20
				2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2349 DCP No: 6
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 186 C

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 03/08/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1
Position: 434367.0mE; 740600.9mN Projection:
Datum: Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = >200kPa Residual = 28kPa		0		OL: Organic SILT: dark brown. No plasticity. (Topsoil)			1
						ML: Sandy SILT: grey. Low plasticity, sand, fine. (Whangamarino Formation)			4
	0.6	Peak = UTP						H	4
									2
									6
									8
									10
									10
									8
						LIGNITE: (Whangamarino Formation)			6
				1			M		6
									10
									10
								MD to D	10
									12
									13
									14
									14
						SP: Fine SAND: with trace silt; grey. Poorly graded. (Whangamarino Formation)			15
								VD	
				2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2349 DCP No: 6
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 187

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 06/01/2020
Borehole Location: Stage 4 Logged by: LK Checked by: AS Scale: 1:25 Sheet 1 of 1

Position: 434368.7mE; 740630.7mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
06-01-2020	0.3	Peak = UTP		0		CH: CLAY: grey mottled orange. High plasticity. (Whangamarino Formation)	M to W	H	
	0.6	Peak = 131kPa Residual = 38kPa				CH: Silty CLAY: light brown mottled grey. High plasticity, moderately sensitive to sensitive. (Whangamarino Formation)	W	VSt	
	0.9	Peak = 102kPa Residual = 23kPa		1					
	1.2	Peak = UTP				CH: CLAY: grey. High plasticity. (Whangamarino Formation)		H	
						ML: SILT: with minor fine sand; dark brownish grey. Low plasticity. (Whangamarino Formation)	S		
	1.5	Peak = UTP				Black, LIGNITE. (Whangamarino Formation)	D to…	H	
						Borehole terminated at 1.5 m			
				2					
				3					
				4					
				5					

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15

Termination Reason: Equipment refusal
Shear Vane No: 2532 DCP No:
Remarks: Groundwater encountered at 1.3m.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 187 A

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 03/08/2020 - 04/08/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434366.1mE; 740619.2mN Projection:
Datum: Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = >200kPa Residual = 31kPa				OL: Organic SILT: dark brown. No plasticity. (Topsoil)			
	0.6	Peak = >200kPa Residual = 31kPa				ML: SILT: with minor clay; grey. Low plasticity. (Whangamarino Formation)			
				1		SM: Silty Fine to coarse SAND: grey. (Whangamarino Formation)	M		5, 7, 10, 5, 4, 5, 4, 4, 5, 8, 8
				2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2349 DCP No: 6
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 188

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 06/01/2020
Borehole Location: Stage 4 Logged by: Checked by: AS Scale: 1:25 Sheet 1 of 1

Position: 434371.3mE; 740642.9mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
						ML: Clayey SILT: light grey mottled brown. Low plasticity. (Fill)	D	H	
	0.3	Peak = 111kPa				CH: CLAY: brown mottled orange. High plasticity, moderately sensitive. (Ashfall Deposits)			
	0.6	Peak = 167kPa Residual = 67kPa						VSt	
	0.9	Peak = 129kPa Residual = 64kPa		1		CH: CLAY: grey mottled orange. High plasticity, insensitive to moderately sensitive. (Whangamarino Formation)			
	1.2	Peak = UTP				*... from 1.20m to 2.00m, Becoming brown, mottled grey.*	W		
	1.6	Peak = UTP						VSt to H	
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 189

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 03/01/2020
Borehole Location: Stage 4 Logged by: LS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				CH: CLAY: Brown mottled light grey. High plasticity. (Fill)	D		
	0.6	Peak = UTP				CH: CLAY: with minor fine to medium gravel: Brown. High plasticity. (Fill)			
	0.9	Peak = UTP		1		CH: CLAY: with minor lenses of medium to coarse sand: Brown. High plasticity. (Fill)		H	
	1.2	Peak = UTP				CH: CLAY: Brown mottled light grey. High plasticity. (Whangamarino Formation)	M		
	1.6	Peak = >200kPa							
						CH: Silty CLAY: with some silt: brown mottled light grey. High plasticity. (Whangamarino Formation)			
	2.0	Peak = 185kPa Residual = 72kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 190

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 11/12/2019
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		ML: SILT: grey. Low plasticity, moderately sensitive to extra sensitive. (Whangamarino Formation)	D		
	0.5	Peak = 159kPa Residual = 40kPa				... from 0.50m to 0.80m, becoming mottled orange.			
	0.8	Peak = >200kPa Residual = 29kPa		1				VSt to H	
	1.2	Peak = 112kPa Residual = 26kPa				... at 1.20m, contains some fine to medium sand.	M		
	1.5	Peak = 130kPa Residual = 14kPa							
	1.8	Peak = 170kPa Residual = 14kPa							
	2.0	Peak = 176kPa Residual = 29kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1785 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 191

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 11/12/2019
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = 86kPa Residual = 3kPa		0		ML: SILT: grey. Low plasticity, quick. (Whangamarino Formation)	D	St to VSt	9
	0.5	Peak = 112kPa Residual = 3kPa				... at 0.60m, becoming brown.	M		7
	0.9	Peak = UTP		1		LIGNITE: (Whangamarino Formation)			7
						Borehole terminated at 1.0 m			7
				2					15
									13
									14
									16
				3					
				4					
				5					

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15

Termination Reason: Target Depth Reached
Shear Vane No: 1785 DCP No: 7
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 192/193

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 06/01/2020
Borehole Location: Stage 4 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434407.1mE; 740598.4mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				ML: Clayey SILT: grey mottled brown. Low plasticity. (Fill)	D to M	H	
	0.6	Peak = UTP				Black, LIGNITE. (Whangamarino Formation)			
						Borehole terminated at 0.6 m			

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15

Termination Reason: Equipment refusal
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 194/195

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 29/12/2019
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = >200kPa Residual = 25kPa		0		ML: Sandy SILT: grey. Low plasticity. (Whangamarino Formation)	W	H	6 6 6
						SP: Silty Fine SAND: grey. Poorly graded. (Whangamarino Formation)		D	10 10 10 4
							M		10
				1		black. LIGNITE. (Whangamarino Formation)			8 8 10 16 20
						Borehole terminated at 1.0 m			
				2					
				3					
				4					
				5					

Termination Reason: Refusal.
Shear Vane No: 1911 DCP No: 7
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 196/197

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 11/12/2019
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		SM: Silty fine SAND: grey. Poorly graded. (Whangamarino Formation)	M	MD to D	1, 3, 3, 3, 4, 4, 8, 10, 10, 13
				1		LIGNITE: (Whangamarino Formation)	D	H	10, 12
						Borehole terminated at 1.2 m			19, 16, 20
				2					
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: DCP No: 7
Remarks: Groundwater not encountered. Shear vane #1785

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 197 A

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 04/08/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434396.7mE; 740551.8mN Projection:
Datum: Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		Organic SILT: No plasticity. (Topsoil)			2
									2
						SW: Silty Fine to coarse SAND: grey. Well graded. (Whangamarino Formation)			7
									8
									6
									8
									9
									8
									10
				1					5
						LIGNITE: (Whangamarino Formation)			10
									14
						Borehole terminated at 1.2 m			20
				2					
				3					
				4					
				5					

Termination Reason: Refusal on hard lignite.
Shear Vane No: DCP No: 6
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 198/199

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 07/01/2020
Borehole Location: Stage 5 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434404.3mE; 740537.0mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)
	0.2	Peak = >200kPa Residual = 18kPa				ML: SILT: with minor clay; grey mottled orange. Low plasticity, extra sensitive. (Whangamarino Formation)	M	H	4, 6
	0.3	Peak = 149kPa							3
	0.4	Peak = 126kPa Residual = 20kPa				SP: Fine SAND: with some silt; grey. Poorly graded. (Whangamarino Formation) *... from 0.40m to 0.50m, Contains a lens of sandy silt.*			3, 3
	0.6	Peak = UTP				SP: Silty Fine SAND: grey. Poorly graded. (Whangamarino Formation)	W	L	2, 3, 3
	0.8	Peak = UTP				ML: SILT: with minor fine sand; grey mottled orange brown. Low plasticity. (Whangamarino Formation)	M	H	6, 12
	1.2	Peak = UTP		1					8, 10, 12
						Black, LIGNITE. (Whangamarino Formation)			20, 26
						Borehole terminated at 1.3 m			
				2					
				3					
				4					
				5					

Termination Reason: Equipment refusal
Shear Vane No: 2532 DCP No: 6
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 198 A

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 03/08/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection:
Datum: Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)
				0		Organic SILT: No plasticity. (Topsoil)	M		2
									2
						SW: Silty fine to coarse SAND: grey. Well graded. (Whangamarino Formation)			8
									6
									9
									10
									10
									16
									15
				1					7
									7
						LIGNITE: (Whangamarino Formation)			10
									10
									14
						Borehole terminated at 1.4 m			15
									16
									20
				2					
				3					
				4					
				5					

Termination Reason: Refusal on hard lignite.
Shear Vane No: DCP No: 6
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 200/201

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 07/01/2020
Borehole Location: Stage 5 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434398.5mE; 740506.0mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = 149kPa Residual = 23kPa		0		ML: Clayey SILT: brown mottled dark brown. Low plasticity, sensitive. (Whangamarino Formation)	M to W		
						... at 0.30m, Becoming light brown, mottled brown and white.			
	0.6	Peak = 143kPa Residual = 12kPa				ML: SILT: with minor clay; white mottled brown. Low plasticity. (Whangamarino Formation)			
						ML: SILT: with minor fine sand, trace clay; grey mottled orange. Low plasticity, extra sensitive. (Whangamarino Formation)		VSt	
	0.9	Peak = 123kPa Residual = 9kPa		1			W to S		
	1.2	Peak = 117kPa Residual = 18kPa							
▼						ML: Clayey SILT: grey. Low plasticity. (Whangamarino Formation)	W	H	
	1.5	Peak = UTP				Black, LIGNITE. (Whangamarino Formation)	M		
						Borehole terminated at 1.5 m			
				2					
				3					
				4					
				5					

Termination Reason: Equipment refusal
Shear Vane No: 2532 DCP No:
Remarks: Groundwater encountered at 1.3m.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 202/203

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 07/01/2020
Borehole Location: Stage 5 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434394.4mE; 740485.7mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				ML: Clayey SILT: with trace fine sand; grey mottled brownish orange. Low plasticity. (Fill)	W		5 10 15
	0.6	Peak = UTP							
	0.9	Peak = UTP		1				H	
	1.2	Peak = UTP				CH: CLAY: brown mottled grey. High plasticity. (Fill)	M		
	1.6	Peak = UTP							
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 204/205

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 07/01/2020
Borehole Location: Stage 5 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434390.4mE; 740467.3mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
	0.3	Peak = UTP				ML: Clayey SILT: with trace fine sand; grey mottled brownish orange. Low plasticity. (Fill)	M	H	
	0.6	Peak = UTP							
	0.9	Peak = 79kPa					W	St	
	1.0	Peak = 73kPa		1					
	1.2	Peak = 64kPa							
	1.3	Peak = 99kPa							
	1.4	Peak = UTP				CH: CLAY: brown mottled pinkish white. High plasticity. (Fill)	M	H	
	1.6	Peak = UTP							
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 204

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 08/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				CL: CLAY: light brown. Low plasticity. (Fill)			
	0.6	Peak = UTP						H	
	0.9	Peak = UTP		1			M to W		
	1.1	Peak = 102kPa				CH: Silty CLAY: Light brown. High plasticity. (Fill)			
	1.2	Peak = 160kPa						VSt to H	
	1.4	Peak = >200kPa				CL: CLAY: light brown. Low plasticity. (Fill)			
	1.6	Peak = 125kPa							
	1.7	Peak = >200kPa				CL: Silty CLAY: Ligh brown. Low plasticity. (Fill)		H	
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 205

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 08/01/2020
Borehole Location: Stage 5 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434385.1mE; 740462.1mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				ML: Clayey SILT: with minor fine sand; greyish brown mottled orange. Low plasticity. (Fill)	M	H	
	0.6	Peak = UTP							
	0.8	Peak = 143kPa				ML: Clayey SILT: light brown mottled. Low plasticity. (Fill)	M to W	VSt to H	
	0.9	Peak = 131kPa							
	1.0	Peak = UTP		1					
	1.1	Peak = UTP							
	1.2	Peak = UTP							
	1.4	Peak = 94kPa					W	St to VSt	
	1.5	Peak = 111kPa							
	1.6	Peak = 120kPa							
	1.7	Peak = UTP				ML: Clayey SILT: with minor fine sand; greyish brown mottled orange. Low plasticity. (Fill)	M	H	
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 206/207

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 07/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434385.4mE; 740448.1mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		SP: Silty Fine SAND: light grey. Poorly graded. (Fill)			
	0.3	Peak = UTP				CL: CLAY: light brown. Low plasticity. (Fill)			
	0.6	Peak = UTP							
	0.9	Peak = UTP		1			D to M	H	
	1.2	Peak = UTP							
						... from 1.40m to 1.70m, Contains a lens of clayey fine sand.			
	1.6	Peak = UTP							
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Dynamic Cone Penetrometer (Blows/100mm): 5, 10, 15

Termination Reason: Target depth
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 208

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 07/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434380.7mE; 740431.5mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				CL: Sandy CLAY: with minor gravel; light brown. Low plasticity. (Fill)	D		
	0.6	Peak = UTP				SP: Fine SAND: grey. Poorly graded, subrounded. (Fill)			
	0.9	Peak = UTP		1		CL: CLAY: light brown. Low plasticity. (Fill)		H	
	1.2	Peak = UTP					D to M		
	1.6	Peak = UTP							
	1.9	Peak = >200kPa							
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 209/210

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 13/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434378.3mE; 740413.2mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		CL: CLAY: with some fine sand; light brown mottled orange. Low plasticity. (Fill)	D	H	
	0.6	Peak = >200kPa					M to W		
	0.9	Peak = 131kPa Residual = 32kPa		1				VSt	
	1.2	Peak = 94kPa Residual = 20kPa				CH: Clayey SILT: light brown with grey. High plasticity. (Fill)		St	
	1.3	Peak = 96kPa Residual = 32kPa							
	1.6	Peak = 91kPa Residual = 61kPa				CL: CLAY: with some fine sand; light brown mottled orange. Low plasticity. (Fill)	W to S		
						CH: Clayey SILT: light brown with grey. High plasticity. (Fill)			
						CL: CLAY: with some fine sand; light brown mottled orange. Low plasticity. (Fill)	M to W	H	
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2352 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 209

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 24/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: AS Scale: 1:25 Sheet 1 of 1

Position: 434378.0mE; 740400.2mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = >200kPa				CL: CLAY: with some fine sand; brownish grey mottled grey. Low plasticity. (Fill)	D	H	
	0.6	Peak = 126kPa					M		
	0.9	Peak = 123kPa		1		CL: CLAY: with minor fine sand; brown, mottled orange. Low plasticity. (Fill)		VSt	
	1.2	Peak = >200kPa				CL: Gravelly CLAY: with minor silt; dark grey. Medium pumiceous gravel. (Fill)	M to W		
	1.6	Peak = UTP				CL: Sandy CLAY: grey mottled, brownish orange. Low plasticity, Sand, fine. (Whangamarino Formation) *... at 1.60m, Minor fine to medium pumiceous gravel*		H	
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 210

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 21/01/2020
Borehole Location: Stage 5 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434375.1mE; 740403.3mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		ML: Clayey SILT: with minor fine sand; greyish brown. Low plasticity. (Fill)	D		
	0.3	Peak = >200kPa						H	
	0.6	Peak = UTP							
	0.9	Peak = UTP							
				1		Silty CLAY: orange brown mottled grey. Low plasticity. (Fill)	M		
	1.2	Peak = UTP							
	1.5	Peak = 146kPa						VSt to H	
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 211/212

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 13/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434406.7mE; 740394.8mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				CL: CLAY: with some fine sand; light brown mottled orange. Low plasticity. (Fill)			
	0.6	Peak = UTP							
	0.9	Peak = >200kPa							
				1		CL: Sandy CLAY: light brown mottled grey. Low plasticity. Sand, fine. (Fill)	M to W	H	
	1.2	Peak = >200kPa				CL: CLAY: brown mottled orange. Low plasticity. (Fill)			
	1.6	Peak = UTP							
	2.0	Peak = 102kPa Residual = 29kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 213

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 13/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 438982.9mE; 717172.2mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				CL: CLAY: with minor fine sand, with trace gravel; brown mottled orange. Low plasticity. Gravel, fine to medium. (Fill)	D		
	0.6	Peak = 161kPa Residual = 58kPa							
	0.9	Peak = UTP		1				VSt to H	
	1.2	Peak = UTP					M to W		
						CL: Sandy CLAY: with minor silt; brown mottled grey. Low plasticity. Sand, fine. (Whangamarino Formation)			
	1.6	Peak = UTP							
						CL: Silty CLAY: with trace gravel, with minor fine sand; dark greyish brown mottled brown. Low plasticity. Gravel, fine to medium. (Whangamarino Formation)			
	2.0	Peak = 131kPa Residual = 73kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

HAND AUGER BOREHOLE LOG - PCHA 214/215

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 21/01/2020
Borehole Location: Stage 5 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434407.4mE; 740448.3mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		ML: Clayey SILT: with minor fine to coarse sand; greyish brown mottled orange. Low plasticity. (Fill)	D	H	
	0.6	Peak = UTP				CL: Silty CLAY: brown mottled greyish orange. Low plasticity. (Fill)	M		
	0.9	Peak = UTP		1		CH: CLAY: orange brown. High plasticity. (Whangamarino Formation)	W	VSt	
	1.2	Peak = 146kPa							
	1.6	Peak = UTP				CH: Silty CLAY: with minor fine to coarse sand, trace fine gravel; white mottled orange pink. High plasticity. (Whangamarino Formation)		H	
	2.0	Peak = 161kPa Residual = 47kPa		2		CH: Silty CLAY: grey mottled orange. High plasticity, moderately sensitive. (Whangamarino Formation)		VSt	
						Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 216/217

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 10/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434417.1mE; 740466.7mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
						CL: CLAY: brown mottled orange. Low plasticity. (Fill)	D		
	0.3	Peak = UTP				CL: Sandy CLAY: light orange brown. Low plasticity. (Fill)			
	0.6	Peak = UTP							
	0.9	Peak = >200kPa Residual = 102kPa		1		CL: CLAY: brown mottled orange. Low plasticity. (Fill)	D to M	H	
	1.2	Peak = UTP							
	1.6	Peak = UTP				*... from 1.80m to 1.90m, Contains lens of white, fine sand.*			
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 218/219

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 10/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434421.8mE; 740494.1mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				CL: CLAY: brownish grey mottled orange. Low plasticity. (Fill)	D	H	
	0.6	Peak = UTP							
	0.9	Peak = 88kPa Residual = 29kPa		1		CH: Silty CLAY: orange brown. High plasticity. (Fill)	M	St	
	1.2	Peak = UTP				CL: Silty CLAY: with minor gravel; orange grey. Low plasticity. Gravel, fine. (Fill)		H	
	1.6	Peak = UTP							
	2.0	Peak = UTP		2		CL: Sandy CLAY: greyish brown. Low plasticity. (Fill)	W		
						Borehole terminated at 2.0 m			
				3					
				4					
				5					

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15

Termination Reason: Target depth
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 218

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 21/01/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
	0.3	Peak = UTP				CL: CLAY: greyish orange. Low plasticity. (Fill)			
	0.6	Peak = UTP							
	0.9	Peak = UTP		1			M to W	H	
	1.2	Peak = UTP							
	1.5	Peak = >200kPa							
	1.8	Peak = >200kPa							
	2.0	Peak = 102kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 219

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 21/05/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection:
Datum: Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = >200kPa		0		OL: Organic SILT: dark brown. No plasticity. (Topsoil)	M to W		
	0.6	Peak = UTP				CH: CLAY: orange brown. High plasticity. (Fill)			
	0.9	Peak = >200kPa				ML: SILT with minor sand: grey. Low plasticity; sand, fine. (Fill)			
	1.2	Peak = >200kPa		1			M	H	
	1.5	Peak = >200kPa							
	1.8	Peak = >200kPa							
	2.0	Peak = 200kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 2087 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 220

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 07/05/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
	0.3	Peak = 52kPa		0		ML: Clayey SILT: Brown. Low plasticity. (Fill)	M	F to H	
	0.6	Peak = >200kPa							
	0.9	Peak = 133kPa		1					
	1.2	Peak = UTP							
	1.5	Peak = UTP				LIGNITE: Black.			
						Borehole terminated at 1.5 m			
				2					
				3					
				4					
				5					

Termination Reason: Refusal on dense strata.
Shear Vane No: 1785 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 221/220

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 10/01/2020
Borehole Location: Stage 4/5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434423.2mE; 740523.3mN Projection: Mount Eden
Datum: Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
						OL: Organic SILT: light grey. Low plasticity. (Topsoil)	D		
	0.3	Peak = 169kPa Residual = 38kPa				MH: Clayey SILT: with trace fine sand; yellowish grey. High plasticity, sensitive. (Whangamarino Formation)	M to W	VSt	
	0.6	Peak = UTP				ML: Sandy SILT: dark brown. Low plasticity. Sand, fine to medium. (Whangamarino Formation)			
▼						Black, LIGNITE. (Whangamarino Formation)			
	0.9	Peak = UTP		1		SM: Silty Fine to medium SAND: dark brown. Poorly graded, subangular. (Whangamarino Formation)	S	H	
	1.2	Peak = UTP				Black, LIGNITE. (Whangamarino Formation)	M		
	1.4	Peak = UTP				Borehole terminated at 1.4 m			
				2					
				3					
				4					
				5					

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15

Termination Reason: Equipment refusal
Shear Vane No: 2349 DCP No:
Remarks: Groundwater encountered at 0.8m.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 220/221A

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 21/05/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1
Position: Projection: Mount Eden
Datum: Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		OL: Organic SILT: dark brown. No plasticity. (Topsoil)	M to W		
	0.3	Peak = 156kPa				CH: CLAY: orange brown. High plasticity. (Fill)	M	VSt to H	
	0.6	Peak = UTP							
	0.9	Peak = >200kPa				ML: SILT: light grey. Low plasticity. (Fill)		H	
				1		LIGNITE: (Whangamarino Formation)		D to VD	9
						Borehole terminated at 1.4 m			16
									20
				2					
				3					
				4					
				5					

Termination Reason: Refusal on hard lignite.
Shear Vane No: 2087 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 222/223

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 08/01/2020
Borehole Location: Stage 4 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1
Position: 434427.3mE; 740547.7mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		OL: Organic SILT: brown. Low plasticity. (Topsoil)	D		
	0.3	Peak = 108kPa Residual = 18kPa				CL: Sandy CLAY: light grey mottled orange. Low plasticity, sensitive; sand, fine. (Whangamarino Formation)	M to W	VSt	
	0.6	Peak = UTP				ML: SILT: black. Low plasticity. (Whangamarino Formation)			
▼						SP: Silty Fine SAND: dark greyish brown. Poorly graded, loosely packed. (Whangamarino Formation)			
	0.9	Peak = UTP				Black mottled dark grey, LIGNITE. (Whangamarino Formation)	W to S	H	
	1.2	Peak = UTP		1					
						Borehole terminated at 1.3 m			
				2					
				3					
				4					
				5					

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15

Termination Reason: Equipment refusal
Shear Vane No: 2349 DCP No:
Remarks: Groundwater encountered at 0.8m.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 223 A

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 22/07/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1
Position: Projection: Mount Eden
Datum: Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
				0		OL: Organic SILT: dark brown. Low plasticity. (Topsoil)			
						MH: Clayey SILT: light brown. High plasticity. (Fill)			
						LIGNITE: (Whangamarino Formation)			
						Borehole terminated at 0.6 m			
				1					
				2					
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 224/225

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 08/01/2020
Borehole Location: Stage 4 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434430.3mE; 740576.4mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
						OL: Organic SILT: brown. (Topsoil)	D		
	0.3	Peak = UTP				CL: CLAY: light orange brown mottled light grey. Low plasticity. (Fill)			
	0.6	Peak = UTP				black. LIGNITE. (Whangamarino Formation)	M	H	
	0.9	Peak = UTP		1					
	1.2	Peak = UTP				SP: Silty Fine to medium SAND: dark brown. Poorly graded, subrounded; tightly packed. (Whangamarino Formation)	W		
	1.6	Peak = UTP				black. LIGNITE. (Whangamarino Formation)	M	H	
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 224 A

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 22/07/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1
Position: Projection: Mount Eden
Datum: Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
				0		OL: Organic SILT: dark brown. No plasticity. (Topsoil)			
						MH: Clayey SILT: light brown. High plasticity. (Fill)			
						LIGNITE: (Whangamarino Formation)			
						Borehole terminated at 0.6 m			
				1					
				2					
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 225 A

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 22/07/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1
Position: Projection: Mount Eden
Datum: Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
				0		OL: Organic SILT: dark brown. No plasticity. (Topsoil)			
						MH: Clayey SILT: light brown. High plasticity. (Fill)			
						LIGNITE: (Whangamarino Formation)			
						Borehole terminated at 0.6 m			
				1					
				2					
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 226/227

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 08/01/2020
Borehole Location: Stage 4 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434442.6mE; 740597.1mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
						OL: Organic SILT: brown. Low plasticity. (Topsoil)	D	H	
	0.3	Peak = UTP				CL: Sandy CLAY: light yellowish grey. Low plasticity. (Fill)			
						SP: Clayey Fine SAND: light yellowish grey. Poorly graded; tightly packed. (Whangamarino Formation)	M		
	0.6	Peak = UTP				black. LIGNITE. (Whangamarino Formation)		H	
						SP: Silty Fine to medium SAND: dark brown. Poorly graded. (Whangamarino Formation)	W		
	0.9	Peak = UTP		1		black. LIGNITE. (Whangamarino Formation)	M	H	
	1.2	Peak = UTP				SP: Silty Fine SAND: dark brown. Poorly graded. (Whangamarino Formation)	W		
						black. LIGNITE. (Whangamarino Formation)			
	1.6	Peak = UTP					M	H	
						SP: Silty Fine SAND: dark brown. Poorly graded. (Whangamarino Formation)	W		
				2		SP: Fine SAND: with some silt; light grey. Poorly graded, subrounded. (Whangamarino Formation)			
						Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 226 A

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 22/07/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1
Position: Projection: Mount Eden
Datum: Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
				0		OL: Organic SILT: dark brown. No plasticity. (Topsoil)			
						MH: Clayey SILT: light brown. High plasticity. (Fill)			
						LIGNITE: (Whangamarino Formation)			
						Borehole terminated at 0.8 m			
				1					
				2					
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 227 A

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 04/08/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection:
Datum: Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
				0		OL: Organic SILT: No plasticity. (Topsoil)			
						ML: SILT: greyish brown. Low plasticity. (Whangamarino Formation)			
						LIGNITE: (Whangamarino Formation)			
						Borehole terminated at 0.8 m			
				1					
				2					
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 228

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 29/12/2019
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
	0.3	Peak = UTP				ML: SILT: grey. Low plasticity. (Whangamarino Formation)	M		
	0.6	Peak = UTP				*... at 0.50m, contains some fine sand.*			
	0.9	Peak = >200kPa Residual = 37kPa		1		ML: Sandy SILT: grey. Low plasticity, sensitive; sand, fine. (Whangamarino Formation)		H	
	1.2	Peak = >200kPa Residual = 43kPa					W		
	1.6	Peak = UTP							
	2.0	Peak = >200kPa Residual = 49kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 229

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 13/01/2020
Borehole Location: Stage 4 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434474.4mE; 740593.9mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)
						CL: CLAY: orange mottled grey. Low plasticity, moderately sensitive. (Whangamarino Formation)	D		
	0.3	Peak = >200kPa				... *at 0.30m, Becoming grey mottled orange.*	M	H	
	0.6	Peak = >200kPa Residual = 94kPa							
	0.9	Peak = >200kPa Residual = 58kPa		1					
	1.2	Peak = >200kPa					W		
▼						MH: Sandy SILT: brown. Thinly bedded, high plasticity. (Whangamarino Formation)			
	1.6	Peak = UTP				SP: Silty Fine SAND: grey. Poorly graded. (Whangamarino Formation)	S		
	1.7	Peak = UTP				Black, LIGNITE. (Whangamarino Formation)	M	H	
						Borehole terminated at 1.7 m			
				2					
				3					
				4					
				5					

Termination Reason: Equipment refusal
Shear Vane No: 2532 DCP No:
Remarks: Groundwater encountered at 1.5m.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 230/231

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 18/02/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				CL: CLAY: light brown mottled brown and grey. Low plasticity. (Fill)			
	0.6	Peak = UTP							
	0.9	Peak = UTP		1			M	H	
	1.2	Peak = >200kPa							
	1.5	Peak = UTP							
	1.8	Peak = UTP				ML: Sandy SILT: grey. Low plasticity; sand, fine. (Whangamarino Formation)			
						SM: Silty fine SAND: grey. Poorly graded. (Whangamarino Formation)		D	
				2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15

Termination Reason: Target Depth Reached
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 232/233

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 17/02/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
	0.3	Peak = UTP		1		CL: CLAY: light brown mottled brown. (Fill)	D	H	
	0.6	Peak = UTP							
	0.9	Peak = UTP							
	1.2	Peak = UTP							
	1.5	Peak = UTP							
				2		Borehole terminated at 1.6 m			
				3					
				4					
				5					

Termination Reason: Refusal on dense dry clay
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 234/235

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 17/02/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				CL: CLAY: light brown mottled brown. Low plasticity. (Fill)			
	0.6	Peak = UTP					M		
	0.9	Peak = UTP		1				H	
	1.2	Peak = UTP							
	1.5	Peak = >200kPa				ML: SILT: grey mottled orange. Low plasticity. (Whangamarino Formation)	D		
	1.8	Peak = UTP							
	2.0	Peak = >200kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 236/237

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 20/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 445229.3mE; 698739.3mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		CL: CLAY: with minor fine sand; orange brown mottled orange. Low plasticity. (Fill)	D	H	5 10 15
	0.6	Peak = UTP							
	0.9	Peak = 197kPa		1				VSt to H	
	1.2	Peak = >200kPa							
	1.6	Peak = 98kPa				CL: Silty CLAY: orange brown. Low plasticity. (Whangamarino Formation)	D to M	St to VSt	
	1.7	Peak = 200kPa							
	2.0	Peak = 123kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 238/239

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 20/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434457.2mE; 740442.7mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		CL: Silty CLAY: with some fine sand; greyish brown. Low plasticity. (Fill)			
	0.3	Peak = UTP				CL: CLAY: with some fine to medium gravel; brown mottled orange. Low plasticity. (Fill)			
	0.6	Peak = UTP							
	0.9	Peak = >200kPa		1		CL: CLAY: minor silt, with minor fine sand; grey mottled orange and brown. Low plasticity. (Whangamarino Formation)	D	H	
	1.2	Peak = UTP							
	1.4	Peak = 169kPa Residual = 71kPa				CL: Sandy CLAY: with minor fine gravel; light grey mottled orange. Low plasticity, moderately sensitive; Sand, fine; Gravel, pumiceous. (Whangamarino Formation)	D to M	VSt to H	
	1.6	Peak = UTP							
20-01-2020							W		
	2.0	Peak = UTP		2			S		
						Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 1911 DCP No:
Remarks: Groundwater encountered at 1.95m.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 240/241

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 20/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434453.7mE; 740416.7mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		CL: CLAY: light brown. Low plasticity. (Fill)	D	H	
	0.6	Peak = UTP				CL: CLAY: grey mottled orange. Low plasticity, moderately sensitive to sensitive. (Whangamarino Formation)	M		
	0.9	Peak = UTP		1					
	1.2	Peak = UTP							
	1.6	Peak = 148kPa Residual = 40kPa				... at 1.50m, Contains minor fine to course sand.	W	VSt	
	2.0	Peak = 123kPa Residual = 22kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 242/243

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 20/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434450.1mE; 740384.9mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				CL: Silty CLAY: with trace fine sand; greyish brown mottled orange. Low plasticity. (Fill)	D		
	0.6	Peak = UTP						H	
	0.9	Peak = UTP		1			M		
	1.2	Peak = UTP				CL: CLAY: with minor fine sand; brown mottled orange. Low plasticity. (Fill)			
	1.6	Peak = 160kPa Residual = 15kPa				MH: SILT: with some clay; grey. High plasticity. (Fill)	W	VSt to H	
						CL: Silty CLAY: with trace fine sand; greyish brown mottled orange. Low plasticity. (Fill)			
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 244

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 24/01/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				CL: CLAY: with some sand, fine; light orange brown, mottled dark brown. Low plasticity. (Fill)	D		
	0.6	Peak = UTP				*... from 0.60m to 1.20m, Minor fine to medium gravel*			
	0.9	Peak = UTP		1				H	
	1.2	Peak = UTP					D to M		
	1.6	Peak = UTP							
	1.8	Peak = >200kPa							
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 245

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 24/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: AS Scale: 1:25 Sheet 1 of 1

Position: 434477.2mE; 740404.6mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		CL: CLAY: with some sand, fine; light orange brown, mottled dark brown. Low plasticity. (Fill)	D		
	0.6	Peak = UTP				CL: Sandy CLAY: brownish grey mottled grey. Low plasticity. (Fill)			
	0.9	Peak = UTP				CL: CLAY: with some sand, fine; light orange brown, mottled dark brown. Low plasticity. (Fill)			
	1.2	Peak = UTP		1			M	H	
	1.6	Peak = UTP							
	1.8	Peak = UTP							
	2.0	Peak = >200kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 246

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 24/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: AS Scale: 1:25 Sheet 1 of 1

Position: 434480.9mE; 740422.4mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				CL: CLAY: with some fine sand; orange brown, mottled brown. Low plasticity. (Fill)	D		
						... from 0.30m to 0.40m, Lens containing fine white sand			
	0.6	Peak = UTP					M		
	0.9	Peak = UTP							
				1		CL: Sandy CLAY: brown, mottled grey. Low plasticity, sand, fine to medium. (Fill)		H	
	1.2	Peak = UTP							
						CL: CLAY: light brown, mottled light yellowish grey. Low plasticity. (Whangamarino Formation)			
	1.6	Peak = UTP				*... from 1.60m to 1.80m, Trace pumiceous gravel.*	M to W		
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 247/248

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 24/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: AS Scale: 1:25 Sheet 1 of 1

Position: 434484.4mE; 740441.2mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = >200kPa				CL: CLAY: with some fine sand; brown. Low plasticity. (Fill)	D		
	0.6	Peak = UTP				CL: CLAY: orange brown mottled brown. Low plasticity. (Fill)			
	0.9	Peak = UTP				... at 0.80m, Some fine to medium gravel			
				1		CL: CLAY: with some fine sand; brownish grey mottled orange. Low plasticity. (Whangamarino Formation)	D to M	H	
	1.2	Peak = UTP							
	1.6	Peak = >200kPa				CH: Silty CLAY: with minor fine sand; grey mottled orange. High plasticity, sensitive. (Whangamarino Formation)	W		
24-01-2020	2.0	Peak = 105kPa Residual = 12kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 1911 DCP No:
Remarks: Groundwater encountered at 2m.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 249

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 21/01/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
				0		ML: Clayey SILT: greyish brown mottled orange. Low plasticity. (Fill)	D		
	0.3	Peak = UTP							
	0.6	Peak = UTP							
	0.9	Peak = UTP		1			M	H	
	1.2	Peak = >200kPa							
	1.6	Peak = >200kPa							
	1.8	Peak = >200kPa				CL: Silty CLAY: orange brown. Low plasticity. (Fill)			
	2.0	Peak = >200kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 250

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 21/01/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		ML: Clayey SILT: greyish brown mottled orange. Low plasticity. (Fill)	D		5 10 15
	0.6	Peak = UTP				... from 0.60m to 0.70m, Contains some fine to medium gravel.			
	0.9	Peak = UTP		1				H	
	1.2	Peak = UTP					M		
	1.6	Peak = >200kPa				CL: Silty CLAY: orange brown. Low plasticity. (Fill)			
	2.0	Peak = >200kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 251

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 17/02/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
						OL: Organic SILT: brown. Low plasticity. (Topsoil)	D		
	0.3	Peak = UTP				CL: CLAY: light brown mottled brown and grey. Low plasticity. (Fill)			
	0.6	Peak = UTP							
	0.9	Peak = UTP							
				1		*... from 1.00m to 1.20m, Minor fine sand.*	M	H	
	1.5	Peak = UTP							
	1.8	Peak = >200kPa							
	1.9	Peak = >200kPa							
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 252/253

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 17/02/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		OL: Organic SILT: brown. Low plasticity. (Topsoil)			5 10 15
	0.6	Peak = >200kPa				CL: CLAY: light brown mottled brown and grey. Low plasticity. (Fill)			
	0.9	Peak = UTP		1			M	H	
	1.2	Peak = UTP							
	1.5	Peak = UTP				*... from 1.60m to 1.80m, Minor fine sand.*			
	1.8	Peak = UTP							
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 254

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 18/02/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
						OL: Organic SILT: brown. Low plasticity. (Topsoil)			
	0.3	Peak = UTP				CL: CLAY: light brown mottled brown and grey. Low plasticity. (Fill)			
	0.6	Peak = UTP							
	0.9	Peak = >200kPa		1			M	H	
	1.2	Peak = UTP							
	1.5	Peak = UTP							
	1.8	Peak = >200kPa				*... at 1.80m, becoming dark brown.*			
	2.0	Peak = >200kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 255

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 17/02/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
	0.3	Peak = >200kPa				OL: Organic SILT: brown. Low plasticity. (Topsoil)			
	0.6	Peak = >200kPa				CL: CLAY: light brown mottled brown and grey. Low plasticity. (Fill)			
	0.9	Peak = >200kPa		1			M	H	
	1.2	Peak = >200kPa							
	1.5	Peak = >200kPa							
	1.8	Peak = UTP							
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 256

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 16/02/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = 151kPa		0		CL: CLAY: light brown, mottled brown and grey. Low plasticity. (Fill)	D to M		5 10 15
	0.6	Peak = >200kPa							
	0.9	Peak = UTP							
	1.2	Peak = UTP		1			M	VSt to H	
	1.5	Peak = UTP				... at 1.40m, contains some fine gravel.			
	1.8	Peak = UTP							
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 257

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 16/02/2020
Borehole Location: Stage 5 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		CL: CLAY: brown, mottled light brown. Low plasticity. (Fill)	D to M		
	0.6	Peak = UTP							
	0.9	Peak = >200kPa				... *at 0.90m, becoming brown, mottled grey.*			
	1.2	Peak = 154kPa		1			M	H	
	1.5	Peak = >200kPa Residual = 89kPa				ML: SILT/CLAY: grey streaked brown. High plasticity, moderately sensitive. (Whangamarino Formation)			
	1.8	Peak = >200kPa Residual = 68kPa							
	2.0	Peak = >200kPa Residual = 102kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 258

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 13/01/2020
Borehole Location: Stage 5 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434502.8mE; 740600.4mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = >200kPa Residual = 91kPa				CL: CLAY: orange mottled grey. Low plasticity. (Fill)	D		
	0.6	Peak = >200kPa Residual = 88kPa				CH: Silty CLAY: grey mottled reddish orange. High plasticity, moderately sensitive. (Whangamarino Formation)		H	
	0.9	Peak = 131kPa Residual = 58kPa		1			M to W		
	1.2	Peak = 146kPa Residual = 70kPa						VSt	
	1.6	Peak = 131kPa Residual = 29kPa				MH: SILT: with minor medium to coarse sand; light orange brown mottled dark brown. High plasticity, sensitive. (Whangamarino Formation)	W to S		
	2.0	Peak = 131kPa Residual = 53kPa		2		CH: Silty CLAY: grey mottled reddish orange. High plasticity, moderately sensitive. (Whangamarino Formation)			
						Borehole terminated at 2.0 m			
				3					
				4					
				5					

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15

Termination Reason: Target depth
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 259

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 13/01/2020
Borehole Location: Stage 4 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434482.5mE; 740609.0mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = >200kPa				CL: CLAY: grey. Low plasticity. (Whangamarino Formation)	D		
	0.6	Peak = UTP				CL: Sandy CLAY: grey. Low plasticity. (Whangamarino Formation)		H	
	0.9	Peak = UTP		1			M		
	1.2	Peak = 146kPa Residual = 70kPa				CL: CLAY: grey. Low plasticity, moderately sensitive. (Whangamarino Formation)			
	1.6	Peak = >200kPa Residual = 41kPa				CL: Silty CLAY: with minor fine sand, silt; light grey. Low plasticity, sensitive. (Whangamarino Formation)		VSt to H	
						MH: SILT: dark brown. High plasticity. (Whangamarino Formation)	W		
	2.0	Peak = UTP		2		CL: Silty CLAY: with minor fine sand, silt; light grey. Low plasticity. (Whangamarino Formation)			
						SP: Fine SAND: light grey. Poorly graded. (Whangamarino Formation)			
						Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 260

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 10/05/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
	0.3	Peak = >200kPa				ML: Clayey SILT: brown. Low plasticity. (Fill)			
	0.6	Peak = >200kPa							
	0.9	Peak = >200kPa							
				1		*... at 0.90m, becoming grey, mottled brown.*	M	H	
	1.2	Peak = UTP							
	1.5	Peak = UTP							
	1.8	Peak = 187kPa							
	2.0	Peak = >200kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1785 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 261

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 10/05/2020
Borehole Location: Stage 4 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: -
Datum: - Survey Source: Site Plan

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15
	0.3	Peak = >200kPa				ML: Clayey SILT: brown, mottled orange and grey. Low plasticity. (Fill)			
	0.6	Peak = >200kPa							
	0.9	Peak = >200kPa		1			M	H	
	1.2	Peak = UTP							
	1.5	Peak = >200kPa							
	1.8	Peak = >200kPa							
	2.0	Peak = >200kPa		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target Depth Reached
Shear Vane No: 1785 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 262

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 08/01/2020
Borehole Location: Stage 4 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434422.2mE; 740657.1mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		CL: CLAY: light brown mottled grey. Low plasticity. (Fill)	D		
	0.6	Peak = UTP							
	0.9	Peak = UTP							
				1			D to M	H	
	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
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 263

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 06/01/2020
Borehole Location: Stage 4 Logged by: LK Checked by: AS Scale: 1:25 Sheet 1 of 1

Position: 434380.0mE; 740691.4mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				ML: SILT: with minor clay; light grey mottled brown. No plasticity. (Fill)	D	H	
	0.6	Peak = UTP				CL: Silty CLAY: brown mottled grey. Low plasticity. (Fill)			
	0.9	Peak = 91kPa				ML: Clayey SILT: grey mottled orange brown. Low plasticity. (Fill)		St to VSt	
	1.0	Peak = 137kPa Residual = 26kPa		1		*... from 1.00m to 1.20m, Contains a lense of silty sand, grey mottled black.*			
	1.2	Peak = UTP					M		
	1.6	Peak = UTP				CH: CLAY: orange brown mottled grey. High plasticity. (Fill)		H	
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Termination Reason: Target depth
Shear Vane No: 2532 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 264

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 08/01/2020
Borehole Location: Stage 4 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434368.0mE; 740709.3mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP				CL: CLAY: grey mottled brown. Low plasticity. (Fill)	D		
	0.6	Peak = UTP				SP: Fine SAND: light grey. Poorly graded. (Fill)			
	0.9	Peak = UTP		1		CL: CLAY: orange mottled light brown. Low plasticity. (Fill)		H	
	1.2	Peak = UTP					M		
	1.6	Peak = UTP							
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15

Termination Reason: Target depth
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

HAND AUGER BOREHOLE LOG - PCHA 265

Client: Lakeside Developments 2017 Ltd
Project: Lakeside Earthworks 2019/20
Site Location: 95 Scott Road Te Kauwhata
Project No.: HAM2019-0062
Date: 08/01/2020
Borehole Location: Stage 4 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434365.4mE; 740722.1mN Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	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	Dynamic Cone Penetrometer (Blows/100mm)
	0.3	Peak = UTP		0		CL: CLAY: light orange mottled brown. Low plasticity. (Fill)	D		
	0.6	Peak = UTP							
	0.9	Peak = UTP				*... from 0.90m to 1.10m, Contains some fine sand*			
				1			D to M	H	
	1.2	Peak = UTP							
	1.6	Peak = UTP							
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			
				3					
				4					
				5					

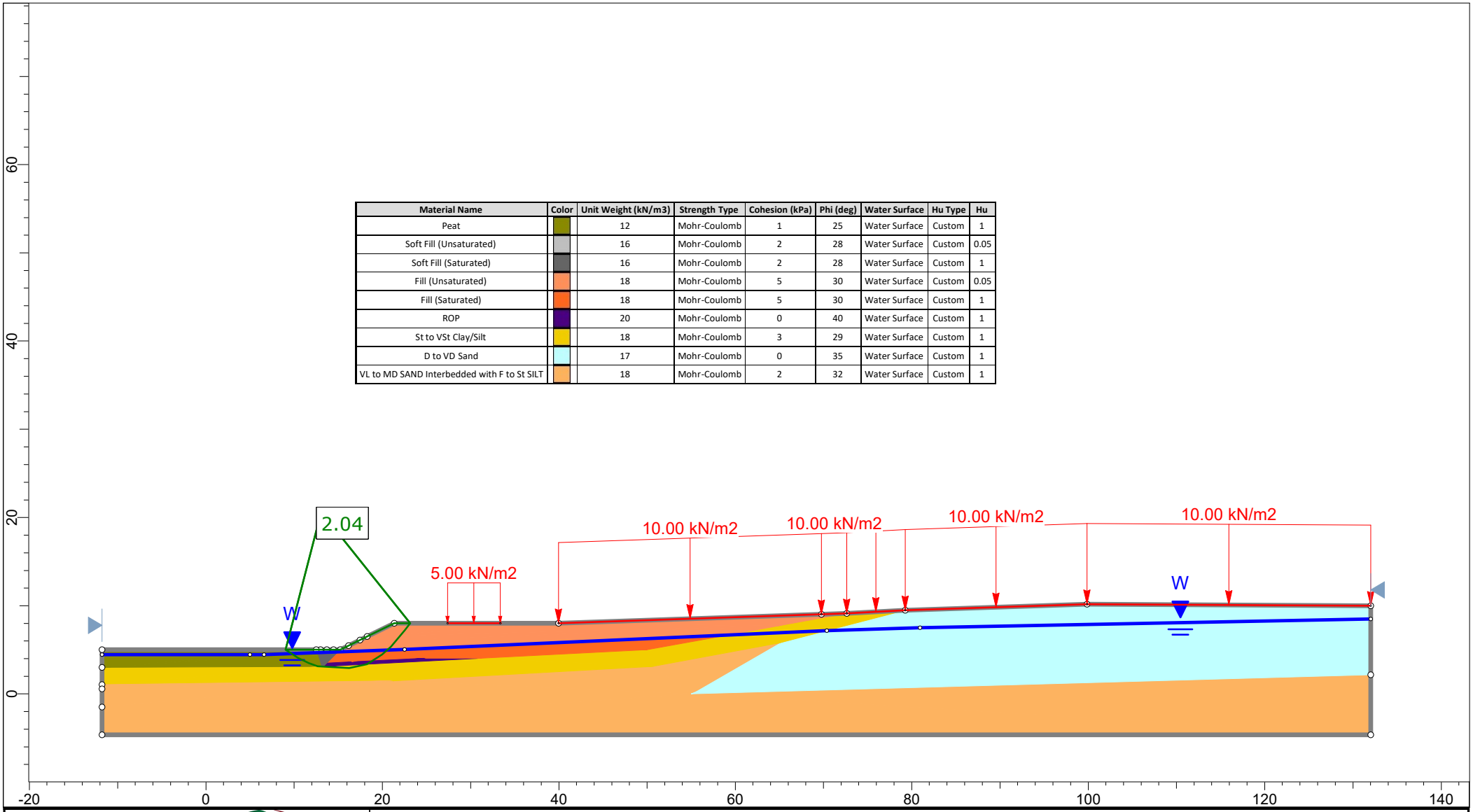
Dynamic Cone Penetrometer (Blows/100mm): 5 10 15

Termination Reason: Target depth
Shear Vane No: 2349 DCP No:
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

Appendix G: Slope Stability Analyses

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Peat		12	Mohr-Coulomb	1	25	Water Surface	Custom	1
Soft Fill (Unsaturated)		16	Mohr-Coulomb	2	28	Water Surface	Custom	0.05
Soft Fill (Saturated)		16	Mohr-Coulomb	2	28	Water Surface	Custom	1
Fill (Unsaturated)		18	Mohr-Coulomb	5	30	Water Surface	Custom	0.05
Fill (Saturated)		18	Mohr-Coulomb	5	30	Water Surface	Custom	1
ROP		20	Mohr-Coulomb	0	40	Water Surface	Custom	1
St to VSt Clay/Silt		18	Mohr-Coulomb	3	29	Water Surface	Custom	1
D to VD Sand		17	Mohr-Coulomb	0	35	Water Surface	Custom	1
VL to MD SAND Interbedded with F to St SILT		18	Mohr-Coulomb	2	32	Water Surface	Custom	1

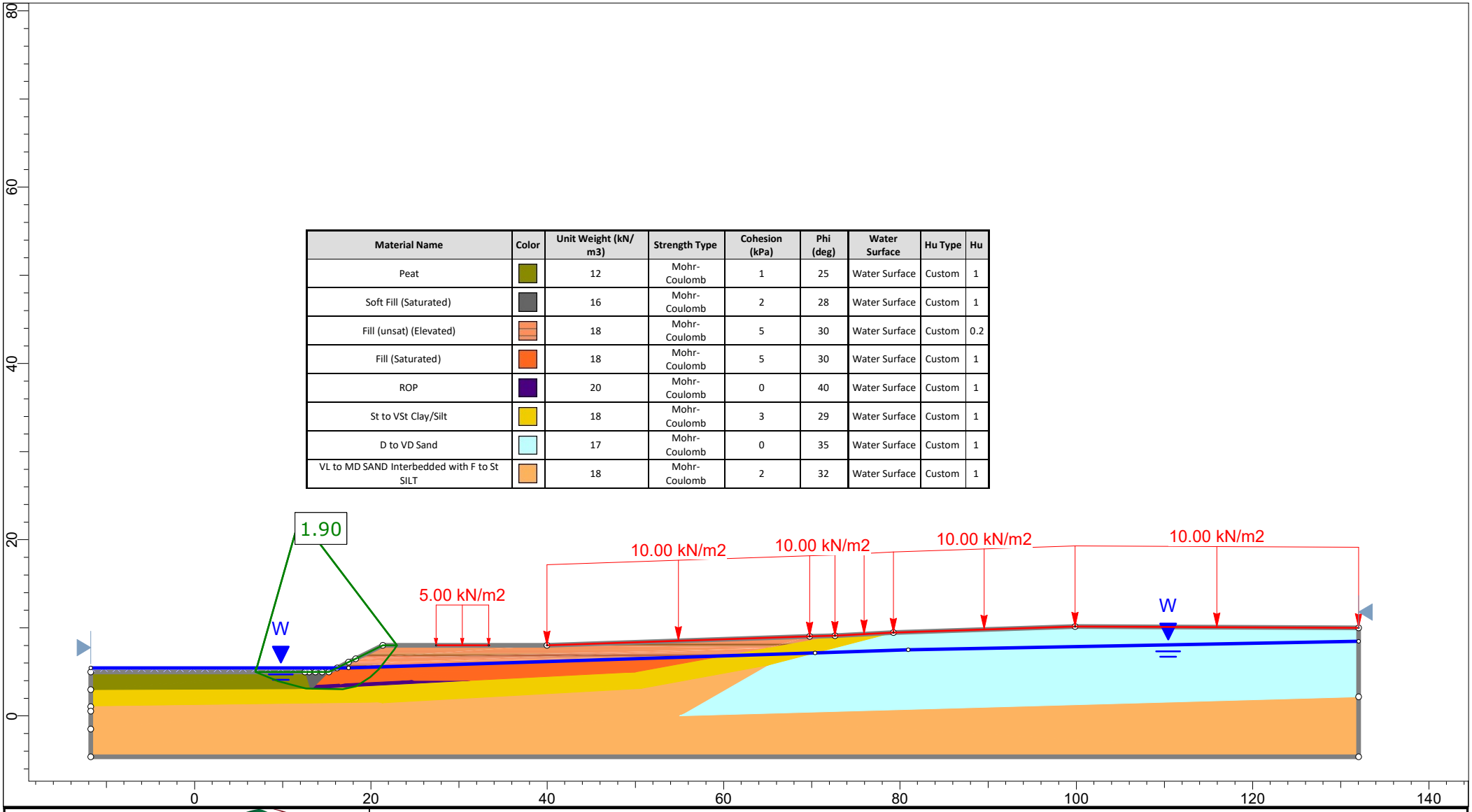


CMW Geosciences

SLIDEINTERPRET 9.001

Project	Lakeside Development HAM2018-0106		
Analysis Description	Road 101 Fill Embankment (Stage 4) - Prevailing Groundwater. Lowest FoS Shown		
Drawn By LK		*Scale* 1:600	*Company* CMW Geosciences
Figure No	*Job No* HAM2018-0106		*File Name* Slide_Drained 27 degrees slope_PGW.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Peat		12	Mohr-Coulomb	1	25	Water Surface	Custom	1
Soft Fill (Saturated)		16	Mohr-Coulomb	2	28	Water Surface	Custom	1
Fill (unsat) (Elevated)		18	Mohr-Coulomb	5	30	Water Surface	Custom	0.2
Fill (Saturated)		18	Mohr-Coulomb	5	30	Water Surface	Custom	1
ROP		20	Mohr-Coulomb	0	40	Water Surface	Custom	1
St to VSt Clay/Silt		18	Mohr-Coulomb	3	29	Water Surface	Custom	1
D to VD Sand		17	Mohr-Coulomb	0	35	Water Surface	Custom	1
VL to MD SAND Interbedded with F to St SILT		18	Mohr-Coulomb	2	32	Water Surface	Custom	1

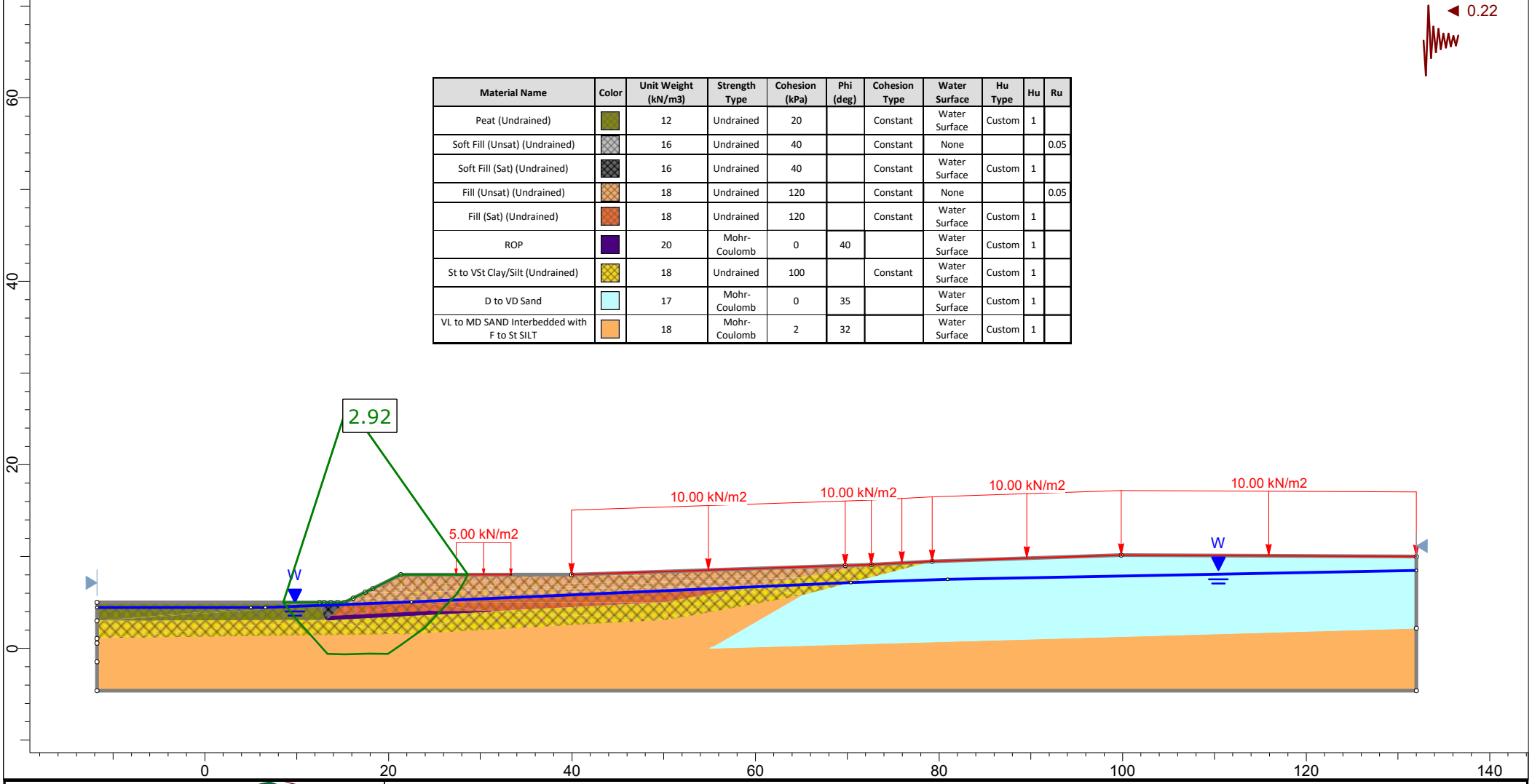


CMW Geosciences

SLIDEINTERPRET 9.001

Project	Lakeside Development HAM2018-0106		
Analysis Description	Road 101 Fill Embankment (Stage 4) - Elevated Groundwater. Lowest FoS Shown		
Drawn By LK		Scale 1:600	Company CMW Geosciences
Figure No	Job No HAM2018-0106		File Name Slide_Drained 27 degrees slope_PGW.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type	Hu	Ru
Peat (Undrained)		12	Undrained	20		Constant	Water Surface	Custom	1	
Soft Fill (Unsat) (Undrained)		16	Undrained	40		Constant	None			0.05
Soft Fill (Sat) (Undrained)		16	Undrained	40		Constant	Water Surface	Custom	1	
Fill (Unsat) (Undrained)		18	Undrained	120		Constant	None			0.05
Fill (Sat) (Undrained)		18	Undrained	120		Constant	Water Surface	Custom	1	
ROP		20	Mohr-Coulomb	0	40		Water Surface	Custom	1	
St to VSt Clay/Silt (Undrained)		18	Undrained	100		Constant	Water Surface	Custom	1	
D to VD Sand		17	Mohr-Coulomb	0	35		Water Surface	Custom	1	
VL to MD SAND Interbedded with F to St SILT		18	Mohr-Coulomb	2	32		Water Surface	Custom	1	

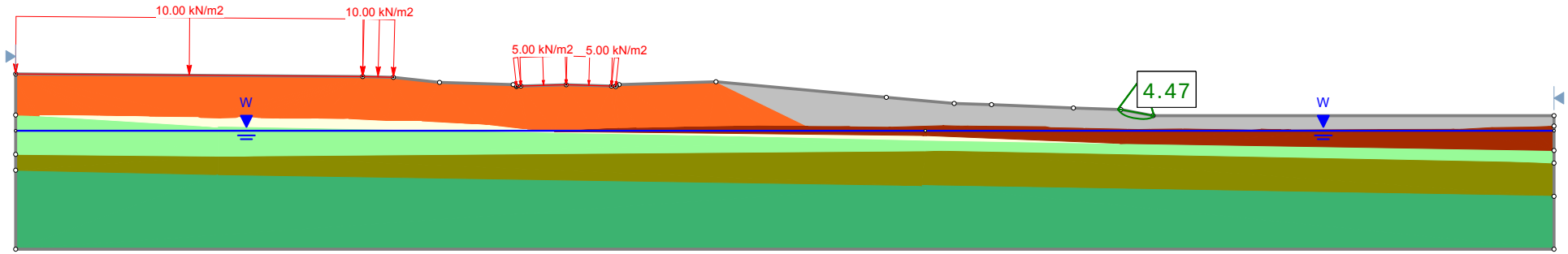


Project	Lakeside Development HAM2018-0106		
Analysis Description	Road 101 Fill Embankment (Stage 4) - Sesimic Scenario. Lowest FoS Shown		
Drawn By LK		Scale 1:600	Company CMW Geosciences
Figure No	Job No HAM2018-0106		File Name Slide_Drained 27 degrees slope_PGW.slmd

CMW Geosciences

SLIDEINTERPRET 9.001

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu	Ru
Stiff silt (low Spec Fill)		16	Mohr-Coulomb	1	28	None			0.1
Very Stiff Clay/Silt (Engineered Fill)		18	Mohr-Coulomb	5	30	None			0.1
Very Soft Peat		12	Mohr-Coulomb	1	25	Water Surface	Custom	1	
Stiff Gravelly Silt		16	Mohr-Coulomb	1	28	Water Surface	Custom	1	
Stiff to Hard clay/sitl (WH Fm)		18	Mohr-Coulomb	3	28	Water Surface	Custom	1	
MD to D Silty Sand (Wh Fm)		16	Mohr-Coulomb	1	35	Water Surface	Custom	1	
Hard Clay/Silt (Wh Fm)		18	Mohr-Coulomb	5	28	Water Surface	Custom	1	

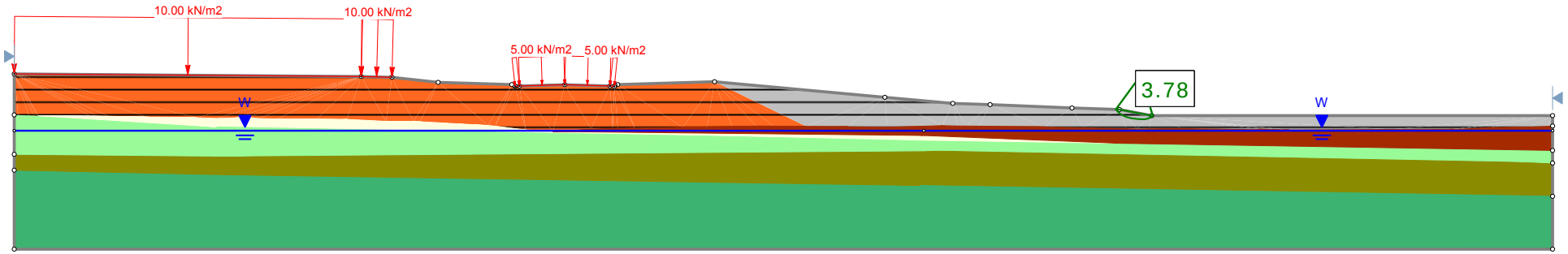


CMW Geosciences

SLIDEINTERPRET 8.026

Project	Lakeside Stage 5		
Analysis Description	Section B - Full Embankment. Prevailing Conditions. Lowest FoS Shown.		
LYK	LYK	*Scale* 1:400	*Company* CMW Geosciences
Date		*File Name*	Section B.slmd

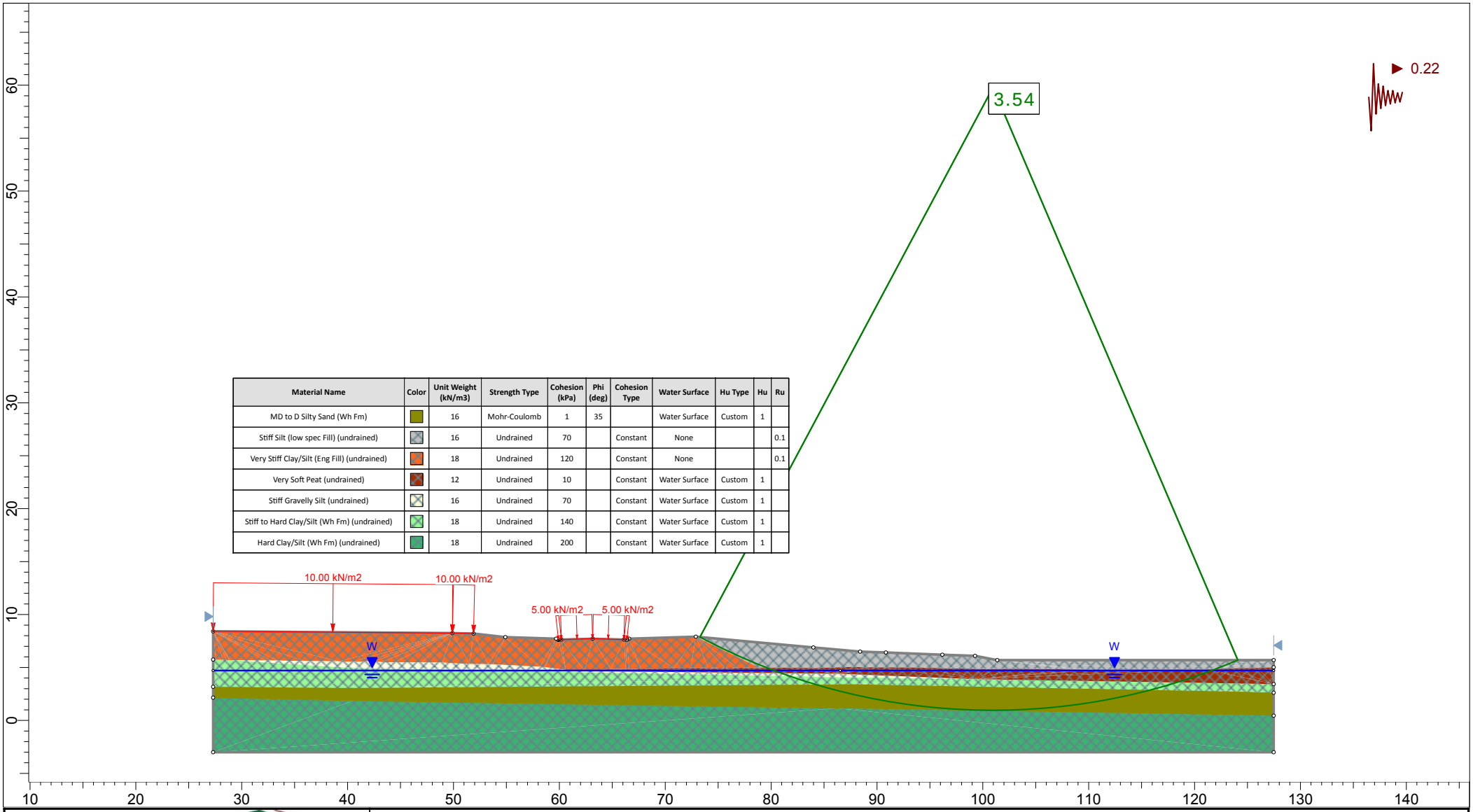
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu	Ru
Stiff Silt (Low spec Fill)		16	Mohr-Coulomb	1	28	None			0.3
Very Stiff Clay/Silt (Eng Fill)		18	Mohr-Coulomb	5	30	None			0.2
Very Soft Peat		12	Mohr-Coulomb	1	25	Water Surface	Custom	1	
Stiff Gravelly Silt		16	Mohr-Coulomb	1	28	Water Surface	Custom	1	
Stiff to Hard clay/sitl (WH Fm)		18	Mohr-Coulomb	3	28	Water Surface	Custom	1	
MD to D Silty Sand (Wh Fm)		16	Mohr-Coulomb	1	35	Water Surface	Custom	1	
Hard Clay/Silt (Wh Fm)		18	Mohr-Coulomb	5	28	Water Surface	Custom	1	



CMW Geosciences

SLIDEINT... 8.026

Project	Lakeside Stage 5		
Analysis Description	Section B - Full Embankment. Elevated Conditions. Lowest FoS Shown.		
LYK LYK	*Scale* 1:400	*Company*	CMW Geosciences
Date		*File Name*	Section B.slmd



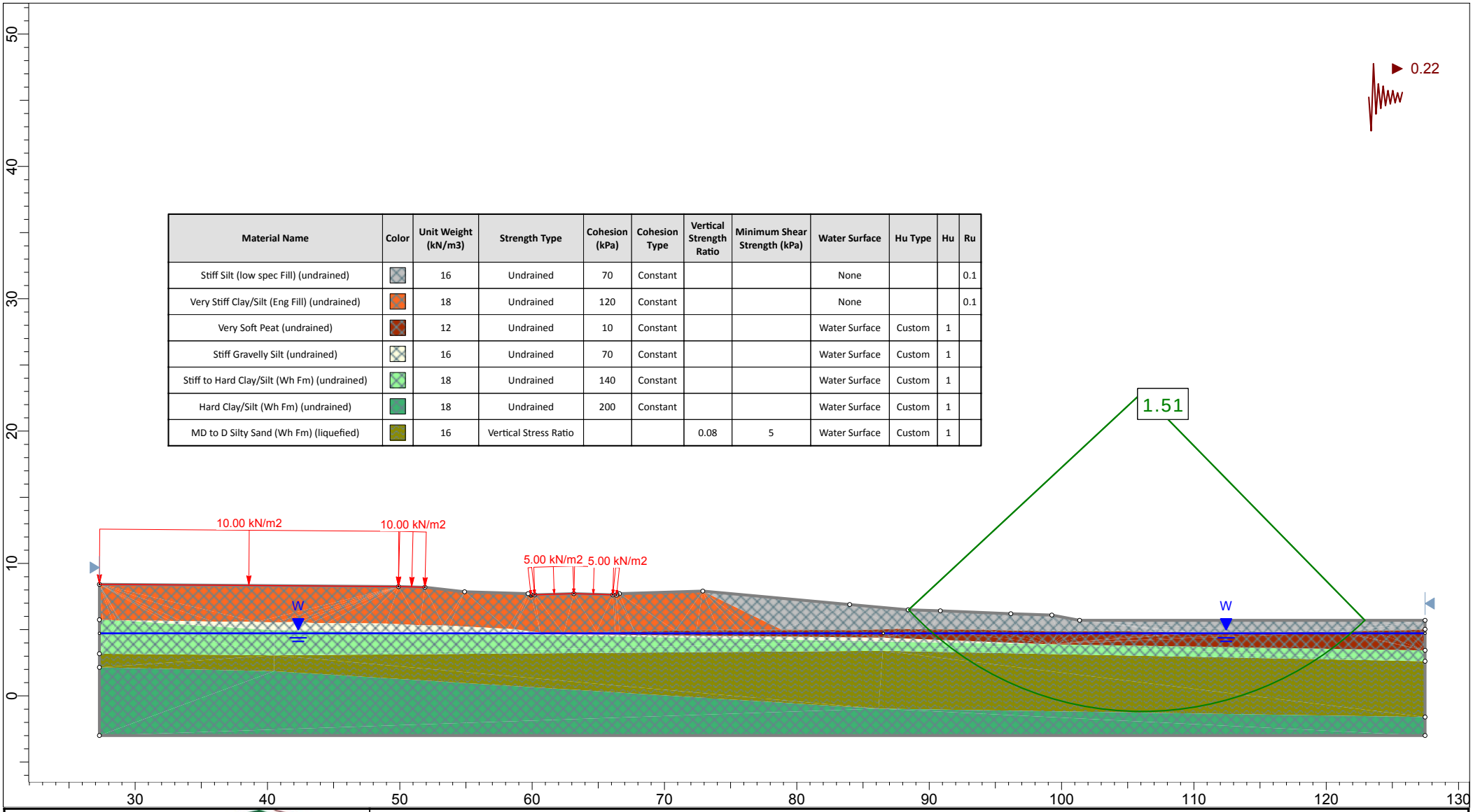
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type	Hu	Ru
MD to D Silty Sand (Wh Fm)		16	Mohr-Coulomb	1	35		Water Surface	Custom	1	
Stiff Silt (low spec Fill) (undrained)		16	Undrained	70		Constant	None			0.1
Very Stiff Clay/Silt (Eng Fill) (undrained)		18	Undrained	120		Constant	None			0.1
Very Soft Peat (undrained)		12	Undrained	10		Constant	Water Surface	Custom	1	
Stiff Gravelly Silt (undrained)		16	Undrained	70		Constant	Water Surface	Custom	1	
Stiff to Hard Clay/Silt (Wh Fm) (undrained)		18	Undrained	140		Constant	Water Surface	Custom	1	
Hard Clay/Silt (Wh Fm) (undrained)		18	Undrained	200		Constant	Water Surface	Custom	1	

CMW Geosciences

SLIDEINTERPRET 8.026

Project	Lakeside Stage 5		
Analysis Description	Section B - Full Embankment. Seismic Scenarion, Prevailing Conditions. Lowest FoS Shown.		
LYK LYK	*Scale* 1:500	*Company*	CMW Geosciences
Date		*File Name*	Section B.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Cohesion Type	Vertical Strength Ratio	Minimum Shear Strength (kPa)	Water Surface	Hu Type	Hu	Ru
Stiff Silt (low spec Fill) (undrained)		16	Undrained	70	Constant			None			0.1
Very Stiff Clay/Silt (Eng Fill) (undrained)		18	Undrained	120	Constant			None			0.1
Very Soft Peat (undrained)		12	Undrained	10	Constant			Water Surface	Custom	1	
Stiff Gravelly Silt (undrained)		16	Undrained	70	Constant			Water Surface	Custom	1	
Stiff to Hard Clay/Silt (Wh Fm) (undrained)		18	Undrained	140	Constant			Water Surface	Custom	1	
Hard Clay/Silt (Wh Fm) (undrained)		18	Undrained	200	Constant			Water Surface	Custom	1	
MD to D Silty Sand (Wh Fm) (liquefied)		16	Vertical Stress Ratio			0.08	5	Water Surface	Custom	1	

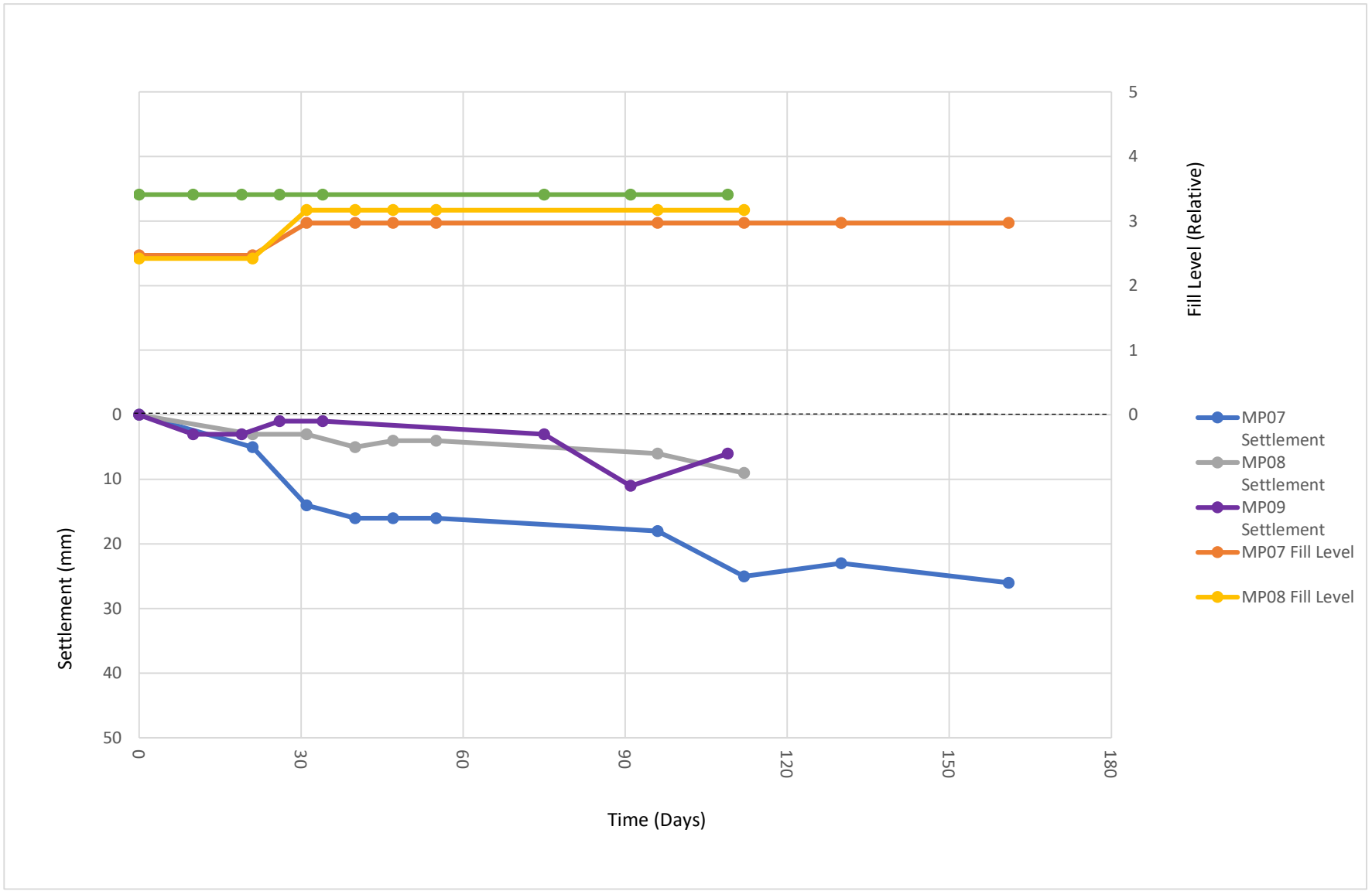


Project	Lakeside Stage 5		
Analysis Description	Section B - Full Embankment. Seismic Scenario-Liquefy, Prevailing Conditions. Lowest FoS Shown.		
LYK	LYK	*Scale* 1:400	*Company* CMW Geosciences
Date		*File Name*	Section B.slmd

CMW Geosciences

SLIDEIN... ...8.026

Appendix H: Stage 5 Settlement Data



CMW Geosciences	CLIENT: LAKESIDE DEVELOPMENT 2017 LTD	DRAWN: LK	PROJECT NO: HAM2019-0062
	PROJECT: LAKESIDE DEVELOPMENT STAGE 5	CHECKED: KJR	DRAWING NO: -
		REVISION: 0	SCALE: NTS
	TITLE: SETTLEMENT MONITORING	DATE: 22/07/2020	SIZE/SHEET: A4L

CMW Geosciences	CLIENT:	Lakeside Developments 2017 Ltd	DESIGNER: LYK
	PROJECT:	Stage 5	CHECKED:
			REVISION: 2
	TITLE:	Primary and Secondary Consolidation of Soft Soil Layers	DATE: 22/07/2020
			PROJECT: HAM2019-0062

1. Consolidation Settlement (Terzaghi)

Exist Fill Density:	16	kN/m3
Silt Density (Saturated):	16	kN/m3
Peat Density (Saturated):	12	kN/m3
Surcharge Density:	18	kN/m3
Additional surcharge load	0	kN/m2

Layer	Original Ground RL	Water Table RL	Surcharge Top RL	Exist Fill Thickness	Soft Soil Thickness	Base Fill RL	Base Soft Soil RL	Mid-Point Soft Soil RL	Surcharge Height	Initial Eff Stress	Applied Surcharge	Comp Index C_c	Recomp. Index C_R	Initial Void Ratio e_0	Exist Over Consol.	Δe	Consol Settlement (100%)	Observed Consol	Cons Coeffi Cv (m2/year)	Drainage path (1 or 2 way)	Time t90 consol (year)	Time t90 consol Days
	(mAHD)	(mAHD)	(mAHD)	(m)	(m)	(mAHD)	(mAHD)	(mAHD)	(m)	(kPa)	(kPa)				(kPa)		(m)	(m)	(m2/year)			
MP09	7.5	4.5	8	2.5	1	5	4	4.5	0.5	48	9	0.25	0.018	1.125	0	-0.0187	**0.009**	**0.006**	0.75	1	**1.131**	**412.693**
MP08	7.5	4.5	8	2.5	0.6	5	4.4	4.7	0.5	46	9	0.43	0.018	1.125	0	-0.0337	**0.010**	**0.009**	0.75	1	**0.407**	**148.570**
MP07	7.5	4.5	8	2.5	0.6	5	4.4	4.7	0.5	48	9	6.5	0.75	10	0	-0.4873	**0.027**	**0.026**	1.5	1	**0.204**	**74.285**
Total																						

2. Mesri Creep Settlement - (Mesri et al (1994) and Mesri & Ajlouni (2007))

Assumed C_α/C_c =	0.04	Silt	0.07	Peat
Design Period, t =	50	yr		
Future Load, Δσ =	10	kPa		

$$\Delta\varepsilon_S = \frac{C_\alpha}{1+e_p}\log\frac{t_2}{t_1}$$

- C_α is the material dependent coefficient of secondary consolidation
- e_p is the void ratio at the end of primary consolidation

	H	Ca	Creep (m)	Creep+Remaining Consol+building
MP09	0.99	1.0E-02	**0.008**	0.019
MP08	0.59	1.7E-02	**0.010**	0.020
MP07	0.57	4.6E-01	**0.057**	0.058
Total				

CMW Geosciences	CLIENT:	Lakeside Developments 2017 Ltd	DESIGNER: LYK
	PROJECT:	Stage 5	CHECKED: KR
			REVISION: 2
	TITLE:	Primary and Secondary Consolidation of Soft Soil Layers - Building Load	DATE: 22/07/2020
			PROJECT: HAM2019-0062

1. Consolidation Settlement (Terzaghi)

Exist Fill Density:	16	kN/m3
Silt Density (Saturated):	16	kN/m3
Peat Density (Saturated):	12	kN/m3
Surcharge Density:	18	kN/m3
Additional surcharge load	0	kN/m2

Layer	Original Ground RL	Water Table RL	Surcharge Top RL	Exist Fill Thickness	Soft Soil Thickness	Base Fill RL	Base Soft Soil RL	Mid-Point Soft Soil RL	Surcharge Height	Initial Eff Stress	Applied Surcharge	Comp Index C_C	Recomp. Index C_R	Initial Void Ratio e_0	Exist Over Consol.	Δe	Consol Settlement	t90	Cons Coeffi Cv (m2/year)	Drainage path (1 or 2 way)	Time t90 consol (year)	Time t90 consol Days
	(mAHD)	(mAHD)	(mAHD)	(m)	(m)	(mAHD)	(mAHD)	(mAHD)	(m)	(kPa)	(kPa)				(kPa)		(m)	(m)	(m2/year)			
MP09	8	4.5	8	3	1	5	4	4.5	0	56	10	0.25	0.018	1.125	0	-0.0178	**0.008**	**0.008**	0.75	1	**1.131**	**412.693**
MP08	8	4.5	8	3	0.6	5	4.4	4.7	0	52	10	0.43	0.018	1.125	0	-0.0331	**0.009**	**0.008**	0.75	1	**0.407**	**148.570**
MP07	8	4.5	8	3	0.6	5	4.4	4.7	0	54	0	6.5	0.75	10	0	0.0000	**0.000**	**0.000**	1.5	1	**0.204**	**74.285**
Total																						

2. Mesri Creep Settlement - (Mesri et al (1994) and Mesri & Ajlouni (2007))

Assumed C_α/C_c =	0.04	Silt	0.07	Peat
Design Period, t =	50	yr		
Future Load, Δσ =	10	kPa		