

22 February 2021

LAKESIDE DEVELOPMENT STAGE 6

GEOTECHNICAL COMPLETION REPORT No.5

Lakeside Development 2017 Limited Ref. HAM2019-0062AP Rev 1

HAM2019-0062AP											
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1. INTRODUCTION

This Geotechnical Completion Report (GCR) has been prepared for Lakeside Developments 2017 Limited as part of the documentation to be submitted to Waikato District Council (WDC) to support the application of land titles for the following residential lots at 98 Scott Road, Te Kauwhata, (*Drawing 45*):

Stage 6: Lots 5 to 10, 19, 72 to 77, 98 to 109, 120 to 149, 157 to 171.

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

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

Stormwater controls, roading and civil works carried out as part of the subdivision have been supervised by other parties 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 6 is split between the elevated rolling hill topography, an expansive south-western gully feature and two smaller south eastern gully features.

Other features of note include:

- Along the northern western extent of Stage 6 a 15 metre high natural escarpment at 24 to 28 degrees separates the elevated rolling topography of Stages 3 & 3A from the south western gully of Stage 6.
 Two historic landslips were present on this escarpment, labelled Ls5a and Ls5b in previous ground investigation report by Earthtech.
- The formation of a structural fill embankment in the south of Stage 3 and north eastern area of Stage 6 created by previous earthworks in the 2017/18 season.

The contours of the original landform are shown on Drawings 64 to 66.

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 67 to 69*), ground levels within the subject areas have been extensively modified by subdivision earthworks incorporating cut and fill depths of up to 4.0m and 6.5m respectively.

The as-built landform (*Drawings 70 to 72*) comprises a series of near level benched building platforms that generally step down towards the south 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 Geosciences Ref. HAM2019-0062AP Rev. 1

- CMW "Alternative School Site, Geotechnical Investigation Report" (ref HAM2018-0106AR Rev 2) dated 21 October 2019.
- CMW Earthworks Specification (ref HAM2018-0106AB Rev 1) dated 17 October 2018.
- CMW Sales Precinct Geotechnical Completion Report (ref HAM2017-0102 Rev 0) dated 30 April 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.
- CMW Geotechnical Completion Report No.4 (ref HAM2019-0062AK Rev 0) dated 28 August 2020.
- CMW Geotechnical Completion Report No.3 Addendum (ref HAM2019-0062AO Rev 0) dated 18 September 2020.

4. GROUND MODEL

4.1. Soil Profile

The landform over which the lots are situated was investigated by Earthtech in October 2016 with further investigation carried out by CMW in August 2019. These investigations comprised a combination of 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. South Western Gully Stage 6: Lots 5 to 10, 19, 120 to 136											
Upper Holocene	Very soft to firm PEAT, SILT and CLAY	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 7.5m									
Whangamarino Formation	Very stiff Clayey SILT and Sandy SILT; Medium dense Silty SAND; Hard LIGNITE	>8.0m									
B. South Eastern Gully Stage 6: Lots 101 to 104, 137 to 149, 163 to 171											
Whangamarino Silts and Clays	Stiff to very stiff CLAY, SILT, Silty CLAY, Clayey SILT, Sandy SILT; pumiceous.	0.0 to 2.0m									
Whangamarino Lignite	Hard LIGNITE	>0.5m									

Whangamarino Sands	Medium dense to dense pumiceous SAND and Silty SAND	0.3m to >1.0m
C. Rolling Hills		
Stage 6: Lots 72 to 77, 98 to 1	00, 105 to 109, 157 to 162	
Geological Unit	Description	Typical Thickness
Brown Ash (Hamilton/Kauroa Ash)	Stiff to very stiff CLAY and Silty CLAY	0.3m to 3.7m
Whangamarino Silts and Clays	Stiff to very stiff CLAY, SILT, Silty CLAY, Clayey SILT, Sandy SILT; pumiceous.	1.0 to 4.0m
Whangamarino Lignite	Hard LIGNITE	0.5m to 3.0m
Whangamarino Sands	Medium dense to very dense pumiceous SAND and Silty SAND	0.5m to 2m

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

However, during construction the Holocene Alluvium soils in the southwestern gully were found to comprise stiff to very stiff clayey silt and sandy silt, over interbedded firm silt and medium dense sand contrary to the anticipated ground conditions based on earlier ground investigation. The decision was made to leave these soils in place rather than undercut them as originally intended.

Further ground investigation undertaken along the south western margin of Stage 6 associated with the alternative school site proved an infilled channel feature of firm silt interbedded with medium dense sand beneath the stiff to very stiff clayey silt and sandy silt. This firm potentially compressible silt was found to be 1.5m thick along the boundary of Lots 123 to 128 increasing to 2m along the southern boundary of Road 1.

Settlement monitoring has since been undertaken to record actual fill induced settlement and allow calculation of potential long-term settlements that may arise from these alluvial soil layers.

4.2. Groundwater

Based on the investigation data and observations, the regional groundwater table across the two gully features ranged between approximately 0.5 to 1.5m below the original ground level typically perched on top of the Whangamarino Lignite layer.

Minimal seasonal fluctuation is expected due to the elevation of these gullies (RL9-13m) above the low-lying alluvial flats (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 topography along the north eastern boundary of Stage 6 and placing engineer certified fill within the lower areas.

The chronology of the main earthworks operations was 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 creating a fill embankment in the north eastern area of
 Stage 6.
- During 2018/19 season, bulk earthworks were carried out across Stages 1 to 4 and the south western gully of Stage 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 (south
 western and south eastern gullies). Works within the south eastern gully were completed but work
 within the south western gully was not.
- Bulk earthworks were completed in the south western gully of Stage 6 midway through the 2020/21 season

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

- Topsoil stripping across all bulk cut and fill earthworks surfaces;
- Over excavation of uncontrolled fill material associated with a historic farm track and silage pits.
- Excavation of localised soft material within the historic farm drains.
- Over-excavation of soft and compressible material that had accumulated within the temporary sediment retention ponds to expose a very stiff to hard subgrade before infilling with engineered fill.
- Over-excavation of landslide Ls5a and Ls5b debris and benching into the undisturbed natural escarpment to the south of Stage 3A and the fill embankment of Stages 3 and 6.
- Subsoil drains were installed at the locations shown on *Drawings 70 to 72* to intercept perched groundwater seepages within the Whangamarino Formation soils;
- The sensitive soils, high groundwater table and the size of machinery being used meant that in the south western gully significant remoulding and 'pumping up' of groundwater was observed during trafficking by plant. Subsoil drains were installed to allow pore pressure dissipation during construction and a 0.5m thick clay starter layer was constructed across this area with nominal compaction to provide an elevated stable working platform for machinery;
- Bulk cut to fill earthworks were then undertaken to cut and fill heights of 3.0m and 6.0m respectively;

During construction further investigation identified potentially compressible soils beneath Road 1
and beneath the lots. Settlement monitoring points were installed to monitor the settlement and
provide geotechnical data to allow the back calculation of long-term creep settlements.

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 undertaken in accordance with the relevant codes, specifications, 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 materials were obtained and subjected to laboratory testing to determine the solid density and compaction properties of the 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, 2019/20 and 2020/21 seasons a total of 665 compliance tests (incl 135 retests) have been carried out across Stages 1 to 6 on a certified fill volume of 572,873,m³ placed to 14 January 2021. This equates to one fill test per 1,100m³ of fill. The specification required 1 test every 1000m³ to 1500m³.

The locations of the respective earthfill quality control tests are presented on the attached **Drawings 73 to 75**.

6.3. Earthfill Suitability

Results of the earthfill quality control testing undertaken to date in Stage 6 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 layer. 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.

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 70 to 72*.

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 (re. 4036-3) and the CMW Alternative School Site Investigation Report.

Soils of the Whangamarino Formation are considered to be non-liquefiable. The Holocene soils left in place within the south western gully are considered potentially liquefiable. The previous analyses reported by CMW for the school site assumed IL3 buildings.

A reassessment has therefore been carried out by CMW for IL2 buildings, taking in to account the fill surcharge and aging of the Whangamarino Formation soils.

Copies of our results are provided in *Appendix G* which indicates that liquefaction induced settlements within the lots are expected to be of the order of <10mm.

Liquefaction induced settlements along the southern boundary of Road 101 are estimated to be of the order of 30mm.

Furthermore, the placement of an engineered fill raft of 4.0 to 6.0 metres in these areas creates a substantial thickness of non-liquefiable crust such that there is a low risk of surface manifestation.

7.2. Slope Stability

Following bulk earthworks, the landform encompassed by this report comprises of 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):20(h).

The south western boundary of Stage 6 comprises a temporary fill embankment up to 5 metres high constructed from very stiff to hard silt and clay fill. Future stages of the development will comprise the placement of up to 7 metres of engineered fill immediately south of Stage 6, and against the embankment slope upto the crest level.

Lots near the temporary fill embankment of Stage 6 are setback 30 metres from the crest of the slope.

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

7.3. Fill Induced Settlement

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.

7.3.1. South Western Gully

Investigation and geomorphological mapping carried out after starting construction identified an infilled channel feature along the south western margin of Stage 6.

Four settlement monitoring points (MP10, 11, 12 and 13) were installed across the area as shown on *Drawings 65/66, 68/69 and 71/72*. Settlement monitoring data is presented in *Appendix H.*

The timing of investigation meant that monitoring points were installed following the placement of fill. Back calculation of the data, and considering settlement data from fill placed over equivalent soils in Stage 1 of the Lakeside Development suggests that 50mm of settlement had already occurred prior to monitoring commencing.

Based on the settlement response to the remaining fill, back analyses of the observed settlement data have been used to define parameters and estimate the post construction settlements at each location.

The estimated post construction settlements are made up of the remaining consolidation settlements and secondary creep settlements.

Creep settlements (Screep) were estimated in accordance with the following relationship as described in Mesri et al (1994):

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

Where C_{∞} and e_0 are as defined in **Appendix H**, H = thickness of compressible layer, t = design life (50 years), $t_1 = t_{90}$ or construction period, whichever is greatest.

Resulting creep settlement magnitudes were estimated based on the following:

• Design life of 50 years.

As the compressible soils are 6m below final level they will not experience loading from conventional light weight strip footings and settlement from the fill weight alone has been calculated.

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

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 450m² 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 450m² one post construction hand auger was carried out near the centre of the Lot.

7.4.2. Lignite

In the geotechnical interpretative reports prepared for the subdivision, various recommendations were made regarding undercutting lignite deposits where exposed at 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 800mm below design subgrade level.

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 in the cut areas of Lots 105 to 109, 143 to 147, 157 to 162 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 and 7.5.3, 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.

7.5.2. Lot 144

Along the north eastern boundary of Lot 144 a pocket of loose sand and soft silt was encountered in the post construction hand augers PCHA 144B and PCHA 146A. Further hand augers carried out within the area of the Lot did not encounter these soils therefore it is believed to be isolated.

A designated building platform (*Drawing 72*) has been provided for Lot 144. This is located 8.7m from the north eastern boundary, 1.5m from the northwestern and south eastern boundaries and 3m from the south western boundary.

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

Should the building extend beyond the designated building platform specific engineer design foundations (i.e piled or cantilevered foundation) will be required.

7.5.3. Lot 146

The post construction hand auger PCHA 146A carried out along the southern boundary encountered loose natural soils below a depth of 1.3m which is not expected to extend into the lot although will be spanned by the building platform. The post construction hand auger indicates that a Geotechnical Ultimate Bearing Capacity of 200 kPa should be available.

Proprietary raft foundations are therefore recommended for this lot on account of natural variability of soil strengths across the lot.

7.5.4. 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. 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 lot 145 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 Candor3 indicates that the topsoil depths across these lots range from approximately 0.1m to 0.35m.

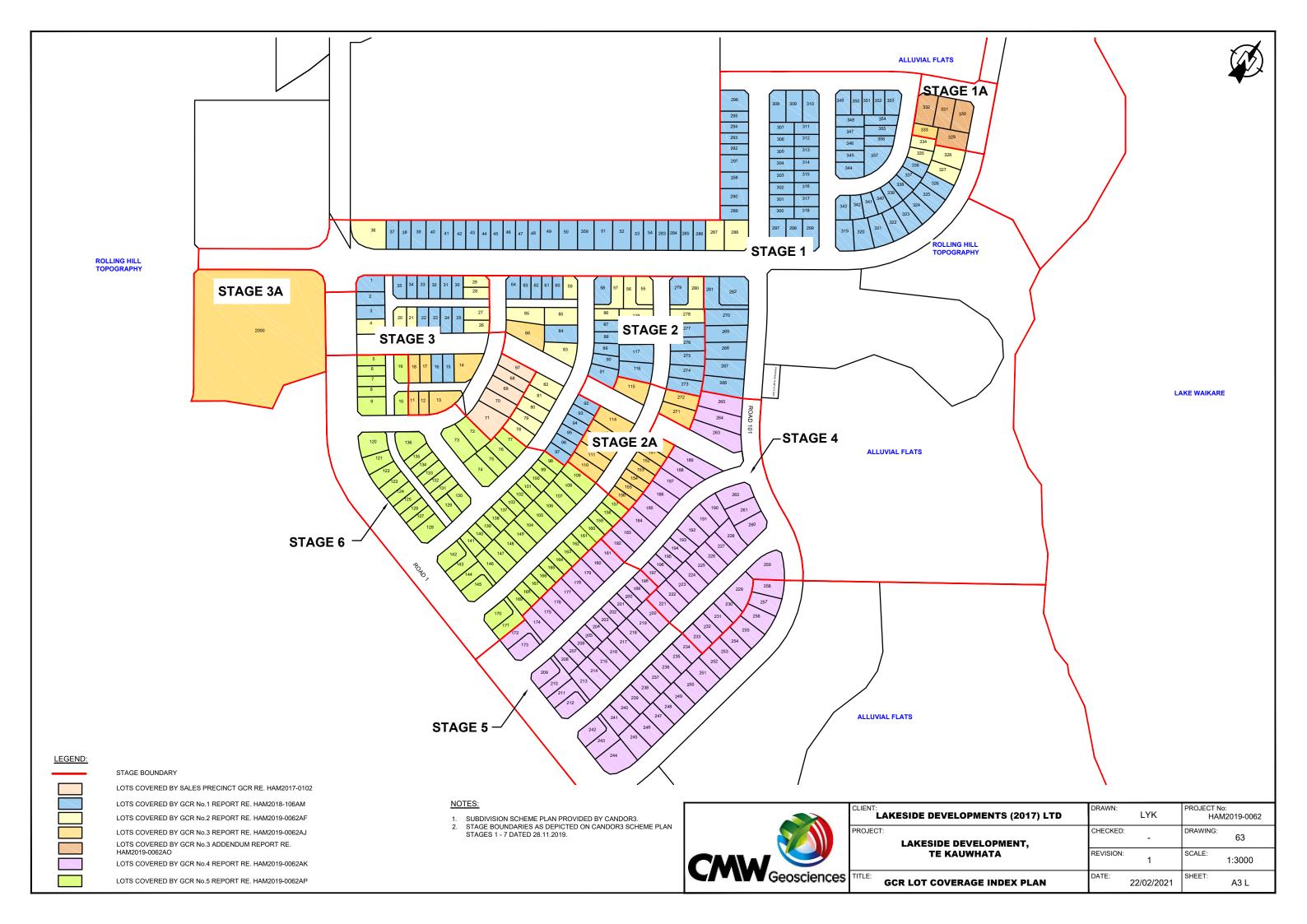
8. LIMITATION

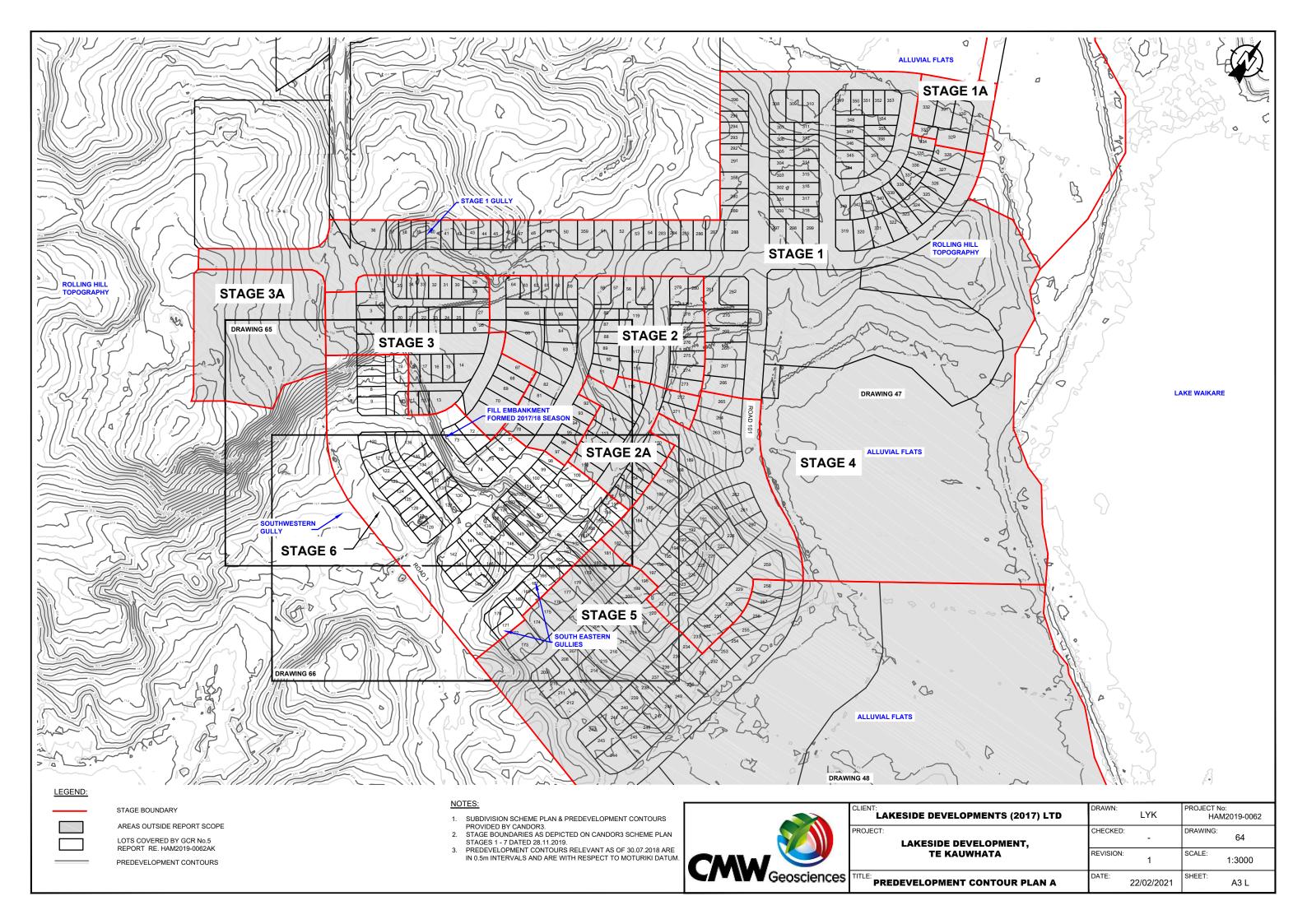
This report has been prepared for use by our Lakeside Developments 2017 Limited, their consultants, and Waikato District Council. Liability for its use is limited to the scope of work for which it was prepared as it may not contain sufficient information for other parties or for other purposes.

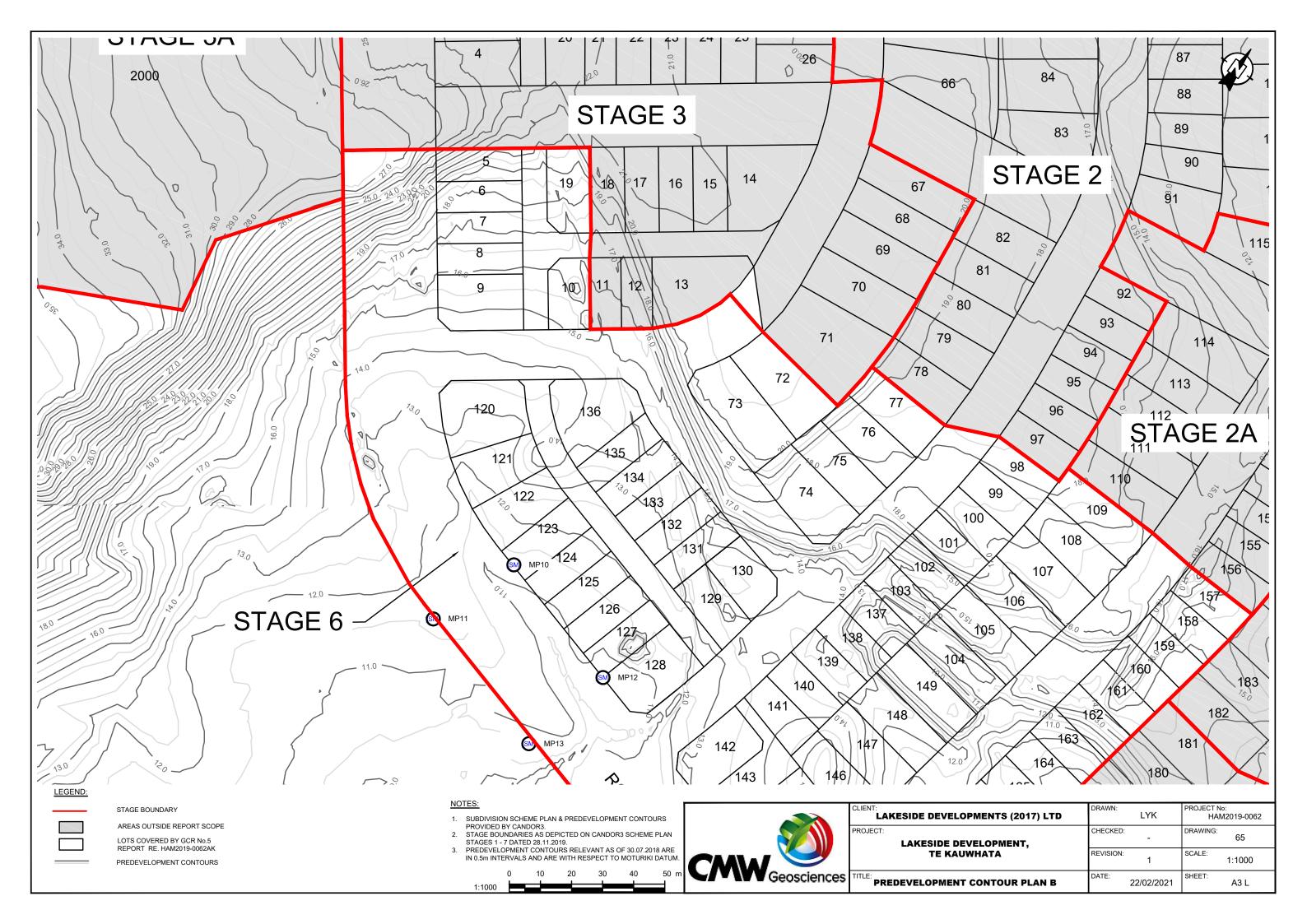
Although regular site visits have been undertaken for observation, for providing guidance and instruction for testing purposed, the geotechnical services scope did not include full time site presence. To this end, our appended suitability statement also relies on the Contractors' work practices and assumes 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.

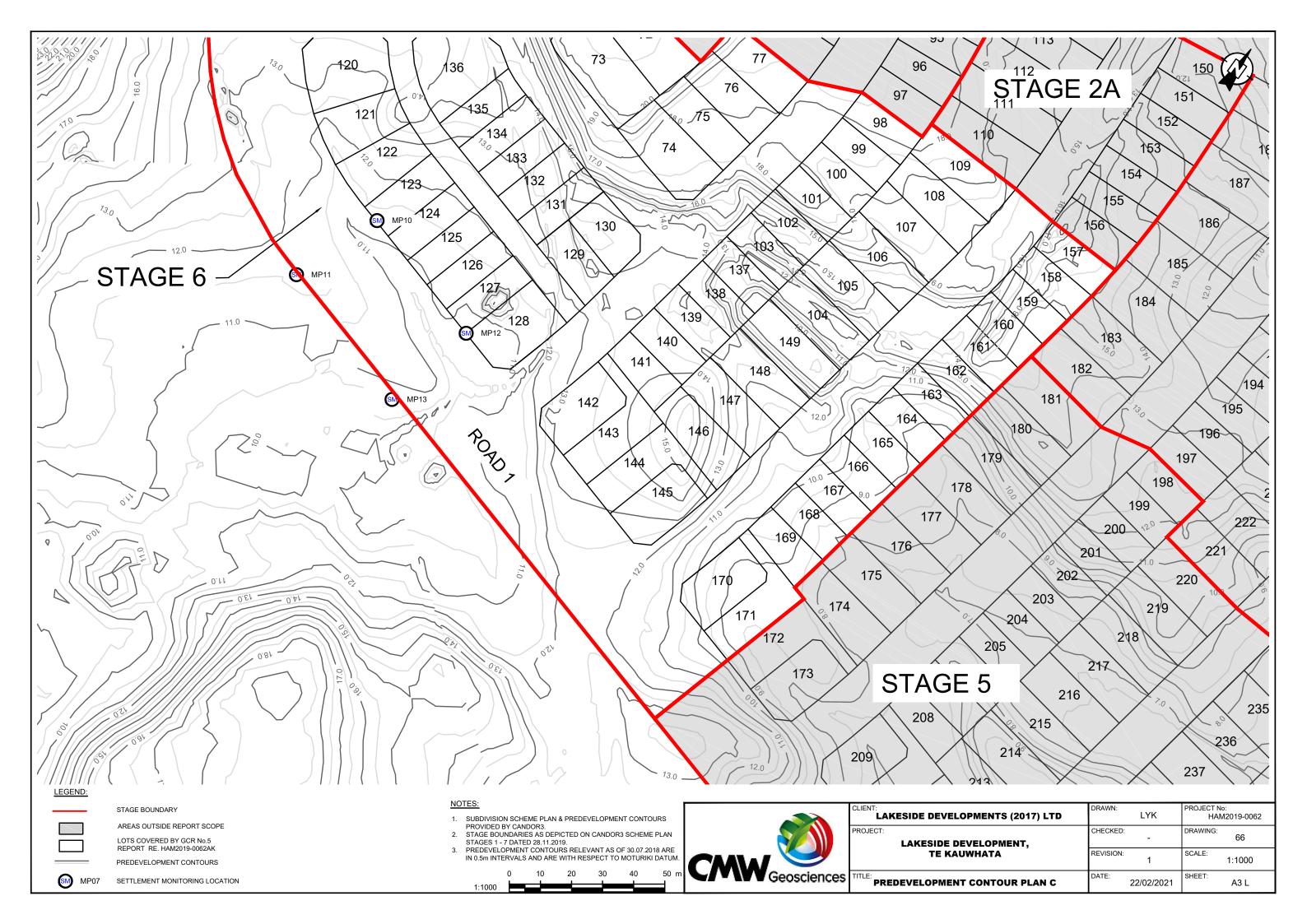
There may be special conditions pertaining to this site which have not been disclosed by the investigation and which have not been taken into account in the report. If variations in the subsoils occur from those described or assumed to exist, then the matter should be referred back to CMW immediately.

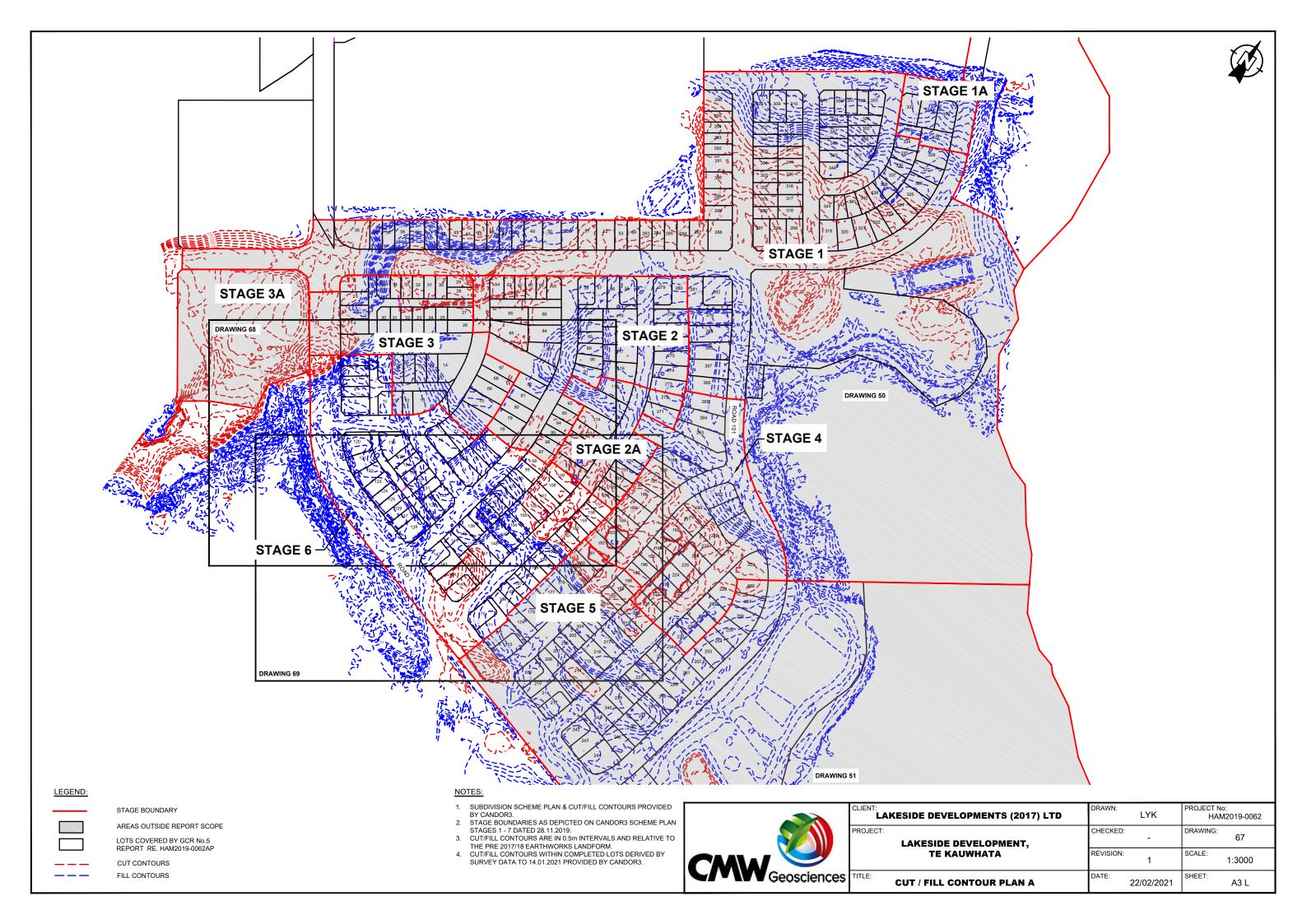
Drawings

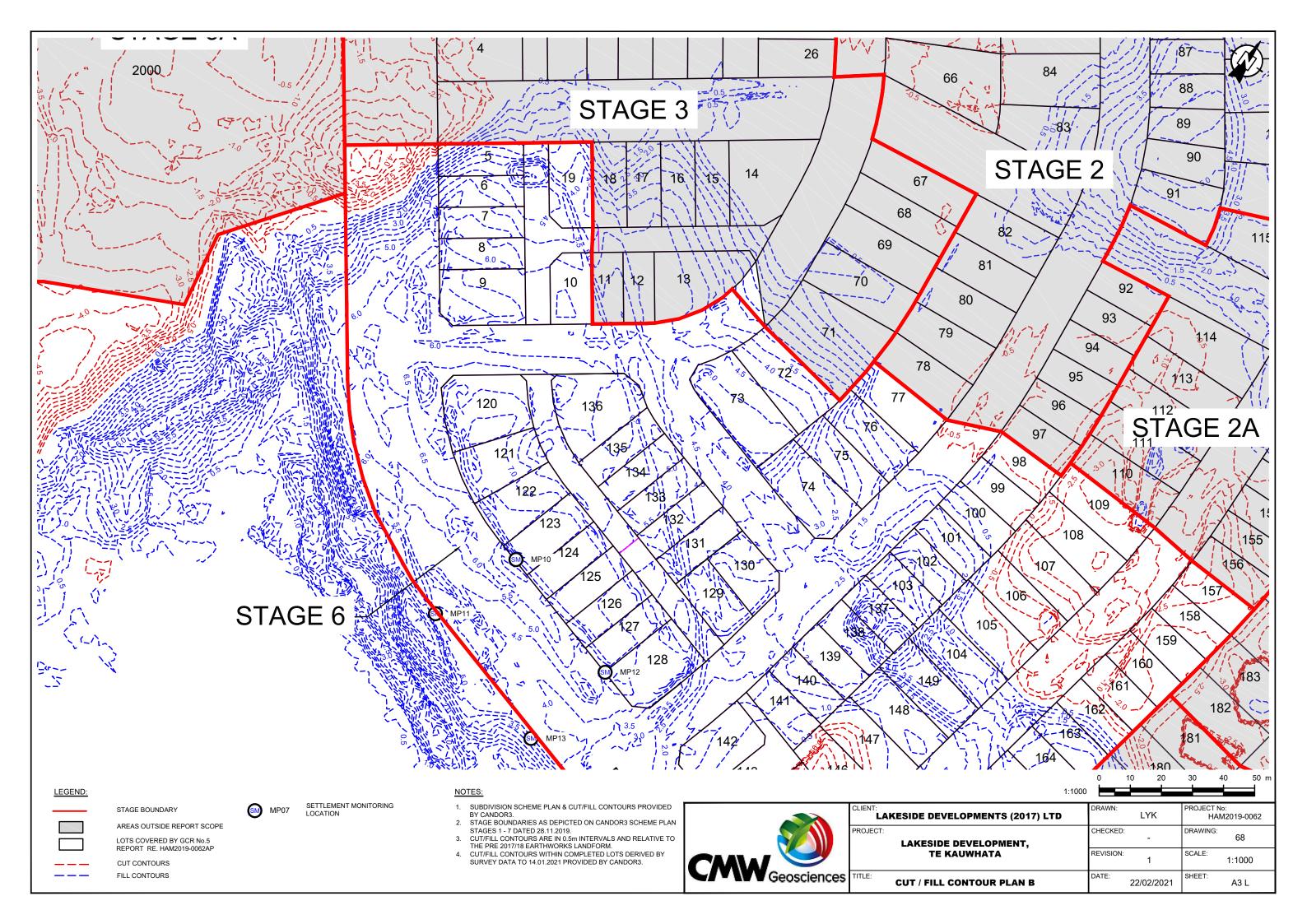


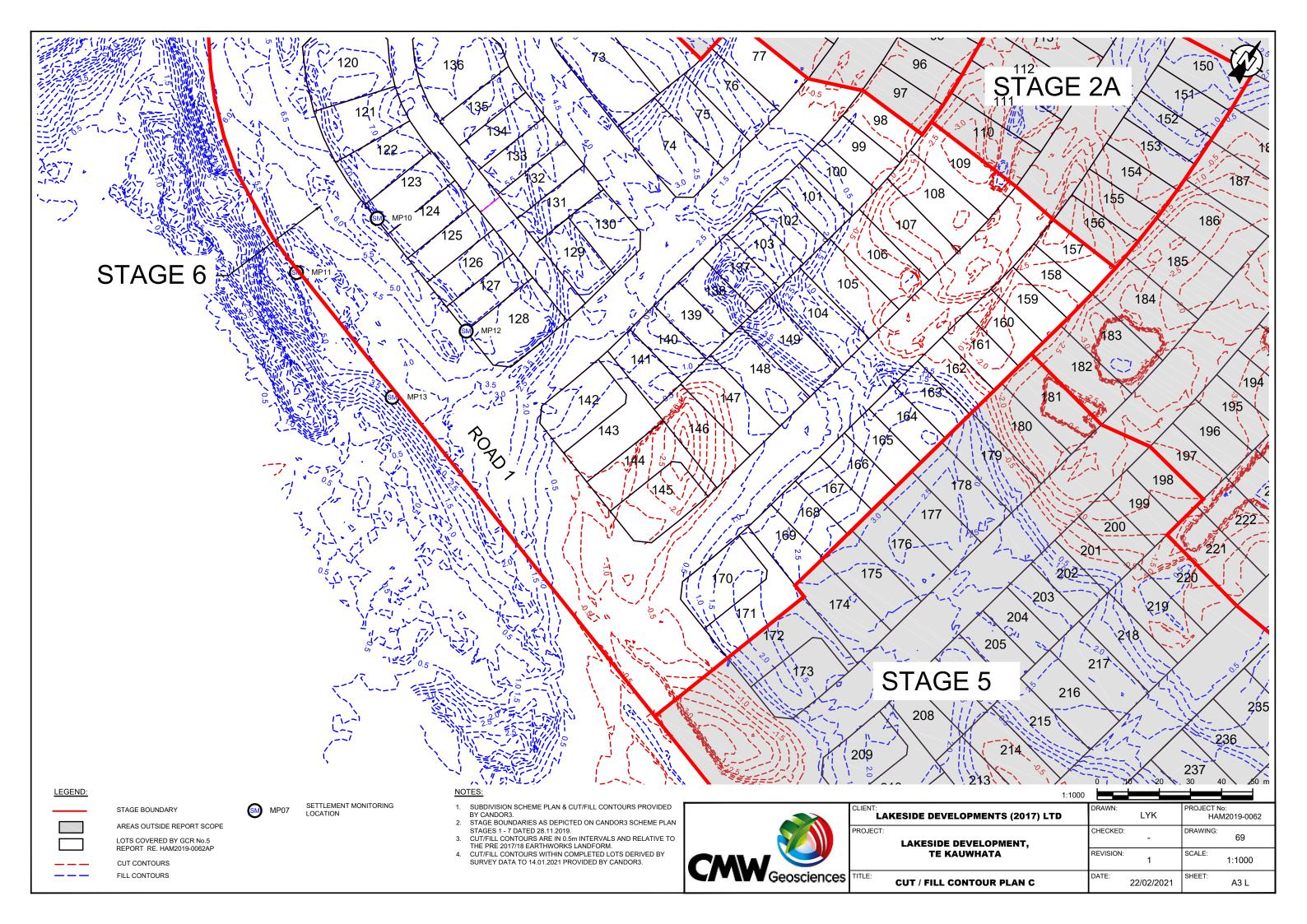


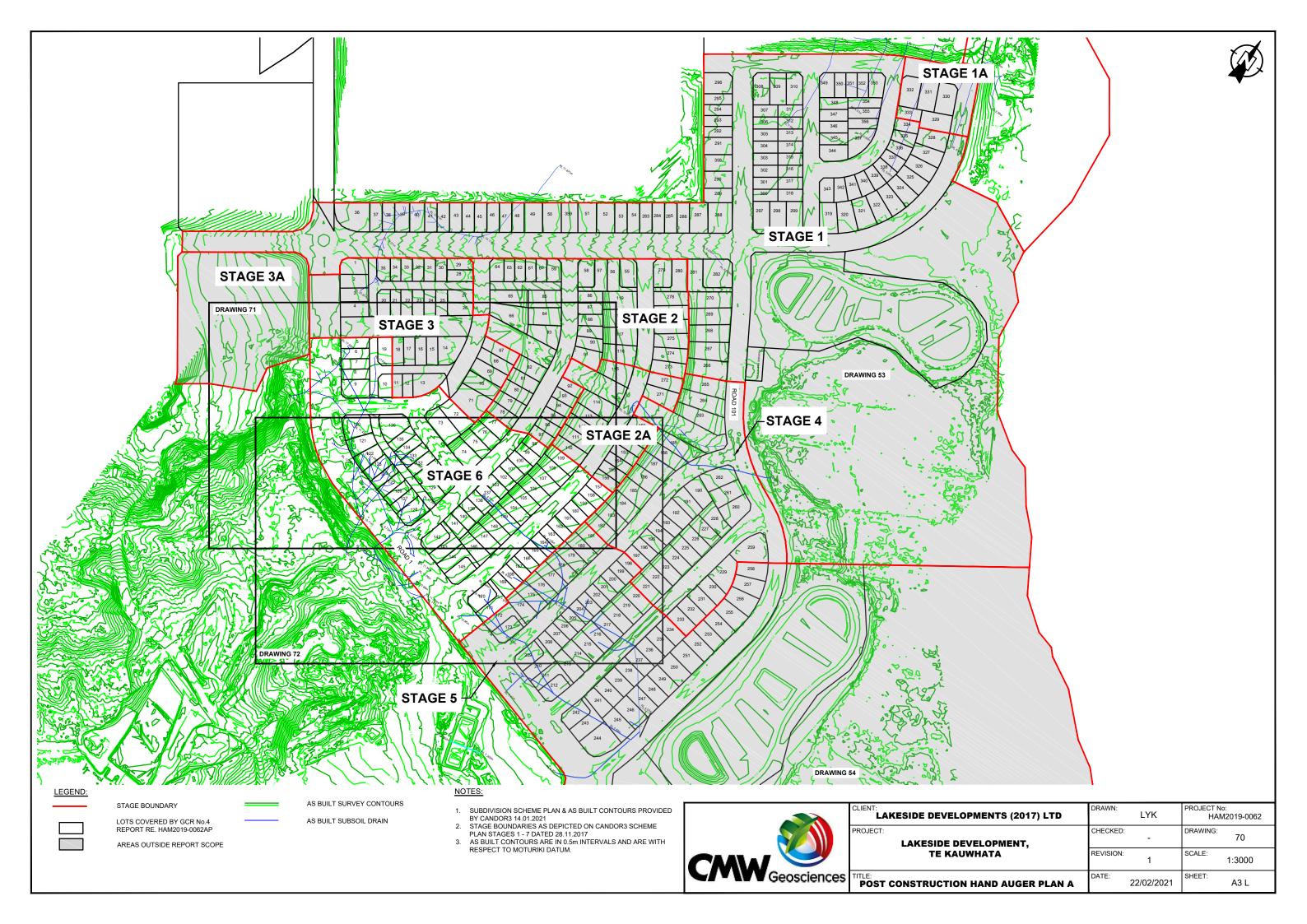


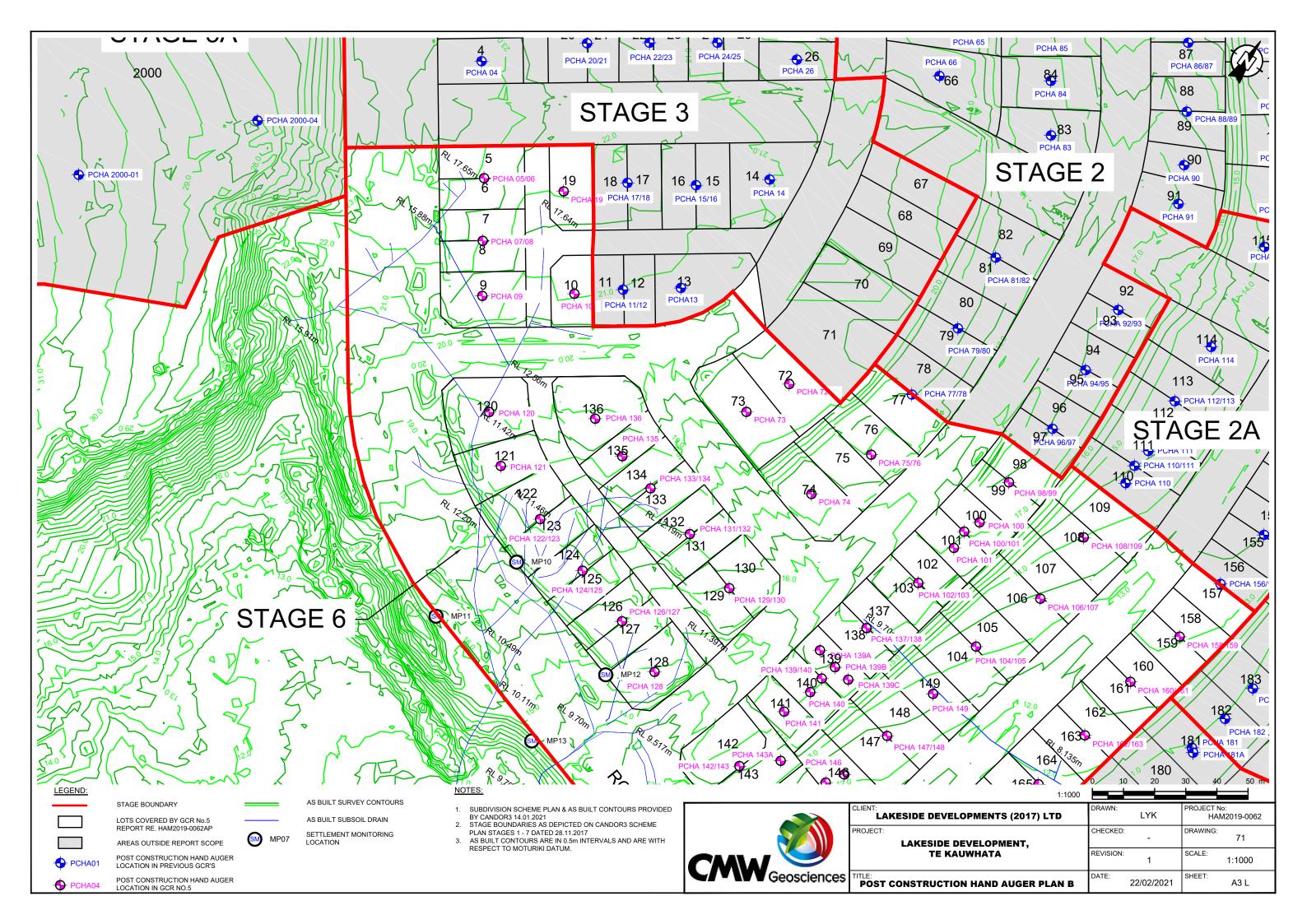


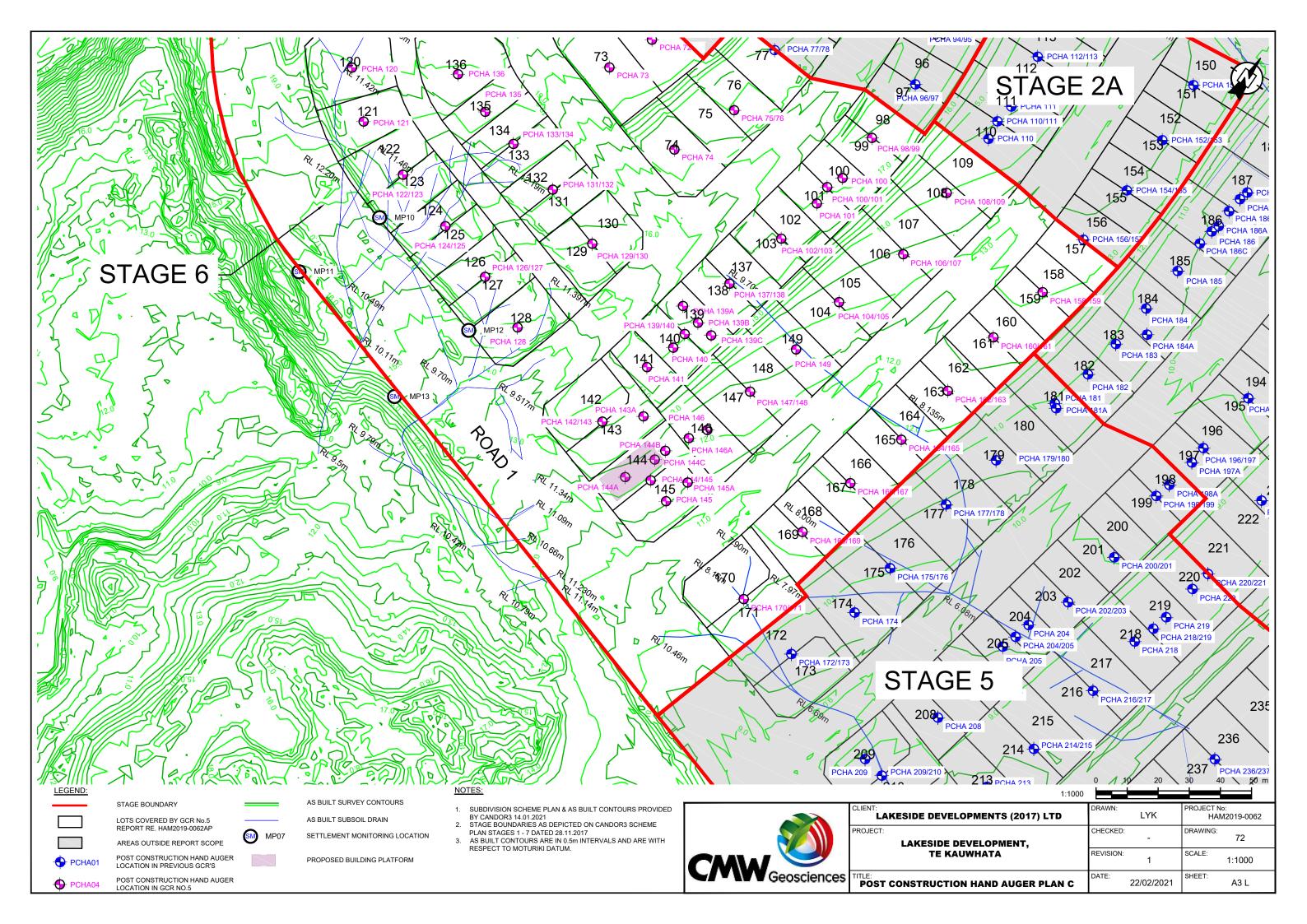


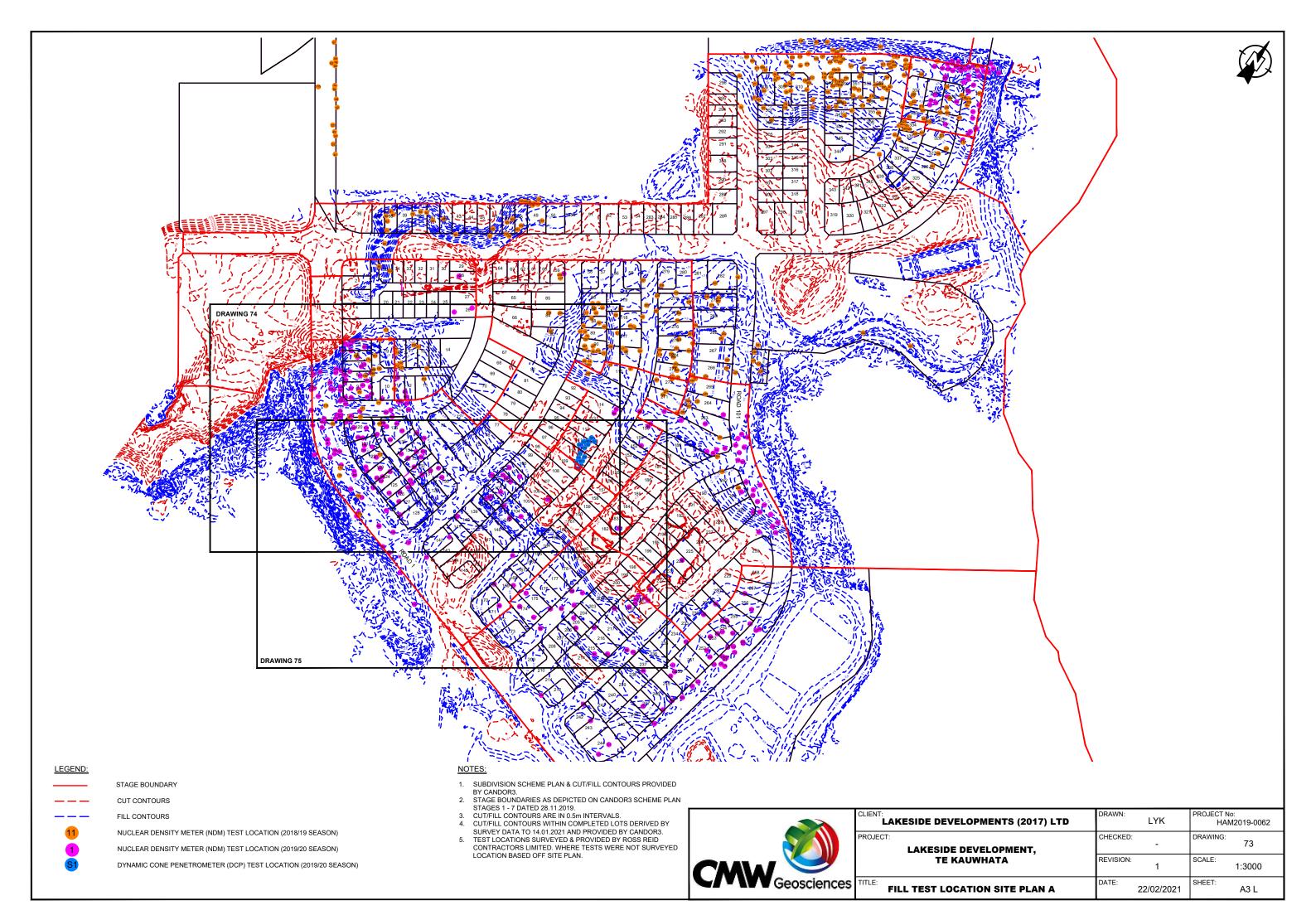


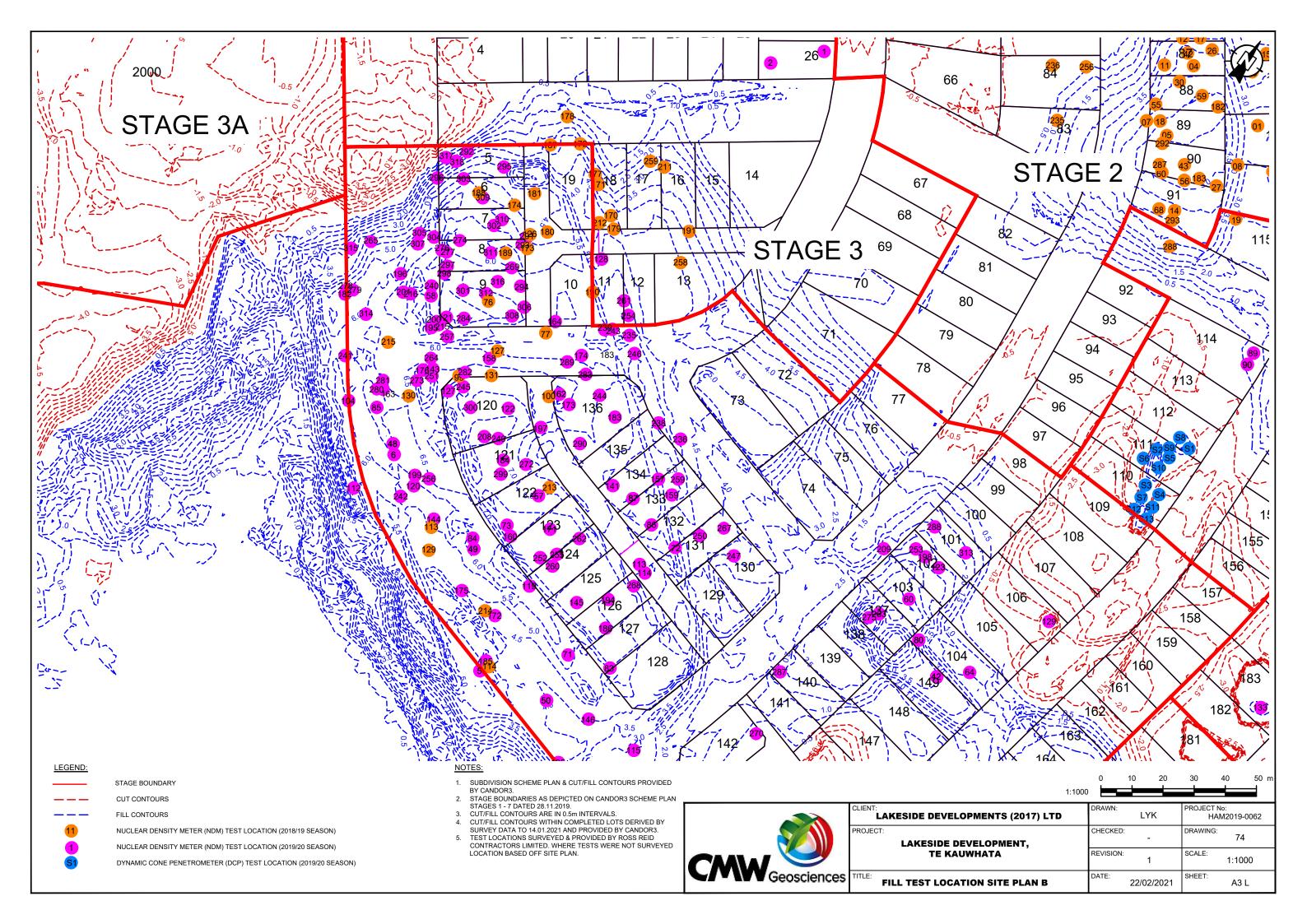


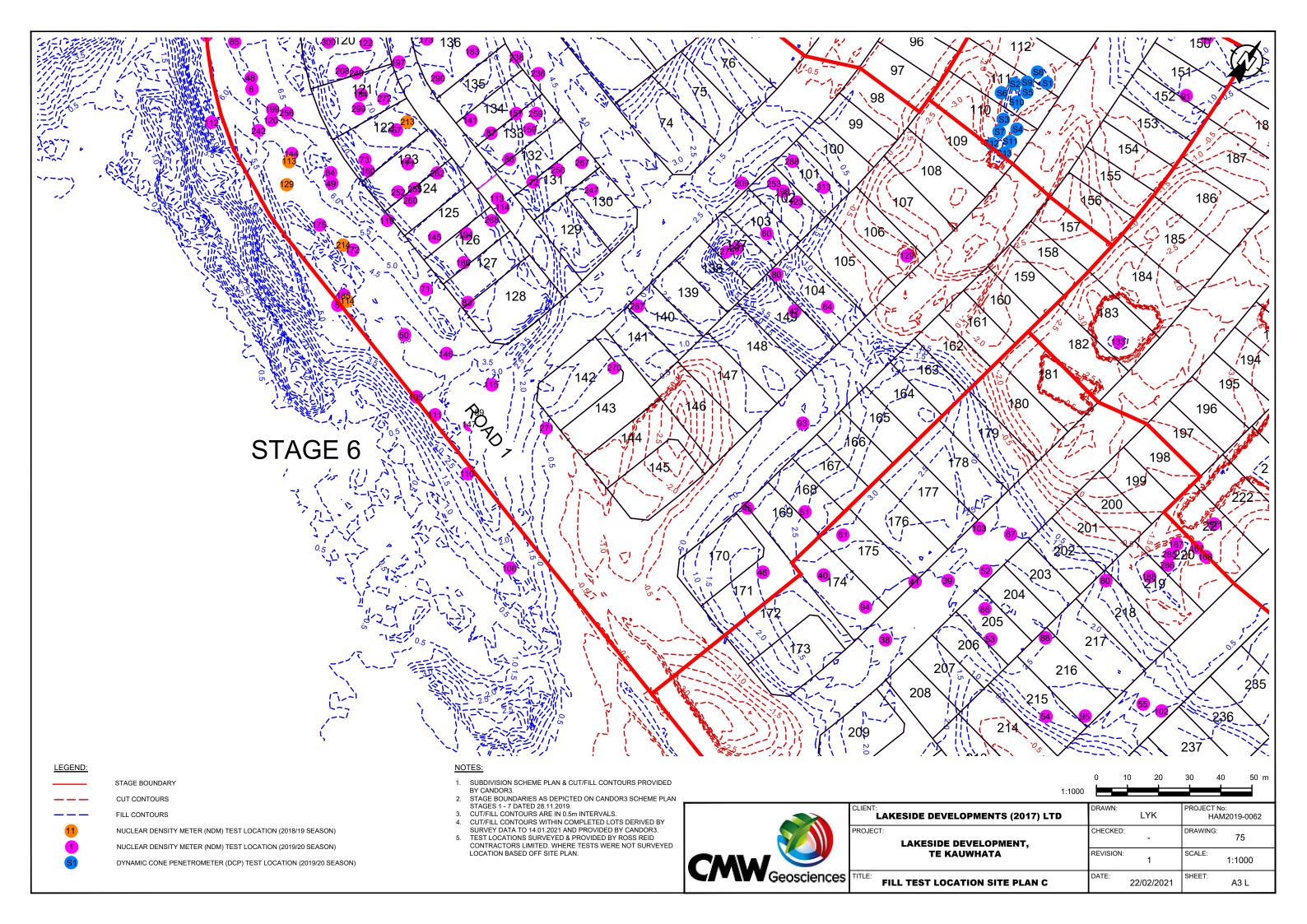












Appendix A: Statement of Professional Opinion & Lot Summary Report

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

Development: Lakeside Development	Stage 6									
Developer: Lakeside Developments (2017) Limited										
Location: 98 Scott Street, Te Kauwha	ita									
I, Kenneth John Read	of CMW Geosciences (NZ) Ltd Partnership,									
(Full name)	5 Hill Street Hamilton									

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), dated December 2017. CMW Stage 5 Construction Recommendations Technical Memo (ref HAM2018-0106AQ Rev 0) dated 16 August 2019.

CMW "Alternative School Site, Geotechnical Investigation Report" (ref HAM2018-0106AR Rev 2) dated 21 October 2019.

and the conclusions and recommendations of those documents have been reevaluated in the preparation of this report.

3. The extent of my inspections during construction, and the results of all tests and/or reevaluations carried out are as described in my geotechnical completion report:

Number: HAM2019-0062AP Rev 1 Date: 22 February 2021

- 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 67 to 69 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 our Geotechnical Completion Report No. 5, Ref HAM2019-0062AP Rev 1, dated 22 February 2021 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: 22/02/2021

Full name: Kenneth John Read

Title: Principal Geotechnical Engineer

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

Copyright waived¹

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



Table 1: Lot Summary Table

Second Part				Subsurface Data						Founda	Bui To			
6 287 6 - 174 Y 4.5 N - Y N 0.15 N 6 275 6 - 174 Y 4.5 N - Y N 0.15 N 7 275 6 - 176 Y 6.0 N - Y N 0.15 N 8 275 6 - 176 Y 6.0 N - Y N 0.15 N 9 487 6 - 190 Y 6.5 N - Y N 0.15 N 19 377 6 - 161 Y 4.0 Y - Y N 0.2 N 72 615 6 16 >200 Y* 4.4 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 3.4m 74 527 <td>Lot No:</td> <td>Area (m²)</td> <td>Stage</td> <td>(average blows per</td> <td>(average kPa over upper</td> <td></td> <td>ill</td> <td>C</td> <td>cut</td> <td>Shallow Foundation to NZS</td> <td>Specific Design</td> <td>Topsoil Thickenss (as provided by Candor3.</td> <td>lding Restriction L</td> <td>Comments</td>	Lot No:	Area (m²)	Stage	(average blows per	(average kPa over upper		ill	C	cut	Shallow Foundation to NZS	Specific Design	Topsoil Thickenss (as provided by Candor3.	lding Restriction L	Comments
6 275 6 - 174 Y 4.5 N - Y N 0.15 N 7 275 6 - 176 Y 6.0 N - Y N 0.15 N 8 275 6 - 176 Y 6.0 N - Y N 0.15 N 9 487 6 - 1990 Y 6.5 N - Y N 0.15 N 10 302 6 - 200 Y 6.0 N - Y N 0.20 N 19 377 6 - 161 Y 4.0 Y - Y N 0.20 N 19 377 6 - 161 Y 4.0 Y - Y N 0.2 N 7 25 6 6 6 14 > 200 Y 4.4 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 1.8m 73 626 6 14 > 200 Y 4.4 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 3.4m 74 527 6 - 200 Y 4.0 N - Y N 0.35 N See Note 1. Fill in 2017/18 season in order of 3.4m 75 377 6 - 187 Y 2.2 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 3.4m 76 387 6 - 187 Y 0.8 Y 1.2 Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 2.2m 77 386 6 11 1 186 Y 0.8 Y 1.2 Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 2.2m 98 263 6 9 187 Y 0.2 N - Y N 0.15 N See Note 1. Fill in 2017/18 season in order of 0.8m Conder of 1.2m 99 263 6 9 187 Y 0.2 N - Y N 0.15 N See Note 1. Cut 2017/18 season in order of 3.0m 99 263 6 9 187 Y 0.2 N - Y N 0.15 N See Note 1. Till in 2017/18 season in order of 3.0m 100 263 6 - 195 Y 1.5 N - Y N 0.15 N 100 263 6 - 195 Y 1.5 N - Y N 0.15 N 100 262 6 11 198 Y 2.0 N - Y N 0.15 N 100 262 6 - 195 Y 1.4 N - Y N 0.15 N 100 262 6 - 195 Y 1.4 N - Y N 0.15 N 100 429 6 - 195 Y 1.4 N - Y N 0.3 N See Note 2. 106 428 6 5 200 N - Y 1.5 Y N 0.2 N See Note 2. 108 428 6 10 188 N - Y 2.0 Y N 0.2 N See Note 2.							' ' '		Depth (m)			_		
7 275 6 - 176 Y 8.0 N - Y N 0.15 N 8 275 6 - 176 Y 6.0 N - Y N 0.15 N 9 487 6 - 176 Y 6.0 N - Y N 0.15 N 10 302 6 - 200 Y 6.5 N - Y N 0.15 N 19 377 6 - 161 Y 4.0 Y - Y N 0.2 N 72 515 6 16 >200 Y* 2.3 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 3.4m 73 626 6 14 >200 Y* 4.0 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in ord	5		6	-			-	N	-		N		N	
8 275 6 - 176 Y 6.0 N - Y N 0.15 N 9 487 6 - 190 Y 6.5 N - Y N 0.15 N 10 302 6 - 200 Y 6.0 N - Y N 0.20 N 19 377 6 - 161 Y 4.0 Y - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 1.8m 73 626 6 14 >200 Y* 4.4 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 3.4m 74 527 6 - 200 Y* 4.4 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 4.0m 75 377 6 - 187 Y* 2.2 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 4.0m 75 377 6 - 187 Y* 2.2 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 4.0m 75 377 6 - 187 Y* 2.2 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 4.0m 76 387 6 - 187 Y* 0.8 Y* 1.2 Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 0.8m Coorder				-			_		-					
9 487 6 - 190 Y 6.5 N - Y N 0.15 N 10 302 6 - 200 Y 6.0 N - Y N 0.20 N 19 377 6 - 161 Y 4.0 Y - Y N 0.2 N 72 515 6 16 >200 Y* 2.3 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 1.8m 73 626 6 14 >200 Y* 4.4 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 3.4m 74 527 6 - >200 Y* 4.4 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 3.4m 75 377 6 - 187 Y* 2.2 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 2.2m 76 387 6 - 187 Y* 0.8 Y* 1.2 Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 2.2m 77 386 6 11 186 Y* <0.5 Y* 3 Y N 0.15 N See Note 1. Fill in 2017/18 season in order of 0.8m. Corder of 1.2m 78 263 6 9 187 Y 0.2 N - Y N 0.15 N See Note 1. Fill in 2017/18 season in order of 0.8m. Corder of 0.2m 99 263 6 9 187 Y 0.2 N - Y N 0.15 N See Note 1. Fill in 2017/18 season in order of 0.8m. Corder of 0.2m 100 263 6 - 195 Y 1.5 N - Y N 0.15 N 101 262 6 - >200 Y 2.4 N - Y N 0.15 N 102 262 6 11 198 Y 2.0 N - Y N 0.15 N 103 262 6 11 198 Y 2.0 N - Y N 0.15 N 104 429 6 - 195 Y 1.4 N - Y N 0.3 N See Note 2. 106 428 6 5 200 N - Y 1.5 Y N 0.2 N See Note 2.	7	275	6	-	176	Υ	6.0	N	-	Υ	N	0.15	N	
10 302 6 - 200 Y 6.0 N - Y N 0.20 N 19 377 6 - 161 Y 4.0 Y - Y N 0.2 N 72 515 6 16 >200 Y* 2.3 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 1.8m 73 626 6 14 >200 Y* 4.4 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 3.4m 74 527 6 - >200 Y* 4.0 N - Y N 0.35 N See Note 1. Fill in 2017/18 season in order of 4.0m 75 377 6 - 187 Y* 2.2 N - Y N 0.35 N See Note 1. Fill in 2017/18 season in order of 4.0m 75 377 6 - 187 Y* 2.2 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 2.2m 76 387 6 - 187 Y* 0.8 Y* 1.2 Y N 0.2 N See Note 1. Fill in 2017/18 season in order of 0.8m. Conder of 1.2m 77 386 6 11 186 Y* <0.5 Y* 3 Y N 0.15 N See Note 1. Fill in 2017/18 season in order of 0.8m. Conder of 1.2m 77 386 6 9 187 Y 0.2 N - Y N 0.15 N See Note 1. Cut 2017/18 season in order of 3.0m 98 263 6 9 187 Y 0.2 N - Y N 0.15 N N See Note 1. Cut 2017/18 season in order of 3.0m 99 263 6 - 195 Y 1.5 N - Y N 0.15 N N N N N N N N N	8	275	6	-	176	Υ	6.0	Ν	-	Υ	Ν	0.15	Ν	
19 377 6 - 161	9	487	6	-	190	Υ	6.5	Ν	-	Υ	Ν	0.15	N	
72 515 6 16 >200 Y* 2.3 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 1.8m 73 626 6 14 >200 Y* 4.4 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 3.4m 74 527 6 - >200 Y* 4.0 N - Y N 0.35 N See Note 1. Fill in 2017/18 season in order of 4.0m 75 377 6 - 187 Y* 2.2 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 4.0m 76 387 6 - 187 Y* 0.8 Y* 1.2 Y N 0.2 N See Note 1. Fill in 2017/18 season in order of 2.2m N - Y N 0.2 N See Note 1. Fill in 2017/18 season in order of 2.2m N - Y N 0.15 N N	10	302	6	-	200	Υ	6.0	Ν	-	Υ	Ν	0.20	N	
The color of the	19	377	6	-	161	Υ	4.0	Υ	-	Υ	Ν	0.2	N	
74 527 6 - >200 Y* 4.0 N - Y N 0.35 N See Note 1. Fill in 2017/18 season in order of 4.0m 75 377 6 - 187 Y* 2.2 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 2.2m 76 387 6 - 187 Y* 0.8 Y* 1.2 Y N 0.2 N See Note 1. Fill in 2017/18 season in order of 2.2m 76 387 6 - 187 Y* 0.8 Y* 1.2 Y N 0.2 N order of 1.2m order of 1.2m 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	72	515	6	16	>200	Y*	2.3	N	-	Υ	N	0.3	N	See Note 1. Fill in 2017/18 season in order of 1.8m
75 377 6 - 187 Y* 2.2 N - Y N 0.3 N See Note 1. Fill in 2017/18 season in order of 2.2m 76 387 6 - 187 Y* 0.8 Y* 1.2 Y N 0.2 N See Note 1. Fill in 2017/18 season in order of 0.8m. Cu order of 1.2m 77 386 6 11 186 Y* <0.5	73	626	6	14	>200	Y*	4.4	N	-	Υ	N	0.3	N	See Note 1. Fill in 2017/18 season in order of 3.4m
76 387 6 - 187 Y* 0.8 Y* 1.2 Y N 0.2 N See Note 1. Fill in 2017/18 season in order of 0.8m. Cu order of 1.2m 77 386 6 11 186 Y* <0.5	74	527	6	-	>200	Y*	4.0	N	-	Υ	N	0.35	N	See Note 1. Fill in 2017/18 season in order of 4.0m
76 387 6 - 187 Y° 0.8 Y° 1.2 Y N 0.2 N order of 1.2m 77 386 6 11 186 Y* <0.5	75	377	6	-	187	Y*	2.2	N	-	Υ	N	0.3	N	See Note 1. Fill in 2017/18 season in order of 2.2m
98	76	387	6	-	187	Y*	0.8	Y*	1.2	Υ	N	0.2	N	See Note 1. Fill in 2017/18 season in order of 0.8m. Cut in order of 1.2m
99	77	386	6	11	186	Y*	<0.5	Y*	3	Υ	N	0.15	N	See Note 1. Cut 2017/18 season in order of 3.0m
100 263 6 - 195 Y 1.5 N - Y N 0.15 N 101 262 6 - >200 Y 2.4 N - Y N 0.15 N 102 262 6 11 198 Y 2.0 N - Y N 0.15 N 103 262 6 11 198 Y 2.0 N - Y N 0.15 N 104 429 6 - 195 Y 1.4 N - Y N 0.3 N 105 429 6 - 195 Y 1.4 N - Y N 0.3 N See Note 2. 106 428 6 5 200 N - Y 1.5 Y N 0.2 N See Note 2. 107 429 </td <td>98</td> <td>263</td> <td>6</td> <td>9</td> <td>187</td> <td>Y</td> <td>0.2</td> <td>N</td> <td>-</td> <td>Υ</td> <td>N</td> <td>0.15</td> <td>N</td> <td></td>	98	263	6	9	187	Y	0.2	N	-	Υ	N	0.15	N	
101 262 6 - >200 Y 2.4 N - Y N 0.1 N 102 262 6 11 198 Y 2.0 N - Y N 0.15 N 103 262 6 11 198 Y 2.0 N - Y N 0.15 N 104 429 6 - 195 Y 1.4 N - Y N 0.3 N 105 429 6 - 195 Y 1.4 N - Y N 0.3 N See Note 2. 106 428 6 5 200 N - Y 1.5 Y N 0.2 N See Note 2. 107 429 6 5 200 N - Y 3.0 Y N 0.2 N See Note 2. <td< td=""><td>99</td><td>263</td><td>6</td><td>9</td><td>187</td><td>Υ</td><td>0.2</td><td>N</td><td>-</td><td>Υ</td><td>N</td><td>0.15</td><td>N</td><td></td></td<>	99	263	6	9	187	Υ	0.2	N	-	Υ	N	0.15	N	
102 262 6 11 198 Y 2.0 N - Y N 0.15 N 103 262 6 11 198 Y 2.0 N - Y N 0.15 N 104 429 6 - 195 Y 1.4 N - Y N 0.3 N 105 429 6 - 195 Y 1.4 N - Y N 0.3 N See Note 2. 106 428 6 5 200 N - Y 1.5 Y N 0.2 N See Note 2. 107 429 6 5 200 N - Y 3.0 Y N 0.2 N See Note 2. 108 428 6 10 188 N - Y 2.0 Y N 0.2 N See Note 2.	100	263	6	-	195	Υ	1.5	N	-	Υ	N	0.15	N	
103 262 6 11 198 Y 2.0 N - Y N 0.15 N 104 429 6 - 195 Y 1.4 N - Y N 0.3 N 105 429 6 - 195 Y 1.4 N - Y N 0.3 N See Note 2. 106 428 6 5 200 N - Y 1.5 Y N 0.2 N See Note 2. 107 429 6 5 200 N - Y 3.0 Y N 0.2 N See Note 2. 108 428 6 10 188 N - Y 2.0 Y N 0.2 N See Note 2.	101	262	6	-	>200	Υ	2.4	N	-	Υ	N	0.1	N	
104 429 6 - 195 Y 1.4 N - Y N 0.3 N 105 429 6 - 195 Y 1.4 N - Y N 0.3 N See Note 2. 106 428 6 5 200 N - Y 1.5 Y N 0.2 N See Note 2. 107 429 6 5 200 N - Y 3.0 Y N 0.2 N See Note 2. 108 428 6 10 188 N - Y 2.0 Y N 0.2 N See Note 2.	102	262	6	11	198	Υ	2.0	N	-	Υ	N	0.15	N	
105 429 6 - 195 Y 1.4 N - Y N 0.3 N See Note 2. 106 428 6 5 200 N - Y 1.5 Y N 0.2 N See Note 2. 107 429 6 5 200 N - Y 3.0 Y N 0.2 N See Note 2. 108 428 6 10 188 N - Y 2.0 Y N 0.2 N See Note 2.	103	262	6	11	198	Υ	2.0	N	-	Υ	N	0.15	N	
106 428 6 5 200 N - Y 1.5 Y N 0.2 N See Note 2. 107 429 6 5 200 N - Y 3.0 Y N 0.2 N See Note 2. 108 428 6 10 188 N - Y 2.0 Y N 0.2 N See Note 2.	104	429	6	-	195	Υ	1.4	N	-	Υ	N	0.3	N	
107 429 6 5 200 N - Y 3.0 Y N 0.2 N See Note 2. 108 428 6 10 188 N - Y 2.0 Y N 0.2 N See Note 2.	105	429	6	-	195	Y	1.4	N	-	Υ	N	0.3	N	See Note 2.
108 428 6 10 188 N - Y 2.0 Y N 0.2 N See Note 2.	106	428	6	5	200	N	-	Y	1.5	Υ	N	0.2	N	See Note 2.
	107	429	6	5	200	N	-	Y	3.0	Υ	N	0.2	N	See Note 2.
	108	428	6	10	188	N	-	Υ	2.0	Υ	N	0.2	N	See Note 2.
109 428 6 10 188 N - Y 3.00 Y N 0.2 N See Note 2.	109	428	6	10	188	N	-	Y	3.00	Υ	N	0.2	N	See Note 2.

Notes:

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^{1.} Some works carried out during 2017/18 season.

^{2.} Sensitive natural soils exposed near finished level. 150mm of sand or hardfill is recommended to protect underlying soils.

Table 1: Lot Summary Table

				Subsurface Data						tions	To	Bui	
Lot No:	Area (m²)	Stage	DCP (average blows per 100mm)	VSS (average kPa over upper 2m)	F	ill	C	ut	Conventional Shallow Foundation to NZS 3604:2011	Specific Design	Topsoil Thickenss (as provided by Candor3.	Building Restriction Line	Comments
					Y/N	Depth (m)	Y/N	Depth (m)	Y/N/NA	Y/N/NA	(m)	_ine	
120	571	6	-	162	Υ	7.0	Ν	-	Υ	N	0.15	N	
121	408	6	-	162	Υ	7.0	N	-	Υ	N	0.15	N	
122	393	6	-	>200	Υ	6.0	Ν	-	Y	N	0.15	N	
123	330	6	-	>200	Υ	6.0	Ν	-	Υ	N	0.20	Ν	
124	275	6	-	182	Υ	6.0	Ν	-	Υ	N	0.30	N	
125	275	6	-	182	Υ	6.0	Ν	-	Υ	N	0.30	N	
126	275	6	-	192	Υ	4.5	Ν	-	Υ	N	0.20	Ν	
127	275	6	-	192	Υ	4.5	Ν	-	Y	N	0.20	N	
128	485	6	-	190	Υ	4.0	Ν	-	Υ	N	0.30	N	
129	316	6	-	199	Υ	3.0	N	-	Υ	N	0.15	N	
130	333	6	-	199	Υ	3.0	N	-	Υ	N	0.15	N	
131	275	6	-	196	Υ	5.0	N	-	Υ	N	0.15	N	
132	275	6	-	196	Υ	5.0	N	-	Υ	N	0.15	N	
133	275	6	-	188	Υ	5.0	Ν	-	Υ	N	0.30	N	
134	275	6	-	188	Υ	5.5	N	-	Υ	N	0.30	N	
135	278	6	-	>200	Υ	6.0	N	-	Υ	N	0.20	N	
136	576	6	-	191	Υ	6.0	Ν	-	Υ	N	0.20	N	
137	262	6	-	168	Υ	4.5	N	-	Υ	N	0.15	N	
138	262	6	-	168	Υ	4.5	N	-	Υ	N	0.15	N	
139	262	6	-	170	Υ	2.5	N	-	Υ	N	0.20	N	
140	262	6	-	175	Υ	2.0	N	-	Υ	N	0.20	N	
141	269	6	-	>200	Υ	1.2	N	-	Υ	N	0.15	Ν	
142	437	6	-	>200	Υ	0.8	N	-	Υ	N	0.20	N	
143	446	6	-	>200	Υ	0.8	Υ	0.5	Υ	N	0.20	N	See note 2.

Notes:

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^{1.} Some works carried out during 2017/18 season.

^{2.} Sensitive natural soils exposed near finished level. 150mm of sand or hardfill is recommended to protect underlying soils.

Table 1: Lot Summary Table

							Founda	Foundations					
Lot No:	Area (m²)	Stage	DCP (average blows per 100mm)	VSS (average kPa over upper 2m)	F	ill	C	Cut	Conventional Shallow Foundation to NZS 3604:2011	Specific Design	Topsoil Thickenss (as provided by Candor3.	Building Restriction Line	Comments
					Y/N	Depth (m)	Y/N	Depth (m)	Y/N/NA	Y/N/NA	(m)	Line	
144	443	6	7	>200	N	-	Y	3.0	Y*	N*	0.20	Υ	See Notes 2 & 3.
145	433	6	6	>200	N	-	Y	3.0	Y	N	0.20	N	See Note 2.
146	429	6	-	153	Υ	0.2	N	3.0	Y	Υ	0.30	N	See Notes 2 & 4.
147	429	6	-	>200	Υ	1.2	N	1.5	Y	N	0.35	N	See Note 2.
148	429	6	-	>200	Υ	1.2	N	2.0	Υ	Ν	0.30	N	
149	429	6	-	191	N	-	N	3.5	Υ	Ν	0.30	N	
157	265	6	-	182	N	-	Υ	2.5	Υ	Ν	0.20	N	See Note 2.
158	259	6	6	140	N	-	Υ	2.5	Υ	N	0.30	Ν	See Note 2.
159	252	6	6	140	N	-	Υ	2.0	Υ	Ν	0.20	N	See Note 2.
160	264	6	-	144	N	-	Υ	2.0	Υ	Ν	0.20	N	See Note 2.
161	264	6	-	144	N	-	Υ	2.0	Υ	N	0.20	N	See Note 2.
162	264	6	-	166	Υ	2.5	Υ	1.0	Υ	N	0.20	N	See Note 2.
163	264	6	-	166	Υ	2.5	N	-	Y	N	0.20	N	
164	264	6	-	191	Υ	2.5	N	-	Y	N	0.15	N	
165	264	6	-	191	Υ	2.5	N	-	Υ	N	0.15	N	
166	264	6	-	180	Υ	2.0	N	-	Υ	N	0.15	N	
167	264	6	-	180	Υ	2.0	N	-	Υ	N	0.15	N	
168	264	6	-	>200	Υ	2.0	N	-	Y	N	0.20	N	
169	274	6	-	>200	Υ	2.0	N	-	Y	N	0.25	N	
170	437	6	-	>200	Υ	2.0	N	-	Υ	N	0.20	N	
171	446	6	-	>200	Υ	2.0	N	-	Υ	N	0.20	N	

Notes:

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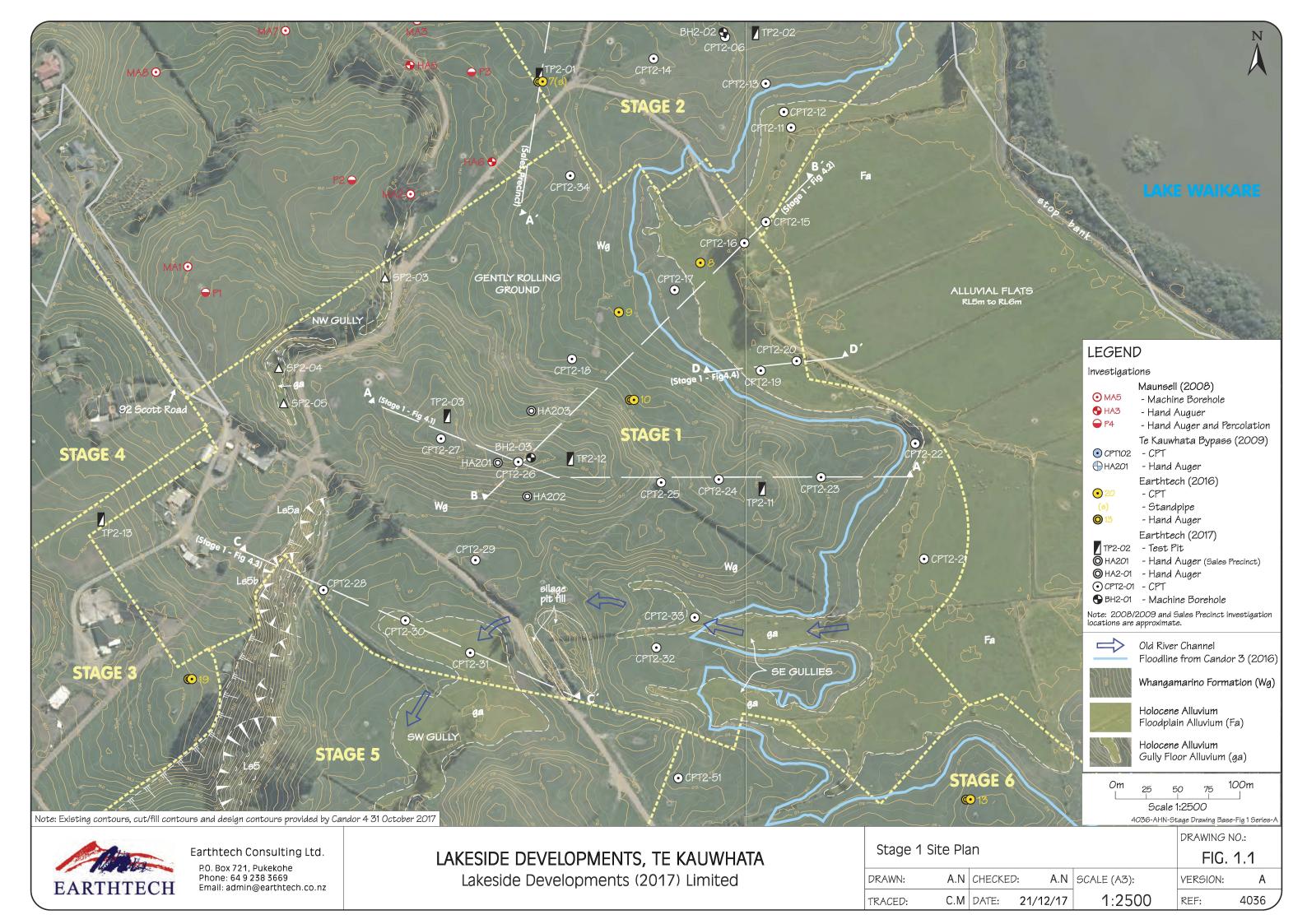
^{1.} Some works carried out during 2017/18 season.

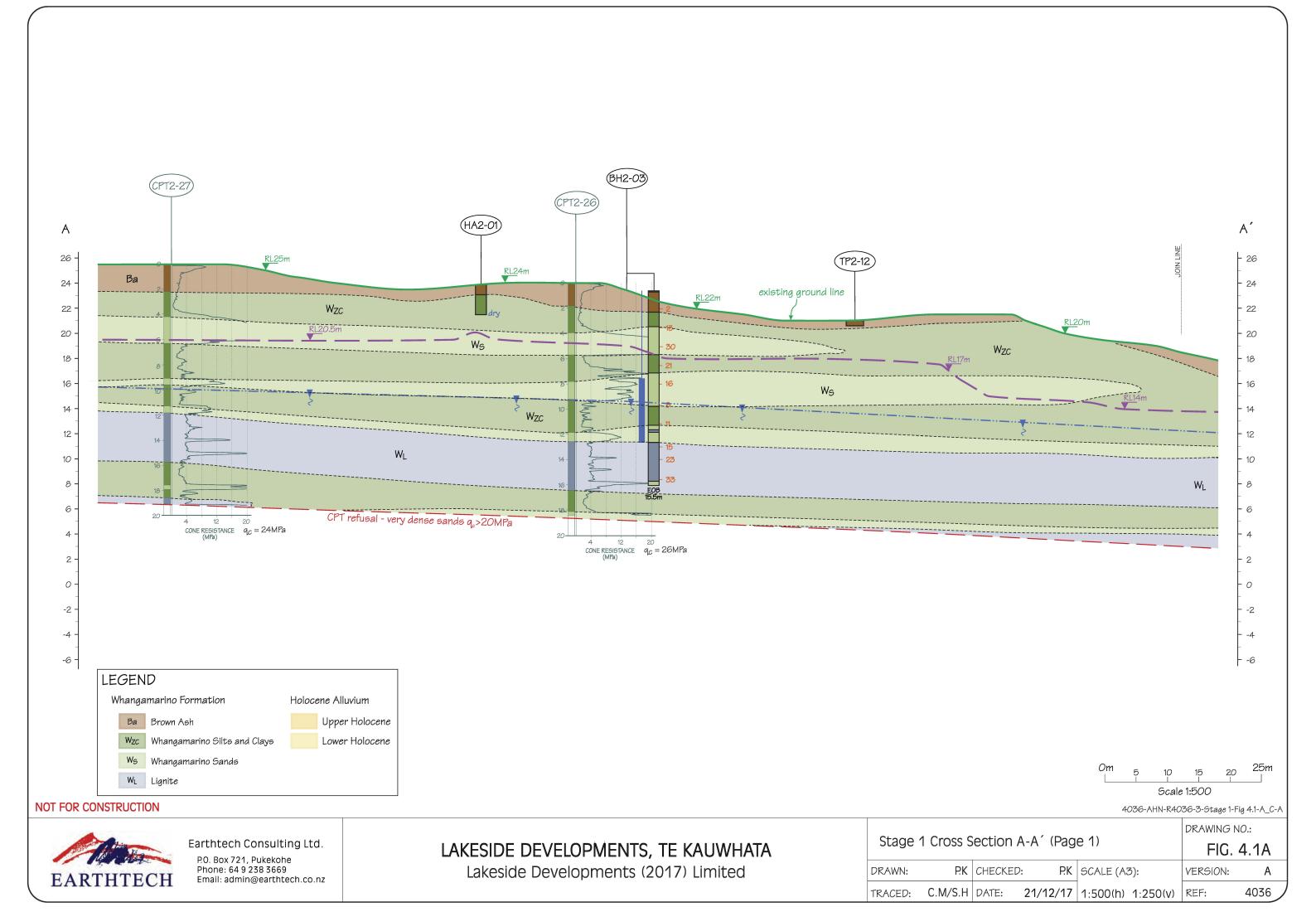
^{2.} Sensitive natural soils exposed near finished level. 150mm of sand or hardfill is recommended to protect underlying soils.

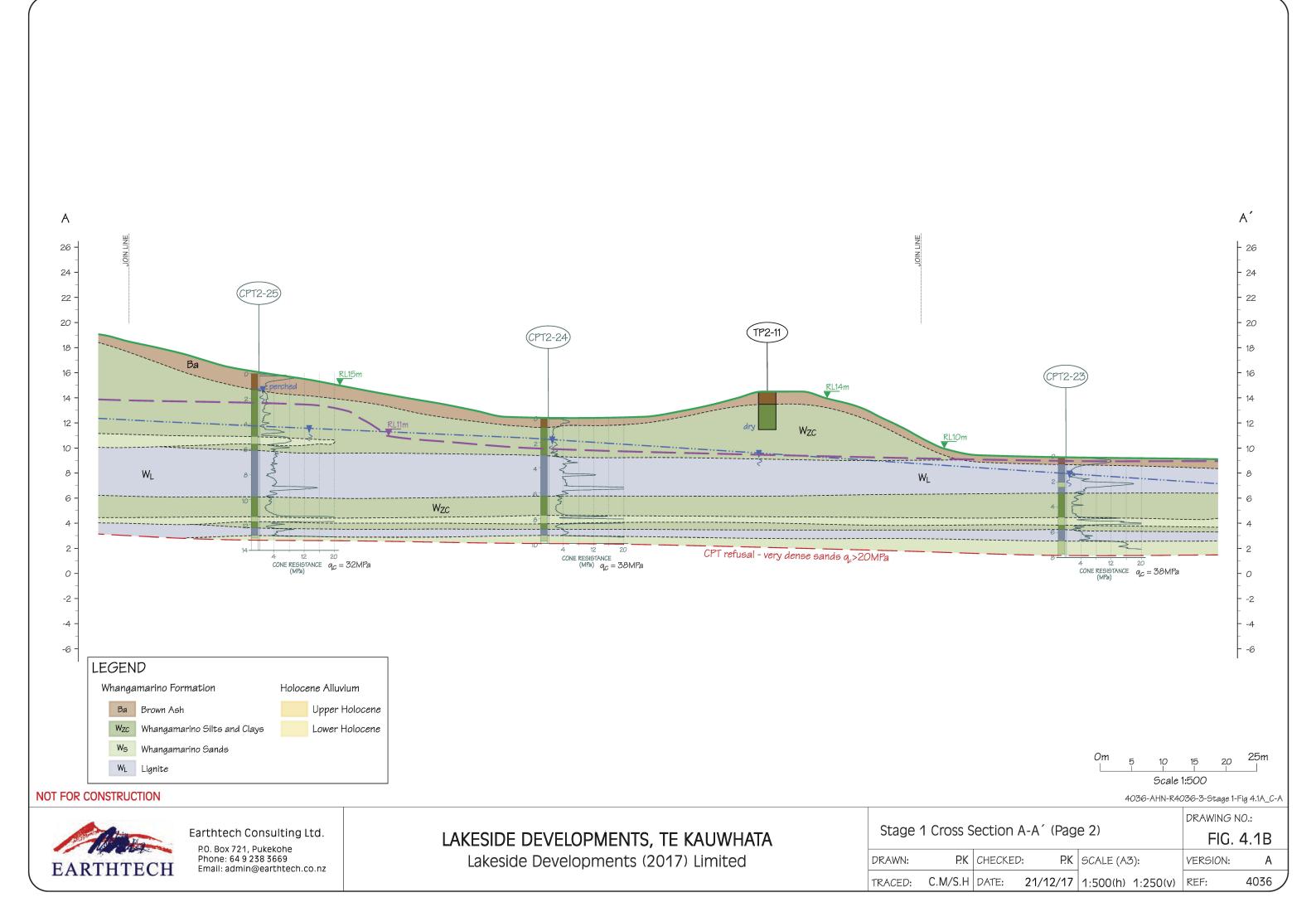
^{3.} Underlying soils within allocated building platform meeting NZS3604 standards. Specific engineer design foundations required if building extends beyond allocated platform.

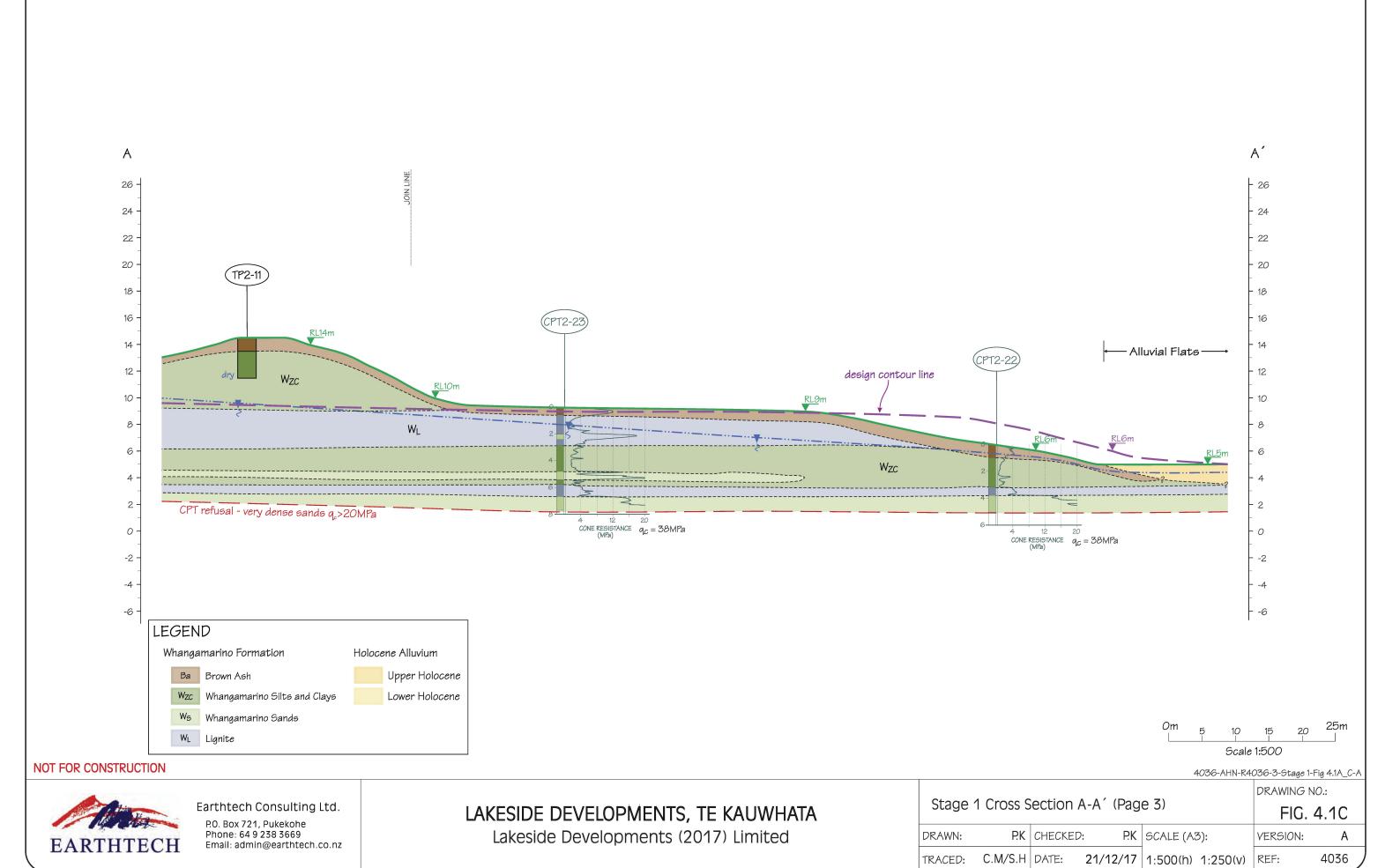
^{4.} Foundations soils are suitable to support proprietary raft foundations for dwelling design in accordance with NZS 3604.

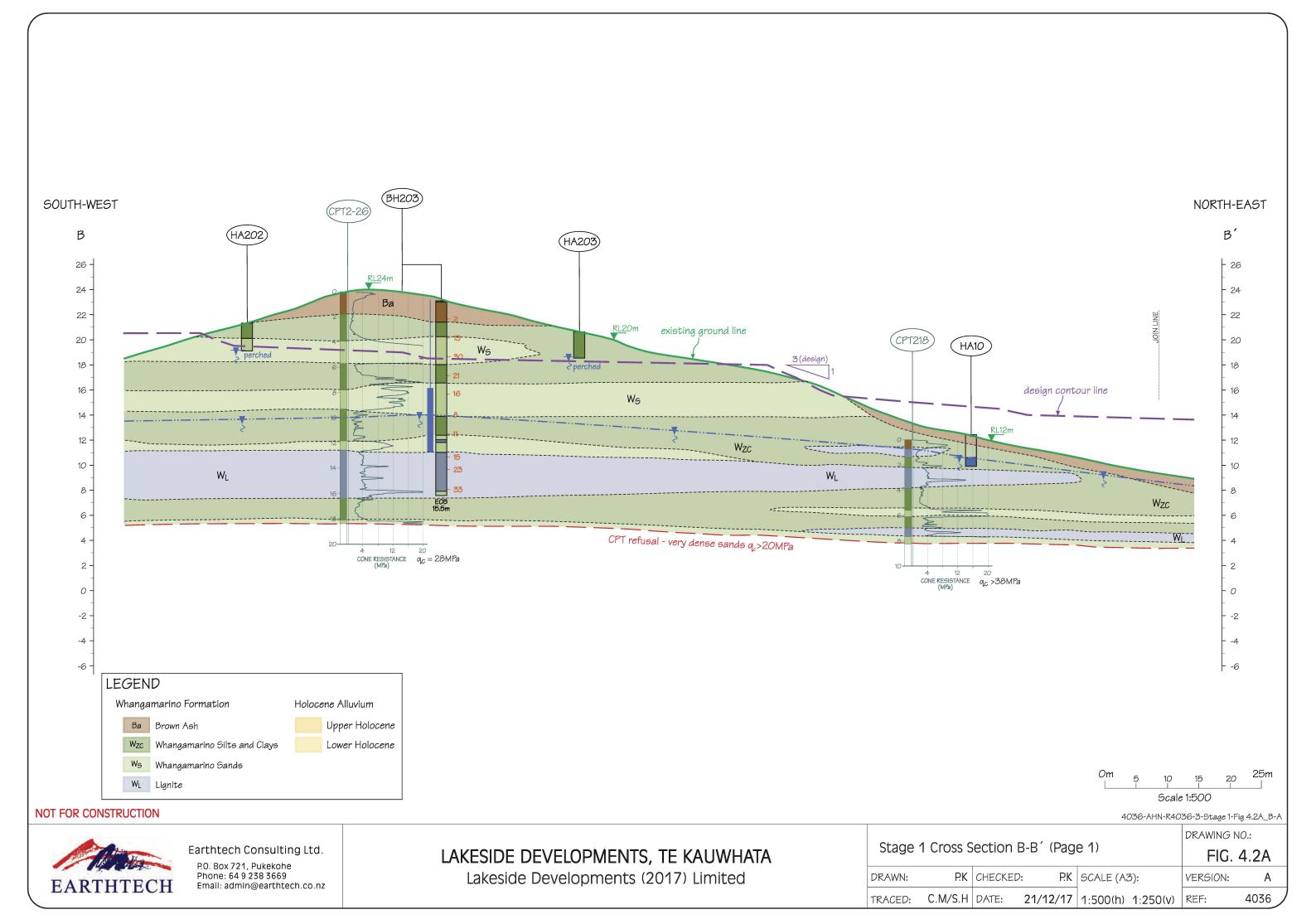
Appendix B: Relevant Pre-Development Field Investigation - Plans, Cross Sections and Data

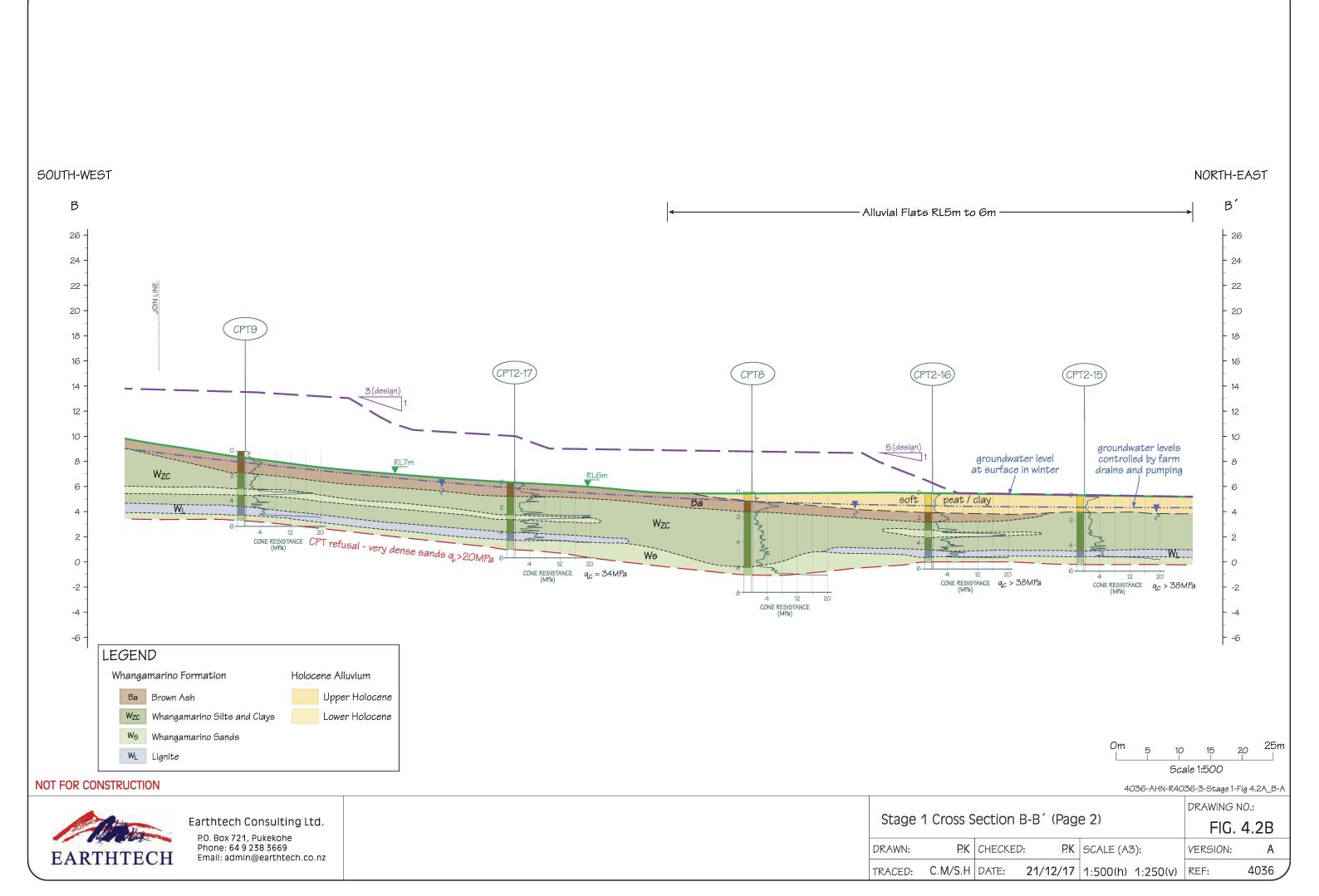


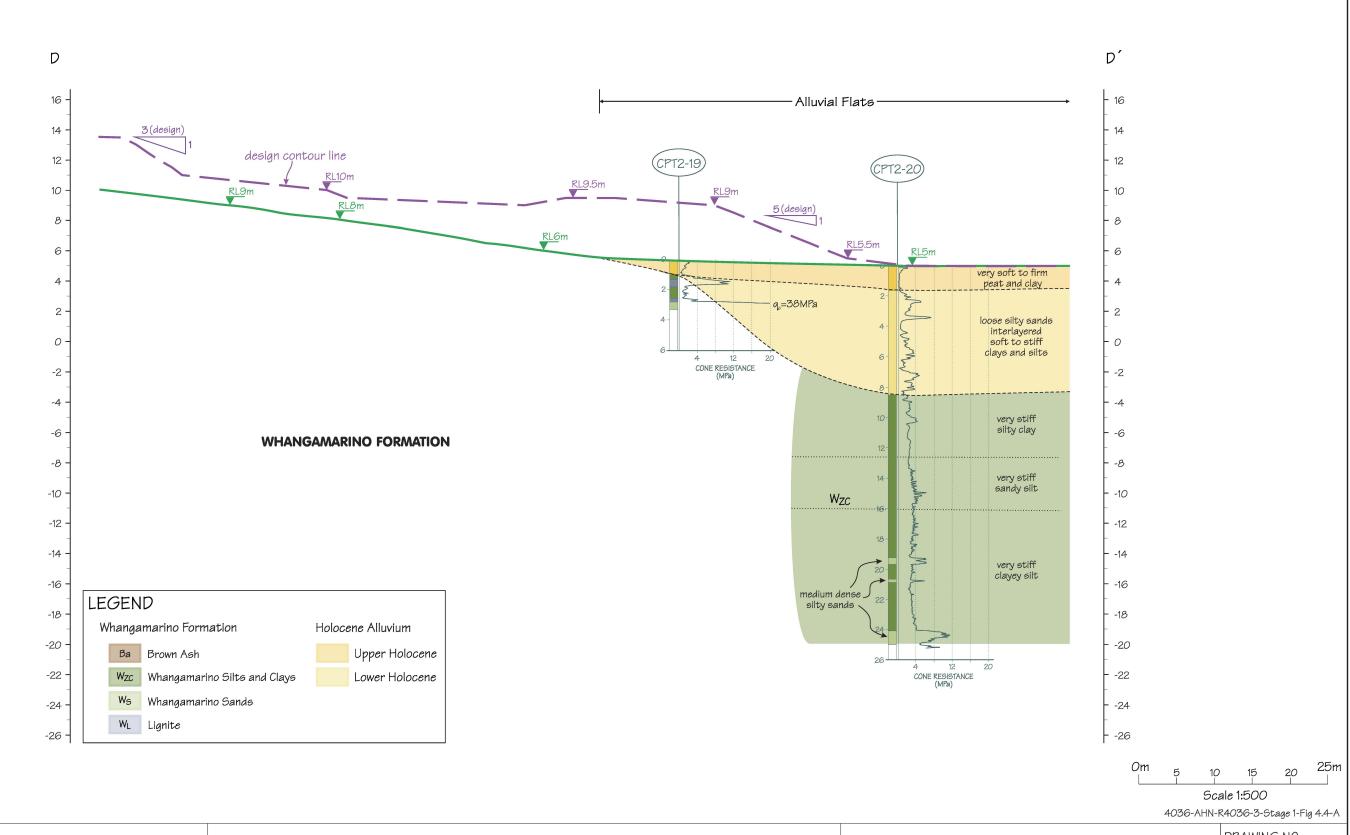












NOT FOR CONSTRUCTION

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

04	4 0	N = 4.1 = F	D D'			DRAWING	10.:
Stage	1 Cross S	section i	J-D			FIG.	4.4
DRAWN:	P.K	CHECKED	P: P:K	SCALE (A3	3):	VERSION:	Α
TRACED:	C.M/S.H	DATE:	21/12/17	1:500(h)	1:250(v)	REF:	4036

HA07 Bore No.: **HAND-AUGER LOG** Project: Scott Road, Te Kauwhata Augered by: MW/SLH Checked by: MW 11/10/2016 Date:

Ref: 4036

\supset	<u> </u>	1			T	
Geology	Soil Description	Soll Symbol	Depth (m)	Water Level	Undrained Shear Strength	Scala Penetrometer Blows/100mm 0 0 1 2 3 4 5 6 7 8 9 10111213
TOP	SILT with minor fine sand; dark brown. Stiff; moist. Minor live rootlets. SILT with trace fine sand; brown. Very stiff; moist;	× × × × × × × × × × × × × × × × × × ×	- - - - - - - - - - - -		131/44kPa 135/38kPa 131/38kPa	
BROWN ASH	CLAY; mottled orange and grey. Very stiff; moist; highly plastic (not pumiceous). Becoming light grey with light orange mottles.	x^xxx^ 	-1.0		153/50kPa 138/53kPa 149/68kPa 136/47kPa 153/74kPa 173/77kPa 109/56kPa 91/56kPa 153/68kPa UTP 157/59kPa	
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.		2.0	₹	161/68kPa 200/53kPa 149/26kPa 115/24kPa 115/24kPa 104/26kPa 124/44kPa 121/41kPa 104/47kPa 92/34kPa	
W	Organic CLAY with trace pumice sand; black. Saturated. Organic LIGNITE; black. Hard; dry; numerous wood fragments.	x	3.0		41/18kPa	
	EOH = 3.7m bgl Target depth reached. Groundwater encountered at 2.6m. PK Shear Vane.		4.0			0 2 4 6 8 10 13 16 18 20 23 26 28 30 Inferred CBR 10%

HAND-AUGER LOG

HA10 Bore No.:

Project: Scott Road, Te Kauwhata

Checked by: MW 12/10/2016 Augered by: MW/SLH Date: Ref: 4036

Geology	Soil Description	Soil Symbol	Depth (m)	Water Level		drained Strength	Scala Penetrometer
-	SILT with minor sand; brown. Stiff; moist. Minor live	85	8	×	0	100 200	0 1 2 3 4 5 6 7 8 9 10 11 12 13
TOP SOIL	rootlets.	× × × × × × × × × × × × × × × × × × ×	F				
Z	SILT; light brown. Very stiff; moist; highly plastic.	* * * * * * * * * * * * * * * * * * *	E			102/37kPa	
BROWN ASH	0.5m: Minor pumice sand with light grey mottles.	× × × × × × × × × × × × × × × × × × ×	0.5			124/62kPa 173/59kPa	
	SILT with minor pumice sand; white/grey with orange mottles. Very stiff; moist.	×. · · ×. × · · · × · · × · · × ·	-			157/41kPa 127/41kPa	
	1.0m: Becoming wet and stiff.	× · × · × · × · × · × · × · × · × · × ·	1.0			131/50kPa 144/47kPa 140/47kPa 123/41kPa	
WHANGAMARINO	Medium-coarse sandy pumiceous SILT; light brown. Hard; wet.	× · · · × · × · × · × · × · × · × · × ·	1.5			144/41kPa >219kPa 192/47kPa UTP	
WHA	CLAY; mottled orange with grey/white. Very stiff; moist; low plasticity.		2.0	₹		192/38kPa 217/34kPa	
	Highly organic HCNITE, block, Hard, caturated	 	<u>-</u>			192/41kPa 71/24kPa UTP	
	Highly organic LIGNITE; black. Hard; saturated.		_ - - - 2.5				
	EOH = 2.5m bgl Target depth. Groundwater encountered at 1.8m. PK Shear Vane.						
			 3.0 				
			_ _ _ _ _ _				
			- 3.5 - - - -				
			4.0				
			_ _ _ _ _				
			- - 4.5 -				
			- - - - 5.0				
			3.0			•	0 2 4 6 8 10 13 16 18 20 23 26 28 30 Inferred CBR 10%



HA201 Bore No.: **HAND-AUGER LOG** Project: Scott Road, Te Kauwhata Checked by: AHN 07/03/2017 Augered by: AHN/SH Date: Ref: 4036

	Great by: 74 may 311 Greated by: 74 may					Ker. 4030
Geology	Soil Description	Soll Symbol	Depth (m)	Water Level	Undrained Shear Strength	Scala Penetrometer Blows/100mm
ō		₩		>	0 100 200	0 1 2 3 4 5 6 7 8 9 10 11 12 13
	TOPSOIL; dry.	~~~~	_ _ _			
HAMILTON- KAUROA ASH	Sandy SILT; light brown. Hard; dry.	×. ×. ×.	_			
P E		×·×·	_		UTP	
AM	Sandy CLAY; dark orange brown. Hard; slightly moist;	.:-:::	_ _ 0.5			
∓₹	plastic.	-· - ··	_			
	Clayey SAND; mottled yellow and white. Hard; slightly moist; slightly plastic.		_		UTP	
	moist, siigiltiy piastic.		_			
			_		UTP	
			- 1.0			
Σ			_			
PUKETOKA ALLUVIUM			_		UTP	
J.	Sandy CLAY; mottled orange and yellow, flecked red.		_			
A A	Moist; plastic.		_ _ 1.5			
o K			_		>219/104kPa	
ĒT			_			
P	Clayey SILT (ignimbrite silt?); pale yellow white. Wet;	×_ ××-	_		>219/89kPa	
	plastic.	× × ×	_ _ _ 2.0			
		×-^××-			192/62kPa	
		××=-,	_			
	No ourse management below 0. Ama	×-×-	_		>219/62kPa	
	No auger recovery below 2.4m	127.4.	_		UTP	
		?	- 2.5		UIF-	
		<u> </u>	_		192/93kPa	
]}	_		192/83kPa	
	EOH =2.4m bgl No recovery.		_			
	Groundwater not encountered.		- 3.0			
	PK Shear Vane.		_			
			_			
			_			
			- - 3.5			
			_			
			_			
			_			
			-			
			- 4.0			
			_			
			_			
			_			
			- - 4.5			
			_			
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			_ _ 5.0			
			2.0			0 2 4 6 8 10 13 16 18 20 23 26 28 30 Inferred CBR 10%
	A CONTRACTOR OF THE PARTY OF TH					I I I I I I I I I I I I I I I I I I I
		1		l l		

HAND-AUGER LOG

HA202 Bore No.:

Project: Scott Road, Te Kauwhata

Checked by: AHN 07/03/2017 Augered by: AHN/SH Date: Ref: 4036

Geology	Soil Description	Soll Symbol	Depth (m)	Water Level	Undrained Shear Strength	Scala Penetrometer Blows/100mm 0 1 2 3 4 5 6 7 8 9 10 11 12 13
	TOPSOIL; dry. Sandy SILT; pale yellow brown. Hard; slightly moist.	~~~~~ ~~~~ ~~~~ × · · · · · · · · · · · · · · · · · ·	- - - - - - - 0.5		UTP	
PUKETOKA ALLUVIUM	Sandy SILT; mottled yellow, orange and brown. Very stiff; moist; plastic.	× · · × · × · × · × · × · × · × · × · ×	1.0		VTP >219/59kPa	
PUKETOKA	Fine clean SAND; pale yellow white. Medium dense; non plastic; becomes grey white with occasional orange staining.		1.5			
	Wet below 2.1m		- 2.0 - -	₹		
	EOH =2.2m bgl Target depth reached. Groundwater encountered at 2.1m. PK Shear Vane.		3.5			0 2 4 6 8 10 13 16 18 20 23 26 28 30 Inferred CBR 10%

HAND-AUGER LOG

HA203 Bore No.:

Project: Scott Road, Te Kauwhata

Ref: 4036

Checked by: AHN 07/03/2017 Augered by: AHN/SH Date:

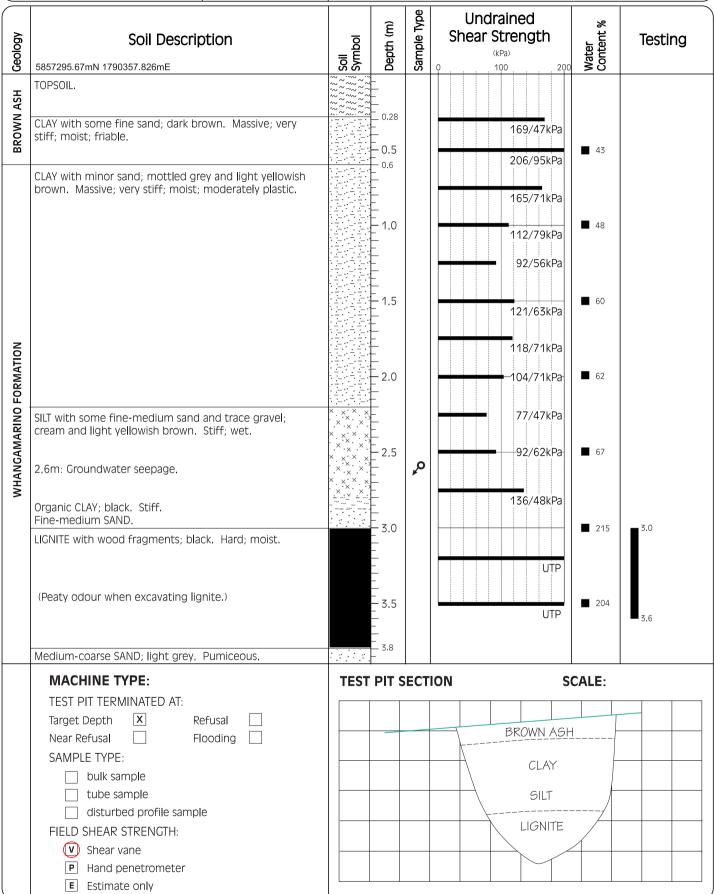
Geology	Soil Description	Soil	Depth (m)	Water Level	Undrained Shear Strength	Scala Penetrometer Blows/100mm 0 1 2 3 4 5 6 7 8 9 10111213
	TOPSOIL; dry.	~~~~				
	Sandy SILT; light orange brown. Stiff; slightly moist; moderately plastic; minor grit from hardpan layers. Becomes more sandy with depth.	× · · · × · · · · · · · · · · · · · · ·	- - - - - 0.5		UTP	
UVIUM		× · × · × · × · × · × · × · × · × · × ·	_ _ _ _		131/29kPa	
PUKETOKA ALLUVIUM	Silty SAND; yellow, white and orange. Medium dense; slightly moist; slightly plastic.	× · × · × · × · × · × · × · × · × · × ·	- - - - - - -		UTP	
PUKE	Sandy CLAY; pale yellow and white. Very stiff; moist; highly plastic.	× · · × · · · · · · · · · · · · · · · ·	1.5		UTP	
	Tilgrily plastic.				199/95kPa	
	Wet below 2.1m; poor recovery; purplish brown; possibly top of lignite?		2.0	—	>219/62kPa	
	EOH =2.1m bgl Poor recovery. Groundwater encountered at 2.1m. PK Shear Vane.		3.5	→ ~		
			4.5			0 2 4 6 8 10 13 16 18 20 23 26 28 30 Inferred CBR 10%

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

Test No.					<u> </u>							
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1	0.15	2.15						4				
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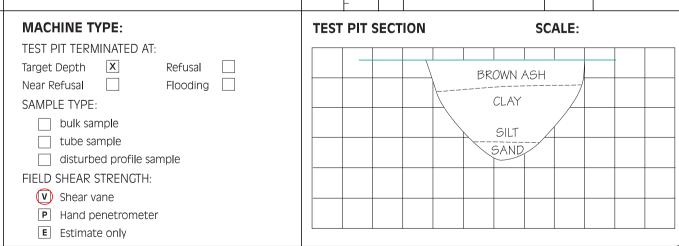
EARTHTECH CONSULTING LIMITED

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



Test Pit No.: **TP2-01 -** Page 2 **TEST PIT LOG** Project: Lakeside Developments (Stage 2) Excavator: 12t - SB Logged by: PK Date: 09/11/17 Ref: 4036 Sample Type Undrained Water Content % Depth (m) **Shear Strength** Soil Description Geology **Testing** (kPa) 200 100 LIGNITE; black. Hard; moist. 241 WHANGAMARINO FORMATION UTP - 4.5 233 UTP Fine-medium SAND with trace silt. Medium dense; pumiceous. 45 - 5.0 LIGNITE; black. Hard; moist. 168 - 5.5 EOP = 5.4mTarget depth reached. Groundwater encountered at 2.6m PK shear vane. 6.0 - 6.5 7.0 F 7.5 **MACHINE TYPE: TEST PIT SECTION SCALE:** TEST PIT TERMINATED AT: X Target Depth Refusal **BROWN ASH** Flooding [Near Refusal SAMPLE TYPE: CLAY bulk sample tube sample SILT disturbed profile sample LIGNITE FIELD SHEAR STRENGTH: (V) Shear vane P Hand penetrometer **E** Estimate only

Test Pit No.: TP2-02 **TEST PIT LOG** Project: Lakeside Developments (Stage 2) Date: 09/11/17 Excavator: 12t - SB Logged by: PK Ref: 4036 Sample Type Undrained Water Content % Depth (m) Shear Strength Geology Soil Description **Testing** (kPa) 5857325.593mN 1790533.163mE 100 200 TOPSOIL. **BROWN ASH** 0.25 CLAY with minor fine sand; light yellowish brown. 169/53kPa Massive; very stiff; moist; friable. - 0.5 33 149/83kPa CLAY with some fine sand and trace fine grayl; mottled grey and light yellowish brown. Massive; stiff; moist. 0.6m-2.6m 126/79kPa NZ standard compaction OWC=49% 48 1.0 NWC=64% 123/63kPa MDD=1.03t/m3 S.. (OWC) = 162kPa 131/48kPa Av (OWC)=9 % Silty CLAY; light greyish brown. Massive; stiff; wet; low $sd=2.54t/m^{3}$ plasticity. F 1.5 **5**5 114/44kPa 1.6 FORMATION 106/41kPa **1** 76 -2.0 114/59kPa ×× Layered SILT; light grey. Stiff; moist; pumiceous; low WHANGAMARINO plasticity. - 2.3 115/48kPa Fine SAND with trace silt; light grey. Medium dense; moist; pumiceous. 2.5 **8**1 - 3.0 72 EOP = 3.0mTarget depth reached. Groundwater not encountered. PK shear vane. - 3.5 **MACHINE TYPE: TEST PIT SECTION** SCALE: TEST PIT TERMINATED AT: X Target Depth Refusal BROWN ASH Near Refusal Flooding CLAY SAMPLE TYPE:



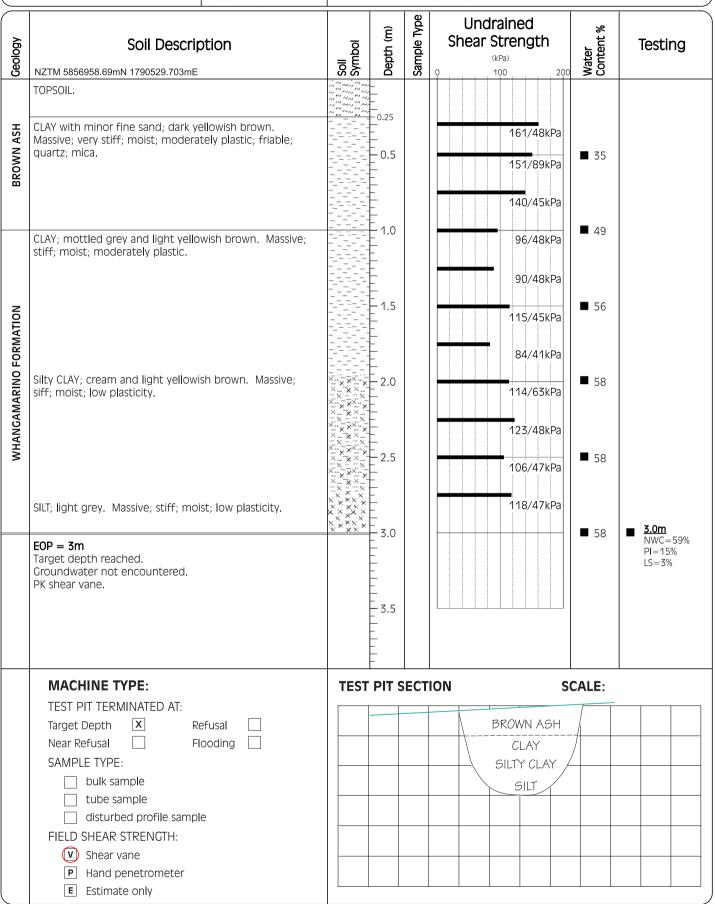
	TEST PIT	1.00	Test Pit No.: TP2-03								
	IESI PII	LOG	Proje	ct:	La	ıkeside D	evelopme	ents - S	tage 1		
Exca	avator: 12t SB	Logged by: PK	Date:		90	3/11/17			Ref: 4036		
Geology	Soil Descrip NZTM 5857023.034mN 1790277.810mB		Soil	Depth (m)	Sample Type	Shear S	rained Strength	Water Content %	Testing		
BROWN ASH	TOPSOIL. CLAY with trace fine sand; light ye Massive; very stiff; moist; friable;	llowish brown.		0.25			UTP 213/59kPa 165/86kPa 184/101kPa 192/109kPa 202/83kPa	■ 46 ■ 47	■ 0.3 0.3m-1.7m NZ standard compaction MDD=1.17t/m³ OWC=44% NWC=42% ■ 1.0 S _u (0WC)=162kPa Av (0WC)=5% sd=2.71t/m³ CBR (0WC)=5% PI=46% LS=13% ■ 1.7		
NO FORMATION	CLAY; light grey and light yellowish stiff; moist; moderately plastic. Silty CLAY; light grey and reddish the stiff; moist.			- 1.8 - 2.0 - 2.3 - 2.5 - 2.5			151/83kPa 147/63kPa 149/71kPa	■ 51 ■ 68	1.7m-3.4m NZ standard compaction MDD=1.14t/m³ OWC=45% NWC=57% S _u (OWC)=162kPa Av (OWC)=5%		
WHANGAMARIN	Clayey SILT; light grey. Massive; st Silty medium-coarse SAND; light g dense; wet.		X. X	- 2.9 - 3.0 			71/38kPa 120/45kPa	■ 52 ■ 68	3 .4		
		efusal	TEST	PIT S	ECTIO	ON	S	CALE:			



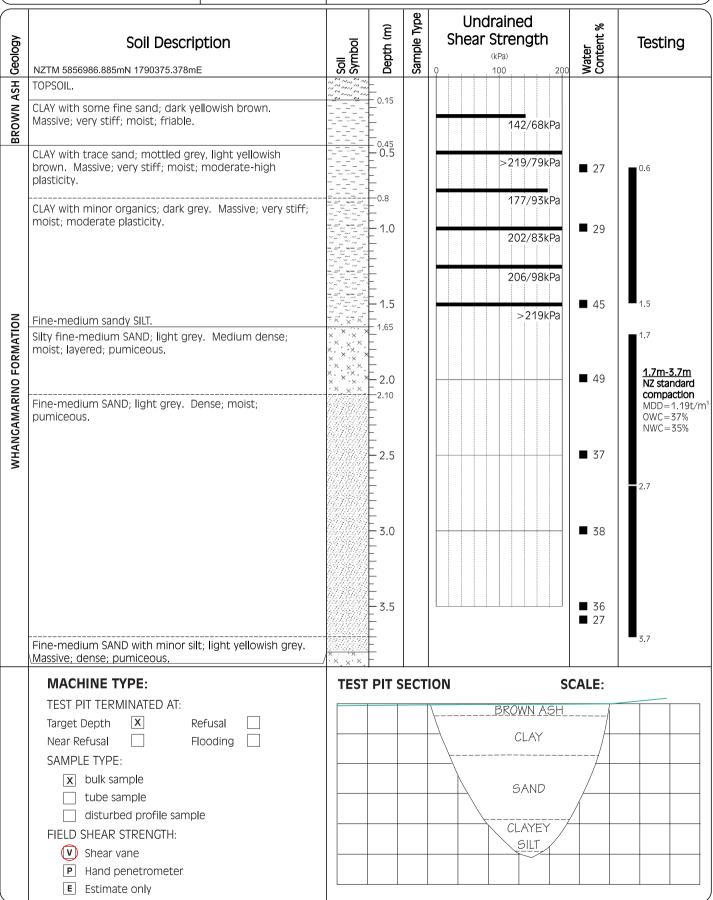
P Hand penetrometerE Estimate only

	TEST PIT	100	Test Pit No.: TP2-03 - Page 2							
	IESI PII	LOG	Proje	ct:	La	keside	Developn	nents		
xca	vator:	Logged by: PK	Date:		30	3/11/17	,		Ref: 4036	
Geology	Soil Descri 5857023.034mN 1790277.810mE	otion	Soil Symbol	Depth (m)	Sample Type		Irained Strength	Water Content %	Testing	
WHANGAMARINO FORMATION	Silty medium- coarse SAND; light medium dense; wet. Medium-coarse SAND; light grey.	4.8	X	- - - - - - - - - - - - - - - - - - -				■ 63 ■ 50	4.4	
WHANGA	dense; wet.			-5.0 -5.0 				■ 51		
	EOP = 5.4m Target depth reached. Groundwater not encountered. PK shear vane.		TEST	5.5 	ECT	ON		SCALE		
	MACHINE TYPE: TEST PIT TERMINATED AT:		TEST	PIT S	ECTI	ON		SCALE:		
		efusal								

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



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



TEST DIT	1.00	Test Pit No	D.: TP2-12 - Page 2	
TEST PIT	LUG	Project:	Lakeside Developments	
Excavator:	Logged by: PK	Date:	09/11/17	Ref: 4036
			Ψ Use already and	

	lvator: Logged by: PK	Date:		19/11/17		Ref: 4036
Geology	Soil Description 5856986.885mN 1790375.378mE	Soll Symbol Depth (m)	Sample Type	Undrained Shear Strength	Water %	Testing
WHANGAMARINO FORMATION	Clayey SILT; light brownish grey. Massive; very stiff; moist; low plasticity.	2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2		151/48kPa	■ 42 ■ 83	
WHANGA	Fine-medium SAND; light grey. Massive; medium dense; moist.	5.0			■ 63	
	EOP = 5.2m Target depth reached. Groundwater not encountered. PK shear vane.					
	MACHINE TYPE:	TEST PIT	SECT	TION S	CALE:	
	TEST PIT TERMINATED AT: Target Depth X Refusal Near Refusal Flooding SAMPLE TYPE: x bulk sample tube sample disturbed profile sample FIELD SHEAR STRENCTH: v Shear vane P Hand penetrometer E Estimate only			SAND CLAYEY SILT		

TEST PIT LOG			Test Pit No.: TP2-13							
	IESI PII	LUG	Proje	Project: Lakeside Developments -						e 1
Exca	avator: 12t - SB	Logged by: PK	Date:		0	9/11/17				Ref: 4036
Geology	Soil Descrip NZTM 5856946.089mN 1790000.557mB		Soil Symbol	Depth (m)	Sample Type	Undra Shear Sti	rength	Water Content %	Te	esting
	TOPSOIL.	-			0,		, 200			
BROWN ASH	CLAY with some fine sand; dark br stiff; moist; friable; quartz; mica.	own. Massive; very		0.23			115/60kPa 138/81kPa 155/98kPa	■ 41 ■ 52		
	CLAY with trace sand; mottled gre brown. Massive; very stiff; moist;			- - - - - - - - - -		>2	83/48kPa 219/101kPa			
z	SILT with trace sand; dark yellowish stiff; wet; friable.	n brown. Massive; very	~ x x x x x x x x x x x x x x x x x x x	- 1.5 - - - - - - - -			142/48kPa	■ 64		
WHANGAMARINO FORMATION	SILT with some fine sand; light yell Massive; stiff; wet; low plasticity.	lowish brown.	X X X X X X X X X X X X X X X X X X X	-2.0 -2.5 -3.0 -3.5 -3.95			115/48kPa 131/71kPa 93/48kPa 109/50kPa 98/47kPa 93/48kPa	■ 88 ■ 95 ■ 79	6	ensitive soil n basis NWC 4% to 95% v 82%
	MACHINE TYPE:	TEST	PIT S	ECT	ION	S	CALE:			
	TEST PIT TERMINATED AT: Target Depth X Re Near Refusal Fl SAMPLE TYPE:				Le soils subhor	vel site rizontally la	yered			



P Hand penetrometerE Estimate only

	TEST PIT	Test Pit No.: TP2-13 - Page 2							
	TEST PIT	LOG	Proje	ct:	La	akeside D	Developme	nts	
Exca	vator:	Logged by: PK	Date:	Date : 09/11/17					
Geology	Soil Descrip NZTM 5856946.089mN 1790000.557mB		Soil Symbol	Depth (m)	Sample Type	Shear S	rained Strength 100 200		Testing
WHANGAMARINO FORMATION	CLAY with minor sand; cream. Ma moderate plasticity; mica. SILT with some fine sand; cream a moist; low plasticity; pumiceous.						153/93kPa 127/95kPa 121/74kPa	■ 42 ■ 50	■ 5.0m
7HM	EOP = 5.2m Target depth reached. Groundwater not encountered. PK shear vane.		****** ****** *****					■ 58	NWC=58% PI=40% LS=15%
	MACHINE TYPE: TEST PIT TERMINATED AT:		TEST	PIT S	ECTI	CALE:			
		efusal ooding efusal					Level site norizontally la	yered	



DRILL HOLE LOG Bore No.: BH203 Sheet 1 of 2 Client: WINTON PARTNERS Drilled by: DrillForce Project: LAKESIDE, TE KAUWHATA Collar Level: Co-ordinates (mPD): 5856989mN 1790343mE Date Started: 25/11/17 Date Started: 25/11/17 Date Finished: 25/11/17

Co-ordinates (mPD): 5856989MN 1790343ME											be started: 23/11/17 Bate Hillshed: 23/11/17					
Drilling Progress	Sample Type	Casing Depth (m)	Drill Run (m)	25 25 50 75	¥ Weathered ₹ (rock only)	Fracture tog (cm)	Orlli Water Loss (%)	Plezometer				DESCRIPTION OF STRATA	Geology			
	HQ							\$\$\$\$\$\$\$\$.1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	TOPSOIL. Clayey SILT; dark yellowish orange. Loose; firm-soft; Fe mottles; rootlets. Clayey SILT; light grey with orange Fe mottles. Loose. Becoming hematitic brown below 1.2m	АЅН			
	SPT		1.5 1.95							.2		SPT 0/1//1/0/0/1 N=2 1.6m: oxides; dark yellowish orange staining. Black MnO ₂ disseminated; fine grained. Slightly sandy SILT with trace clay; pale yellowish brown. Stiff; clasts, quartz dominated.	BROWN			
-	SPT		3								X X X X X X X X X X X X X X X X X X X	Increasing sand towards base, flakes of black organic material. SPT 2/2//3/4/4 N=13 Slightly silty SAND; light grey. Medium dense-dense; fine-medium				
	HQ		3.45	LC LC				\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		· · · 4	X: X: X X: X: X X: X: X	grained. Trace veinlets of organic material, clear quartz; sand with trace pumice fragments; 1% disseminated black mineral.				
-	SPT		4.5 4.95							· · ·5	X X X X	SPT 6/7//7/8/8 N=30				
	SPT		6							· ·	X X X X X X X X X X X X X X X X X X X	CLAY; light brown with Greenish brown disseminated mottles. Stiffvery stiff; moderately plastic lacustrine clay. SILT with trace sand; greenish brown. Medium dense-dense; fine grained. SPT 4/5//5/4/5/7 N=21	RMATION			
	HQ		6.45							. 7	× × × × ×	Silty SAND with decreasing silt; light yellowish brown. Medium dense; black fine grained disseminated material; fine grained sand. Fine-medium grained SAND; grey. Medium-dense.	0 F0			
	SPT		7.5 7.95									SPT 2/3//4/5/4/3 N=16 Fine grained SAND; grey. Medium dense. Medium grained SAND; grey.	NGAMARIN			
										. 9		Fine grained SAND, slightly silty; light grey to light brownish grey; medium dense; clean sand. Silty SAND; light grey. Medium dense; very fine grained; becoming organic. SDT 1/2/2/4/2/3 N=8	WHAP			
	SPT		9.15								X	SPT 1/2//2/1/2/3 N=8 Sandy SILT; brown. Medium dense; very fine grained sand; organic.				
			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 2/2//3/2/2/4 N=11				
-	SPT		11.15							·11		Slightly silty SAND; grey. Medium dense; very fine grained. LIGNITE; black; hard. SAND with trace silt; brownish grey. Medium dense; clean;				
			12							· ·		medium-coarse grained.				

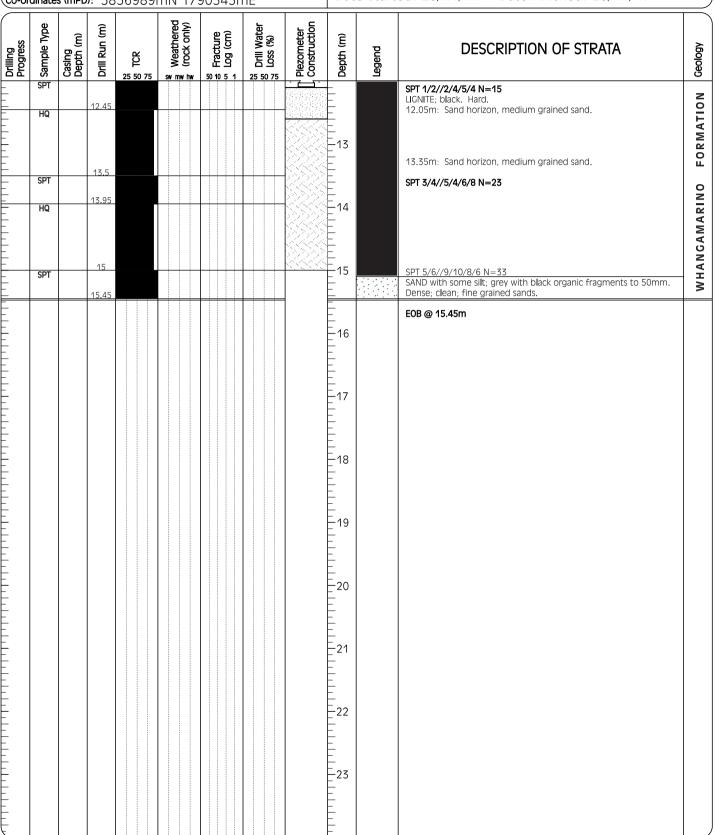
Remarks:

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

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

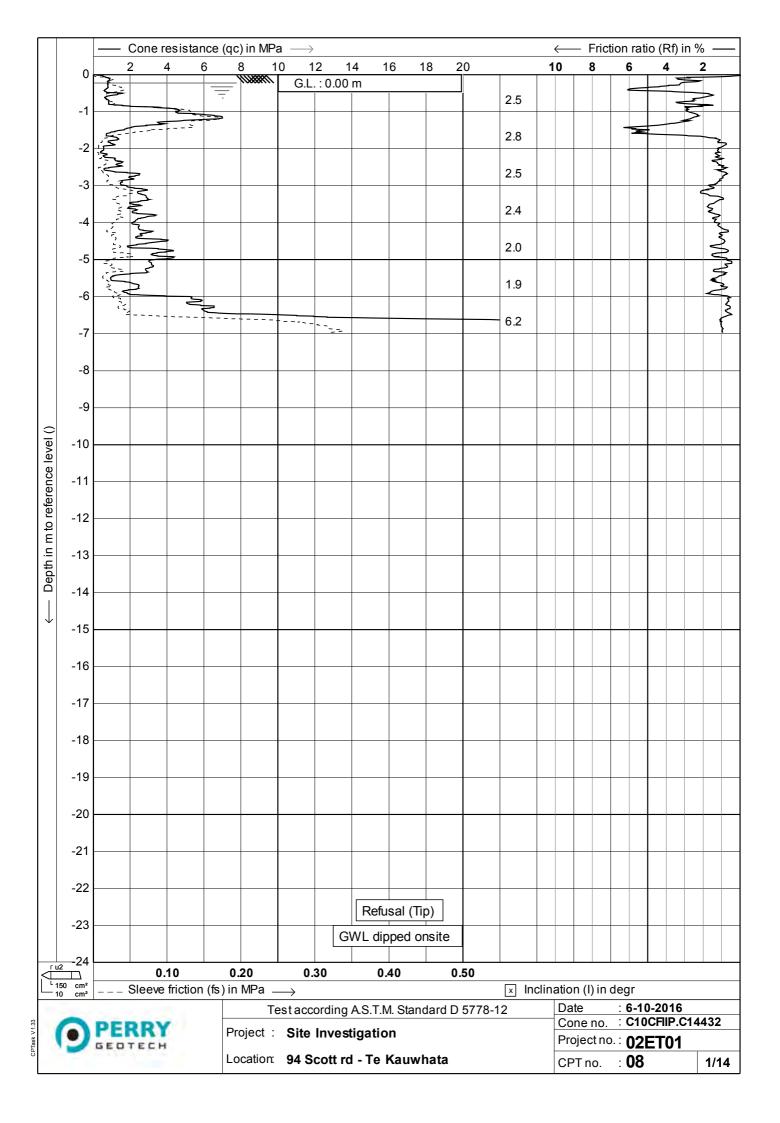


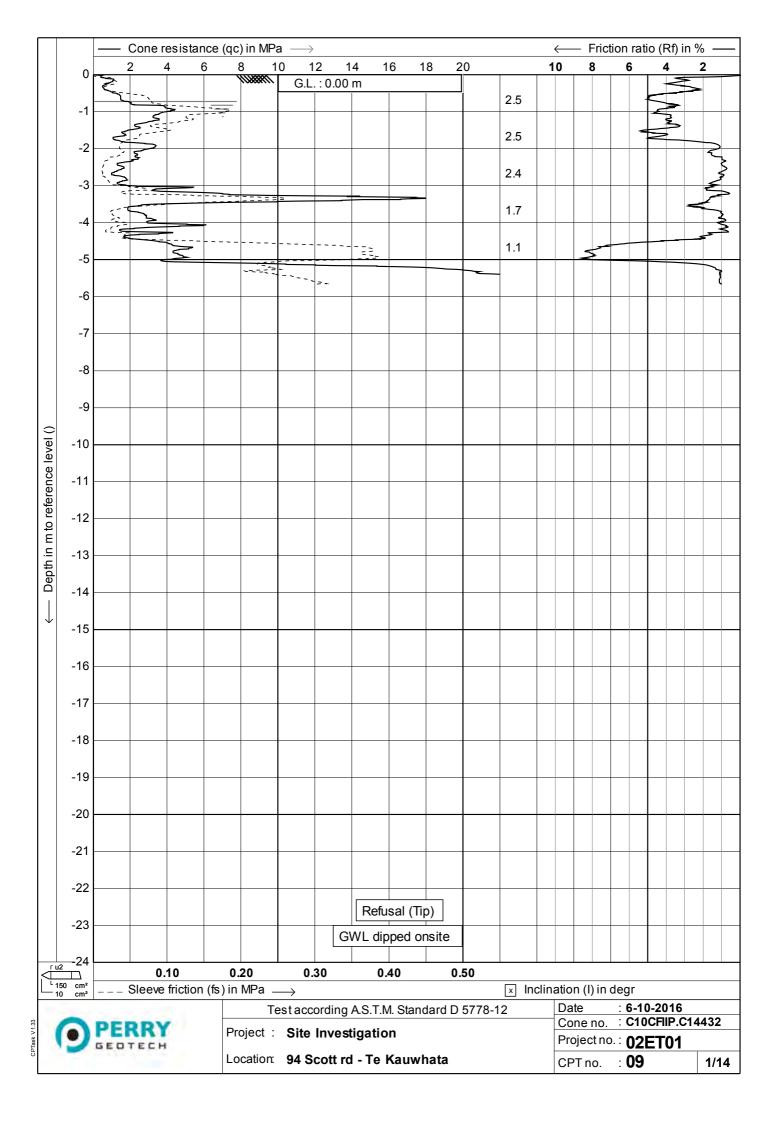
Bore No.: BH203 Sheet 2 of 2 **DRILL HOLE LOG** Client: WINTON PARTNERS Drilled by: DrillForce Project: LAKESIDE, TE KAUWHATA Ref: 4036 Collar Level: **Date Started**: 25/11/17 Date Finished: 25/11/17 Co-ordinates (mPD): 5856989mN 1790343mE

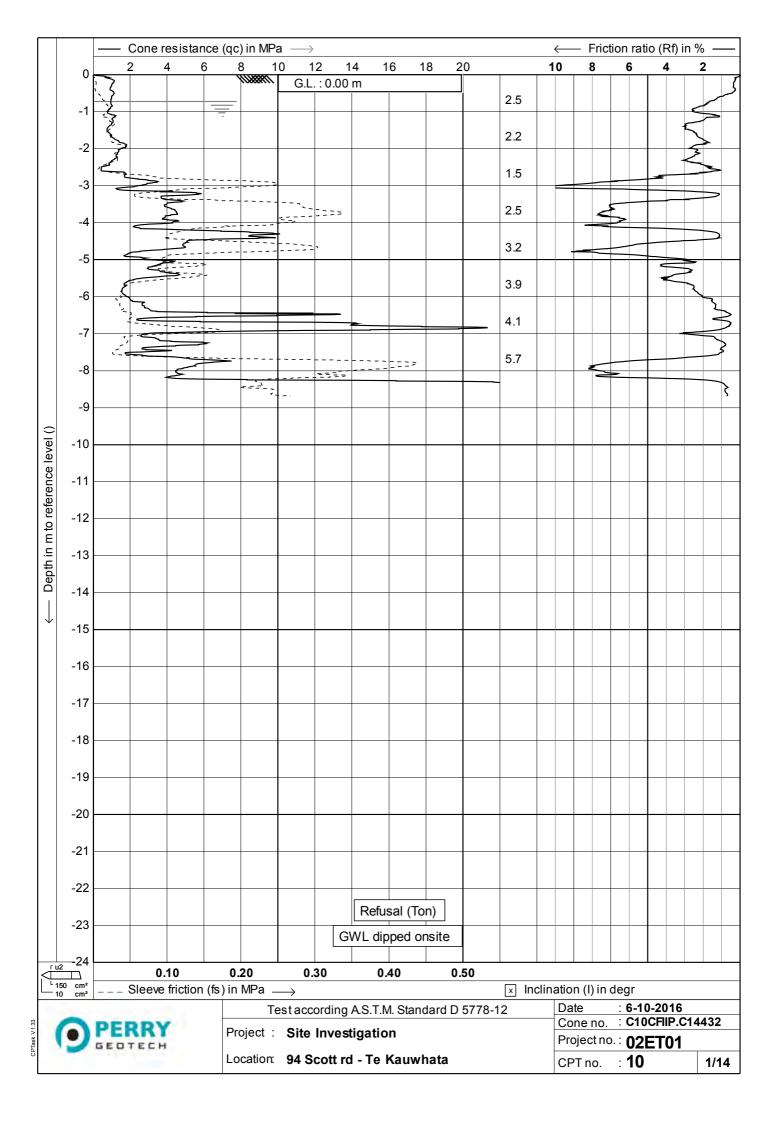


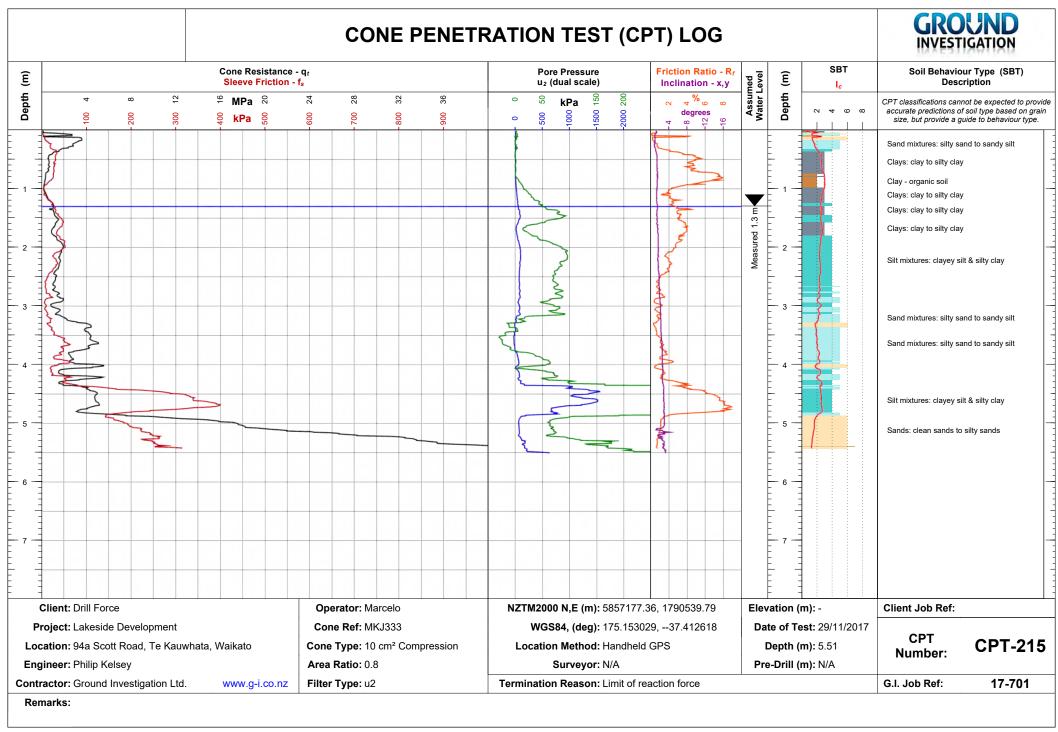
Remarks:	Logged By:	NH	Water Level Observations During Drilling				I
	Date:		Date	Time	Depth	Depth	Depth
	Checked By:	NH	Date	IIIIIE	of Hole	of Casing	of Water
	Scale:						
	Hole Length:	15.45m					
	Core Boxes:						

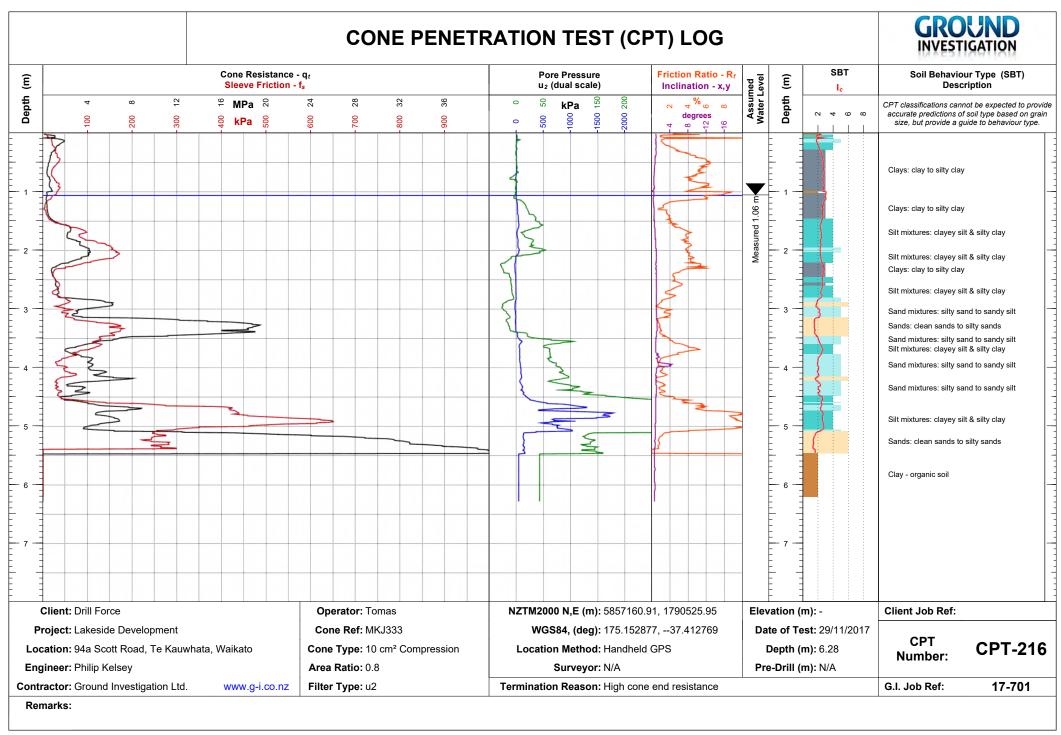


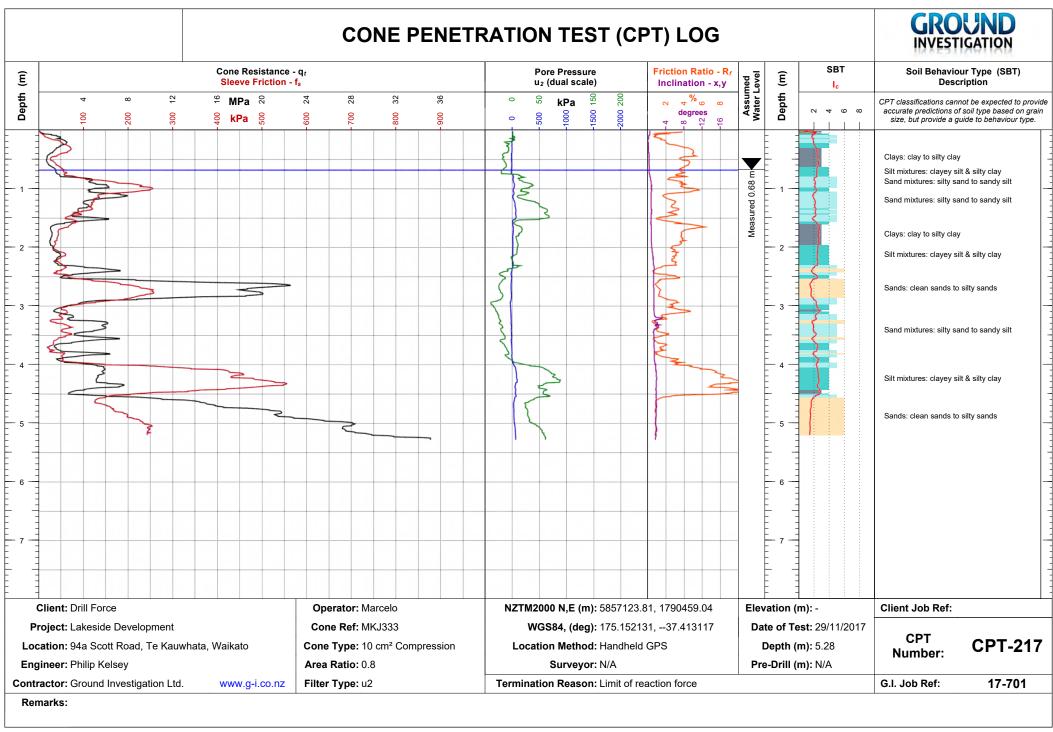


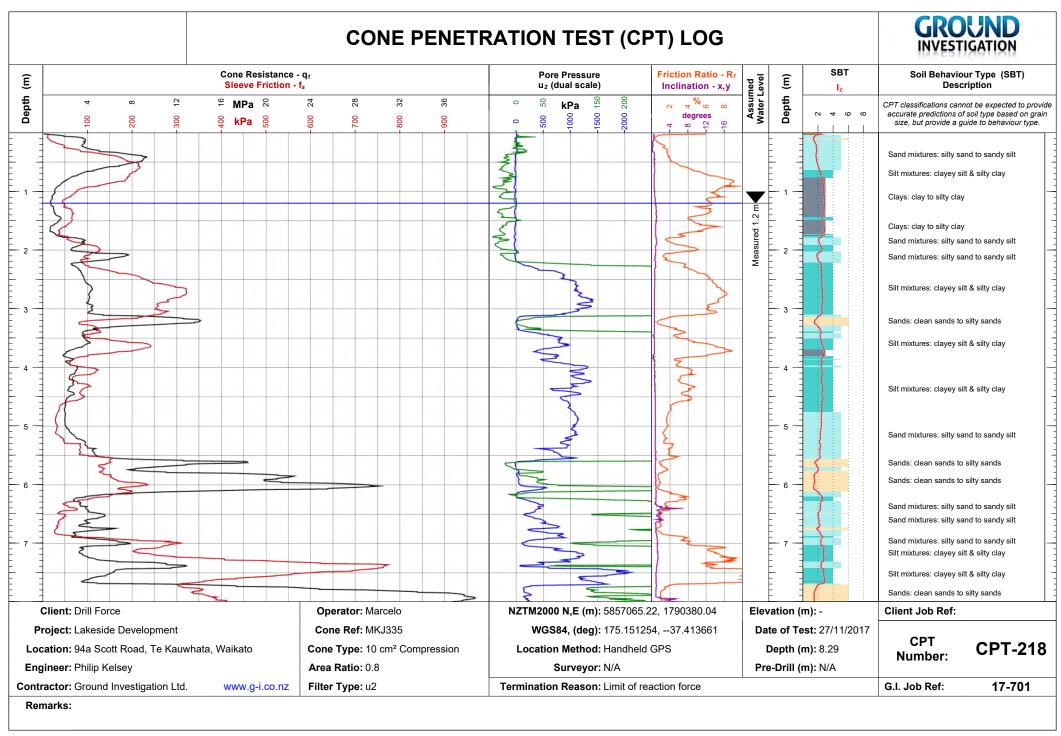


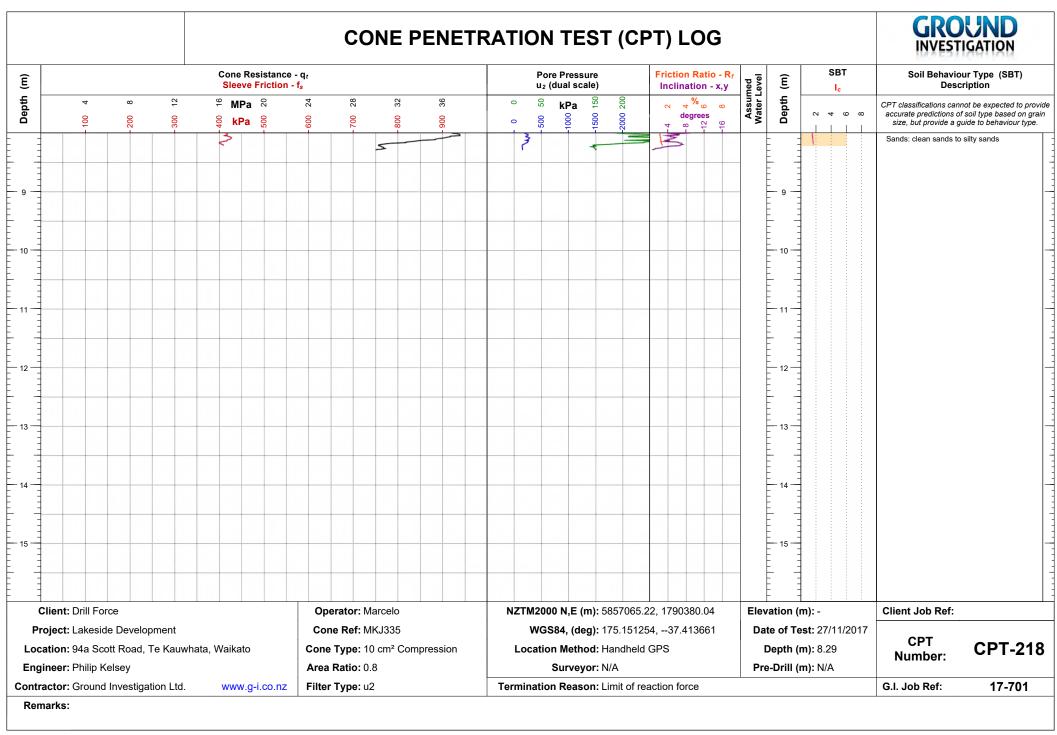


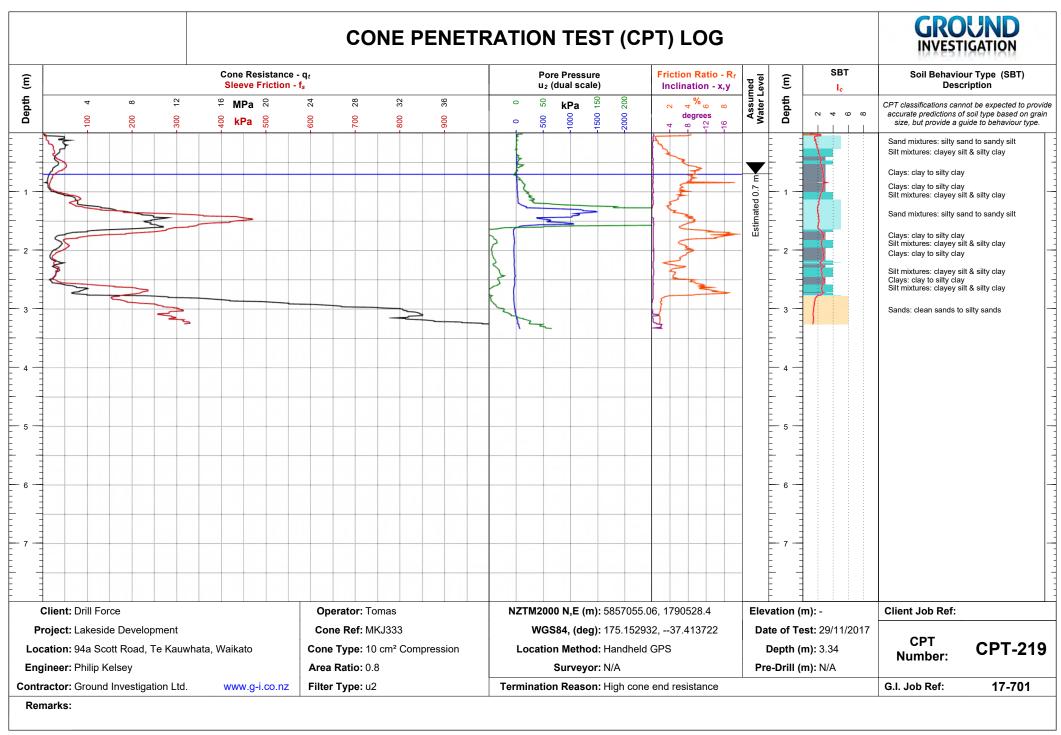


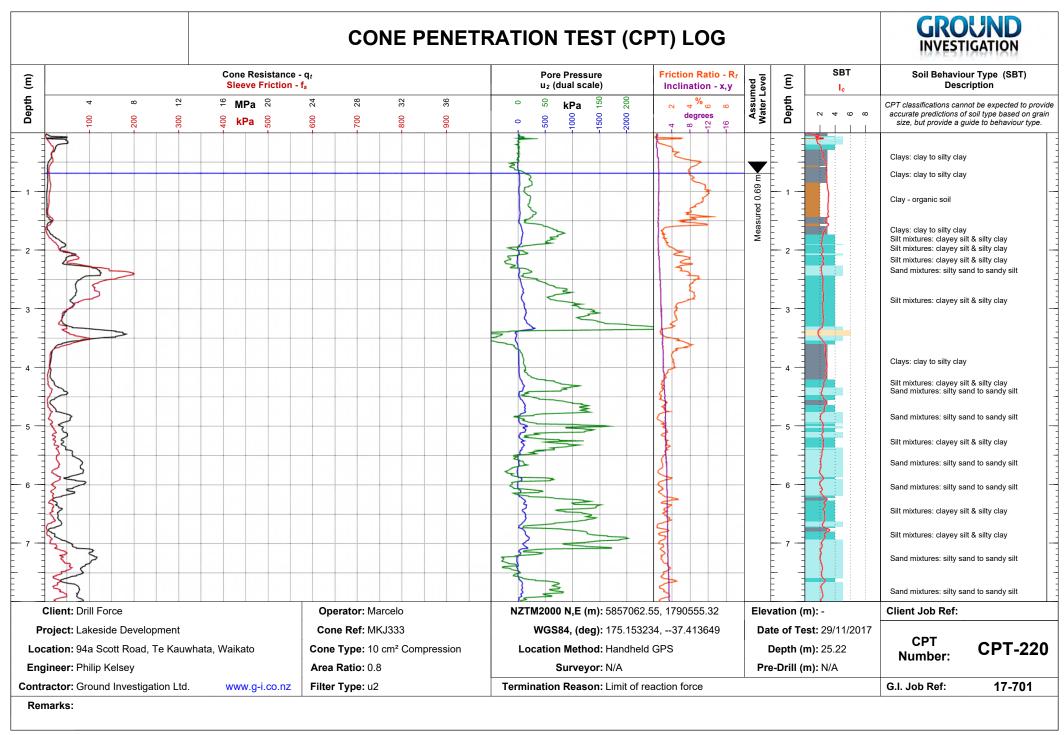


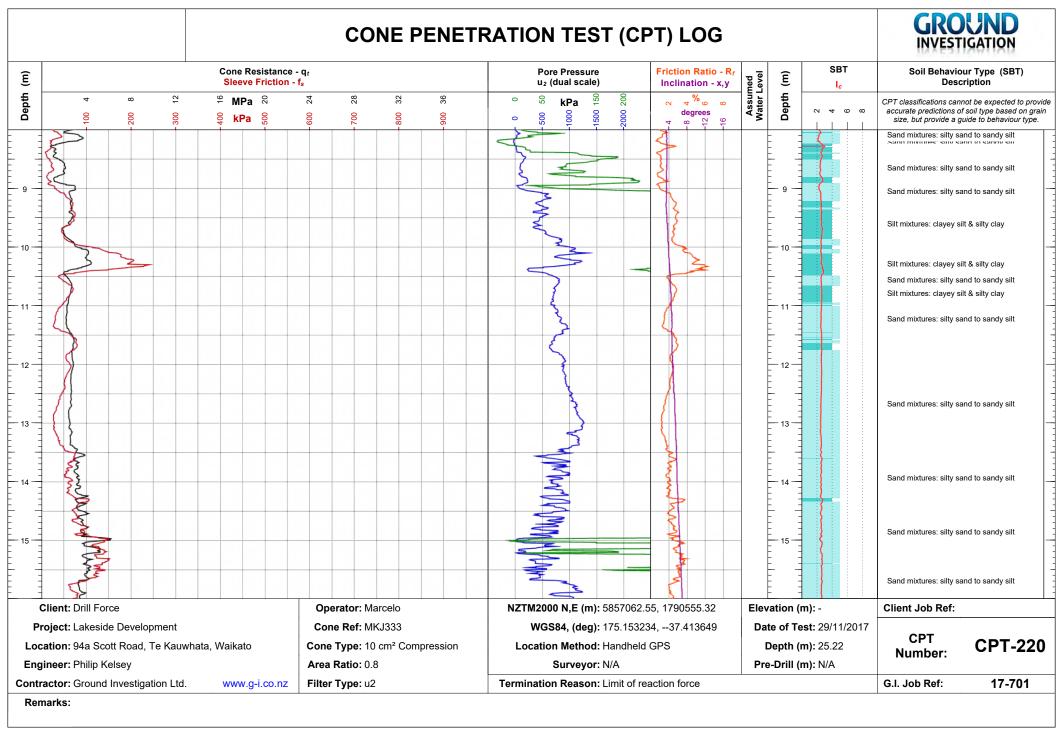


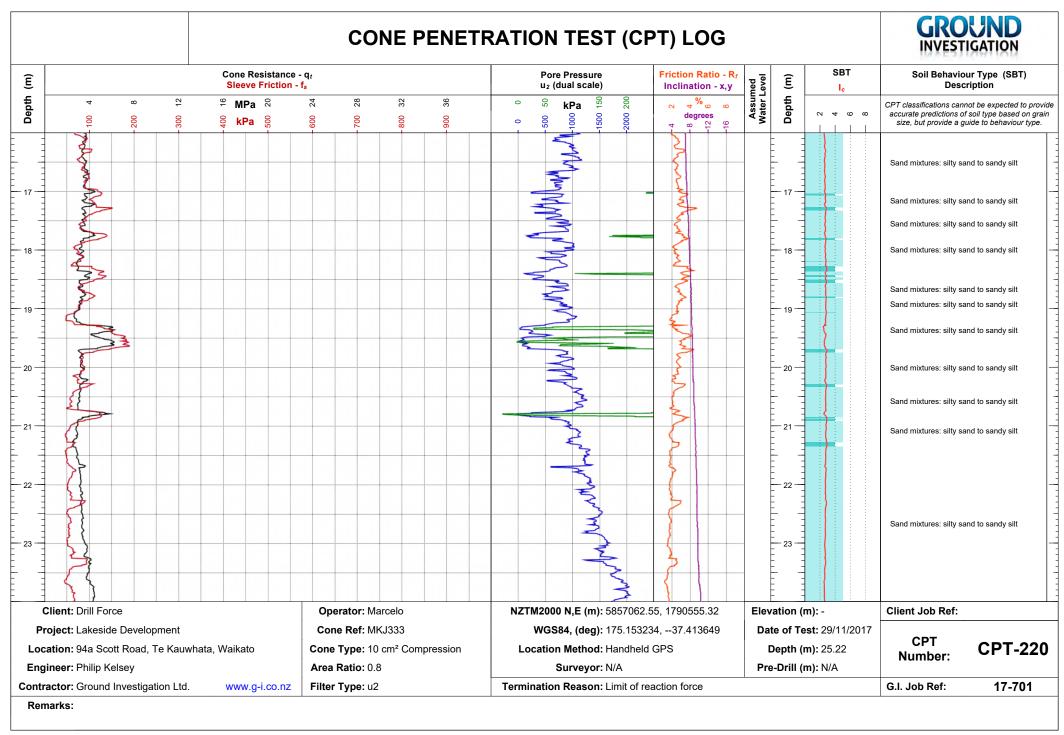


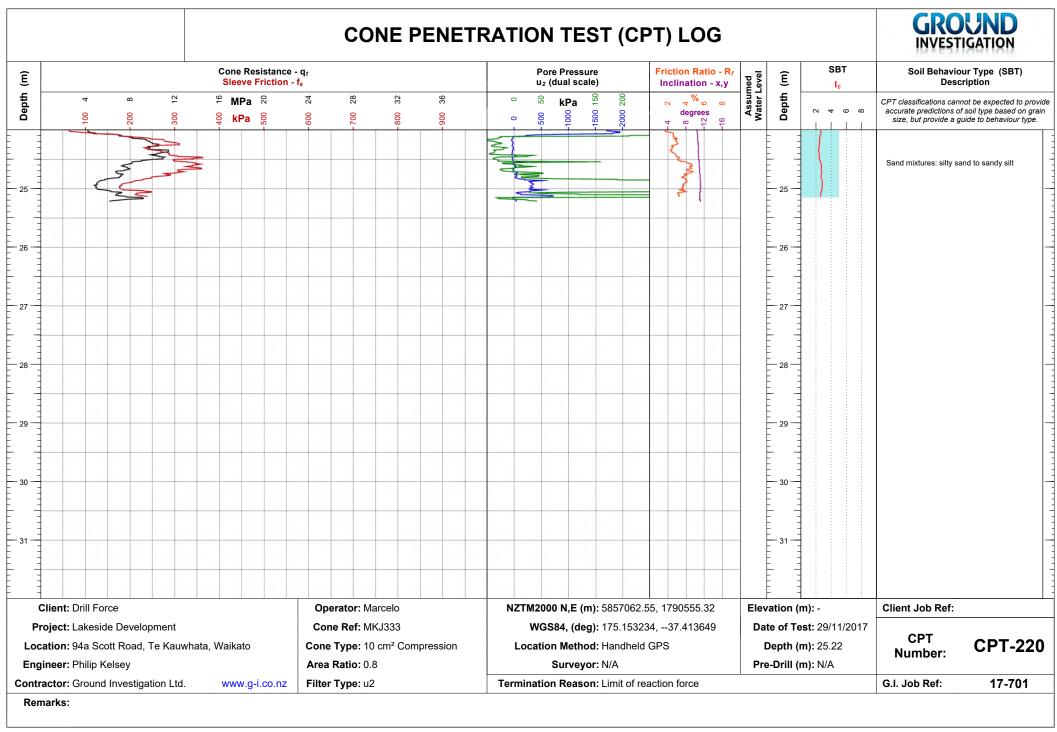


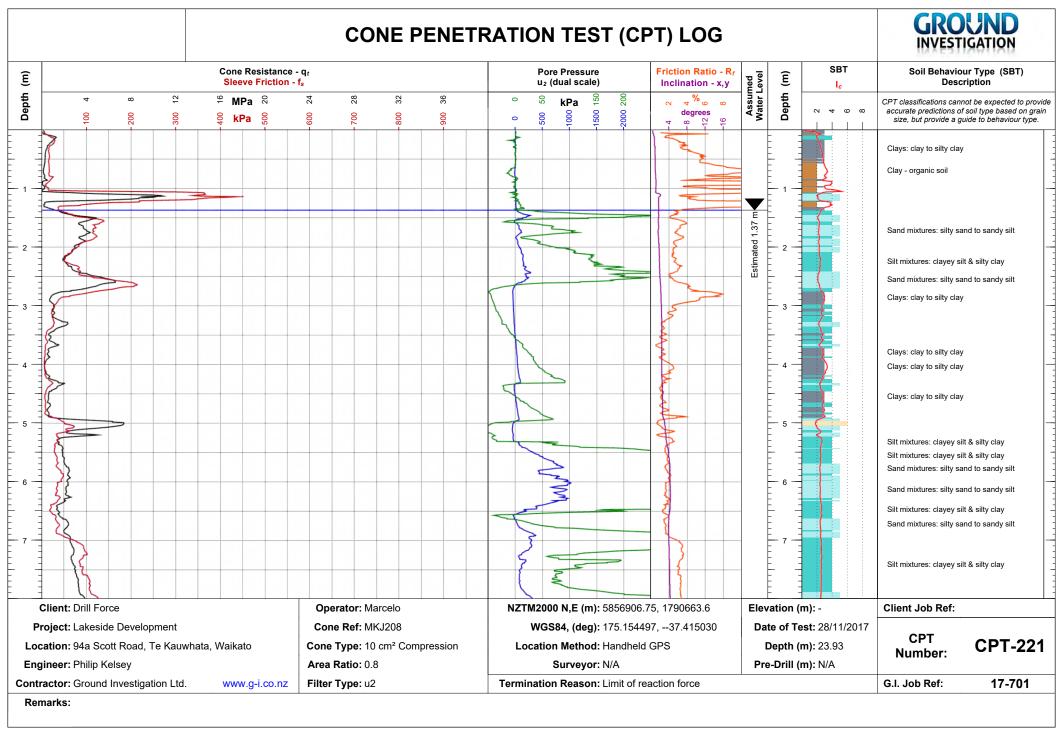


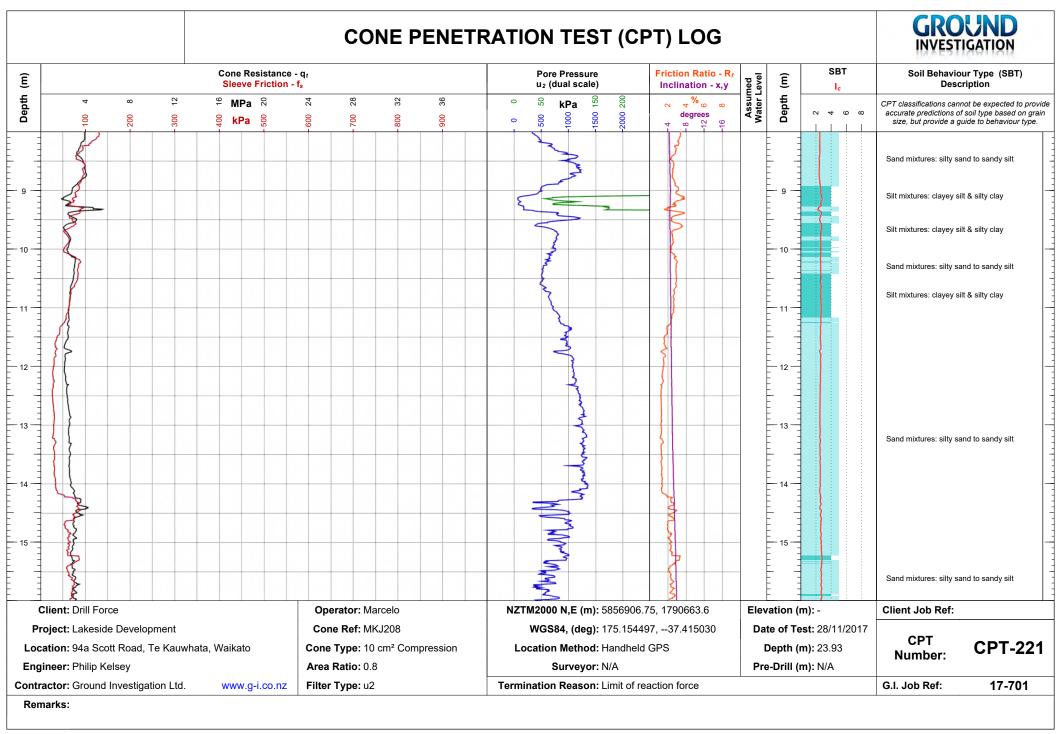


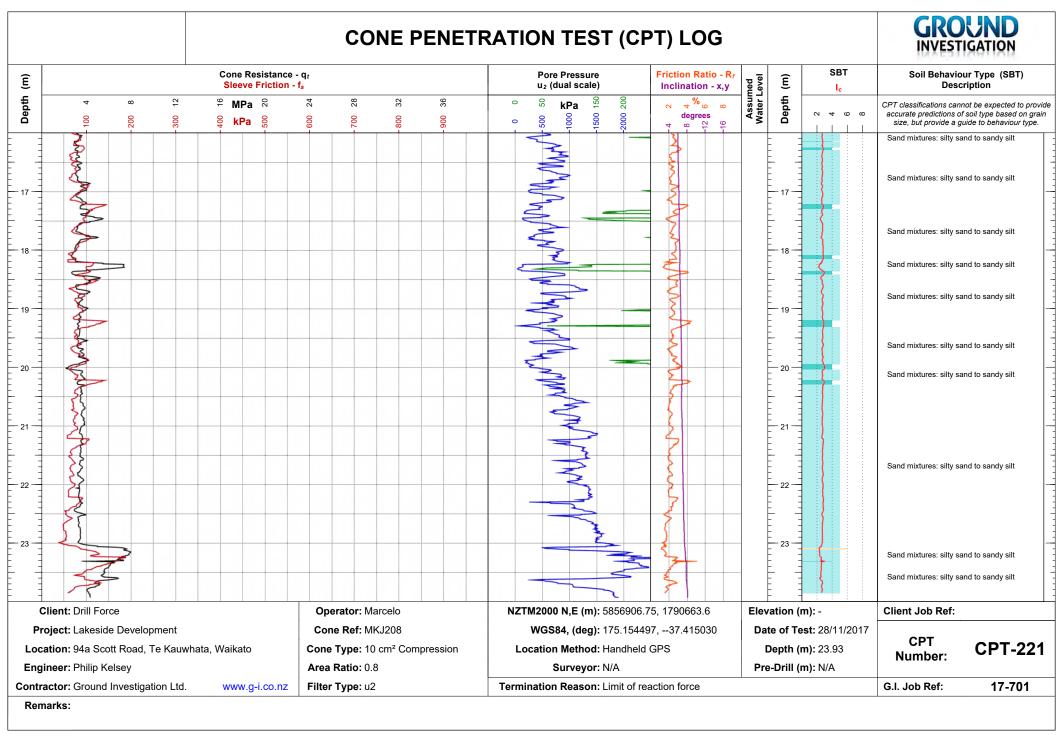


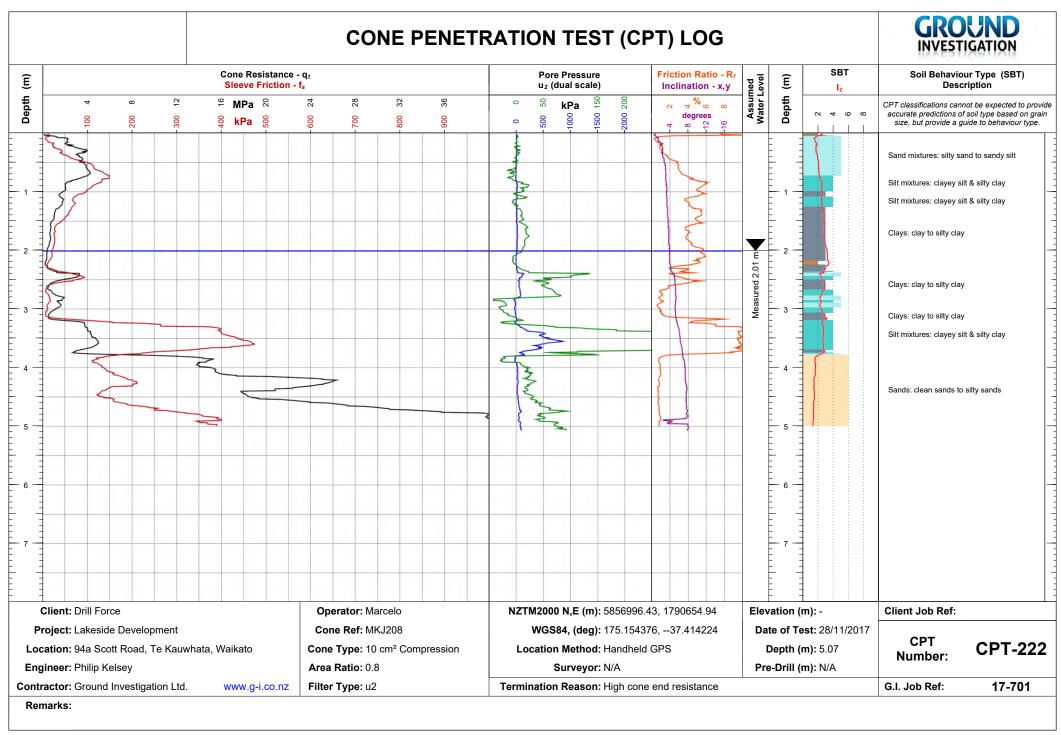


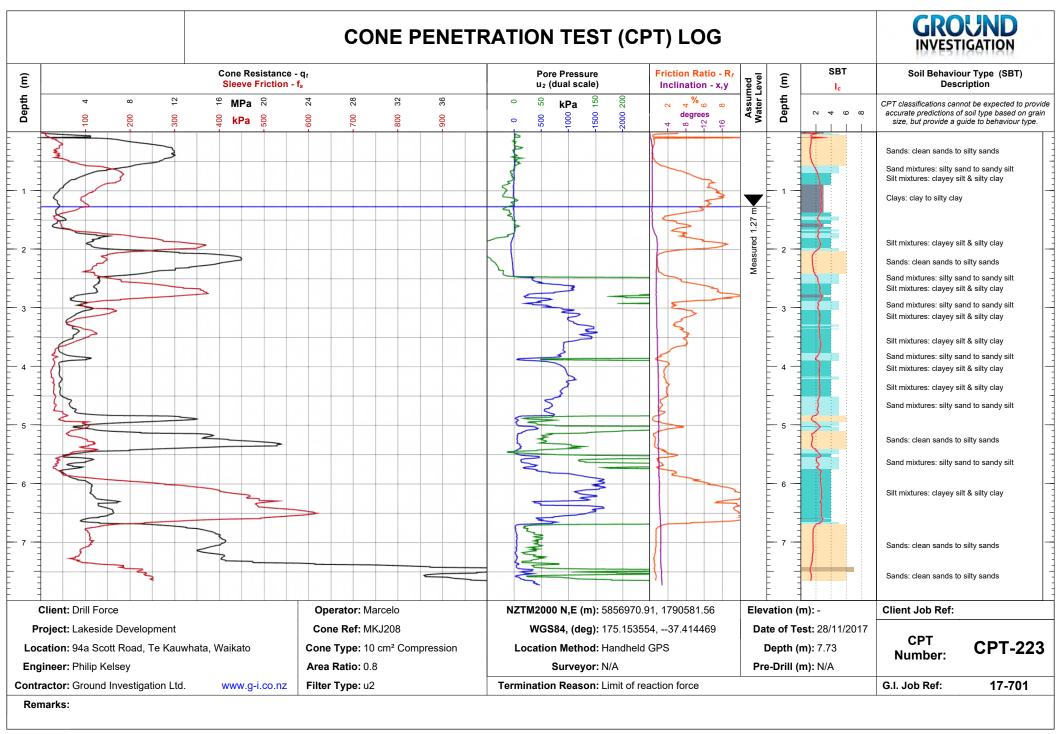


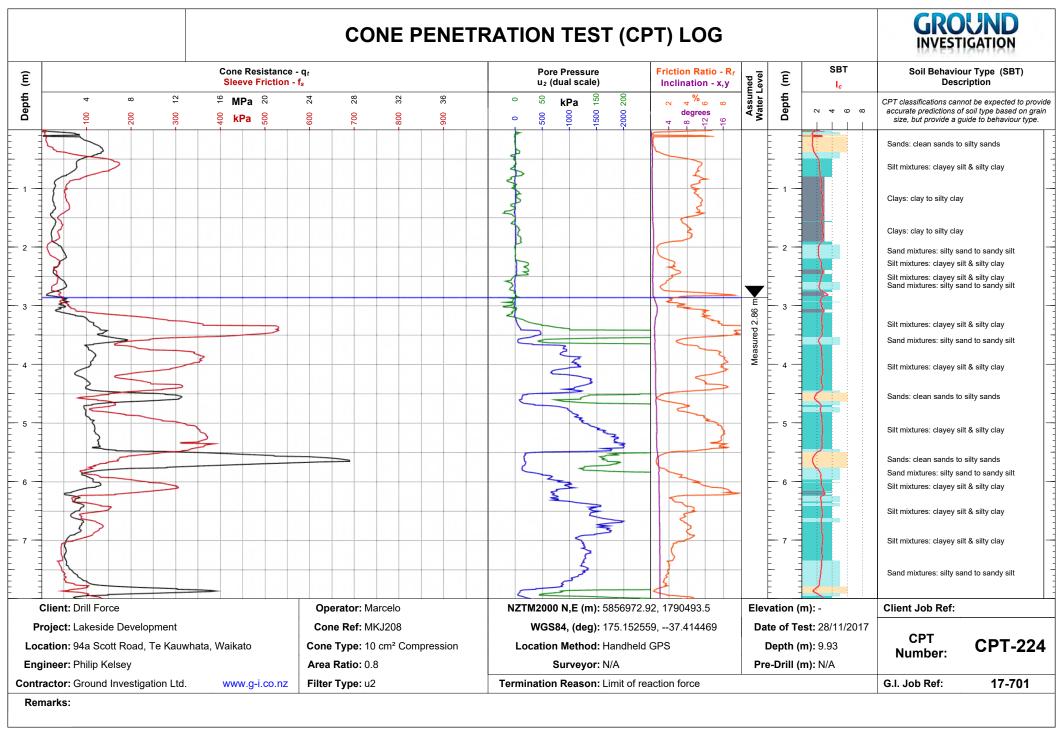


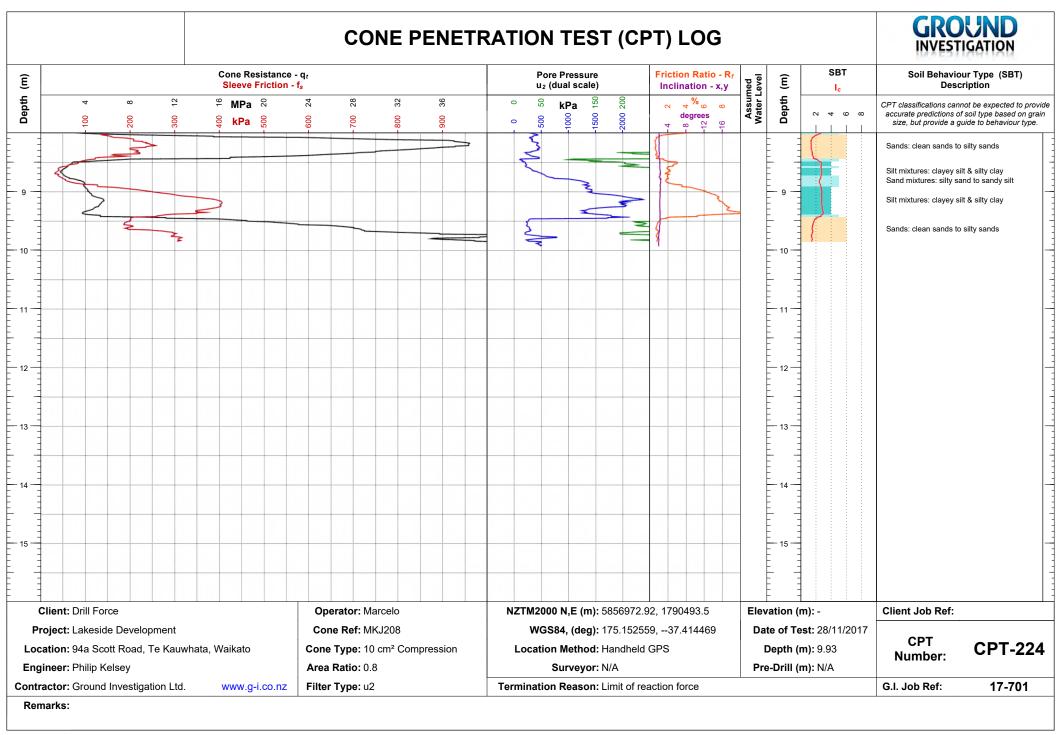


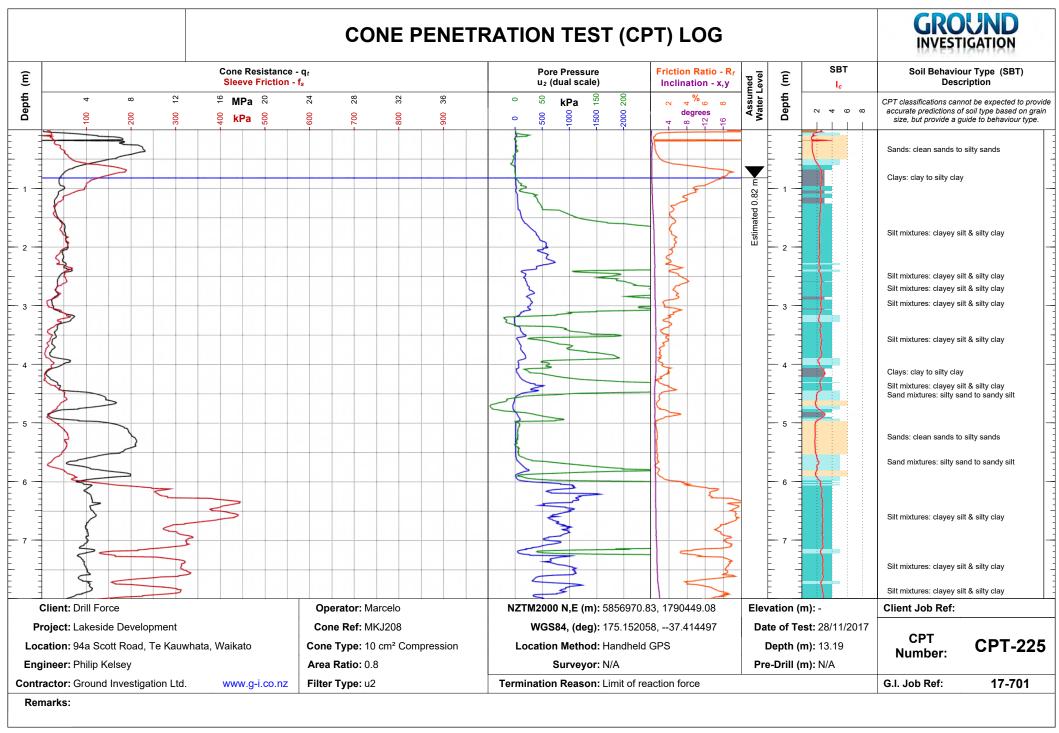


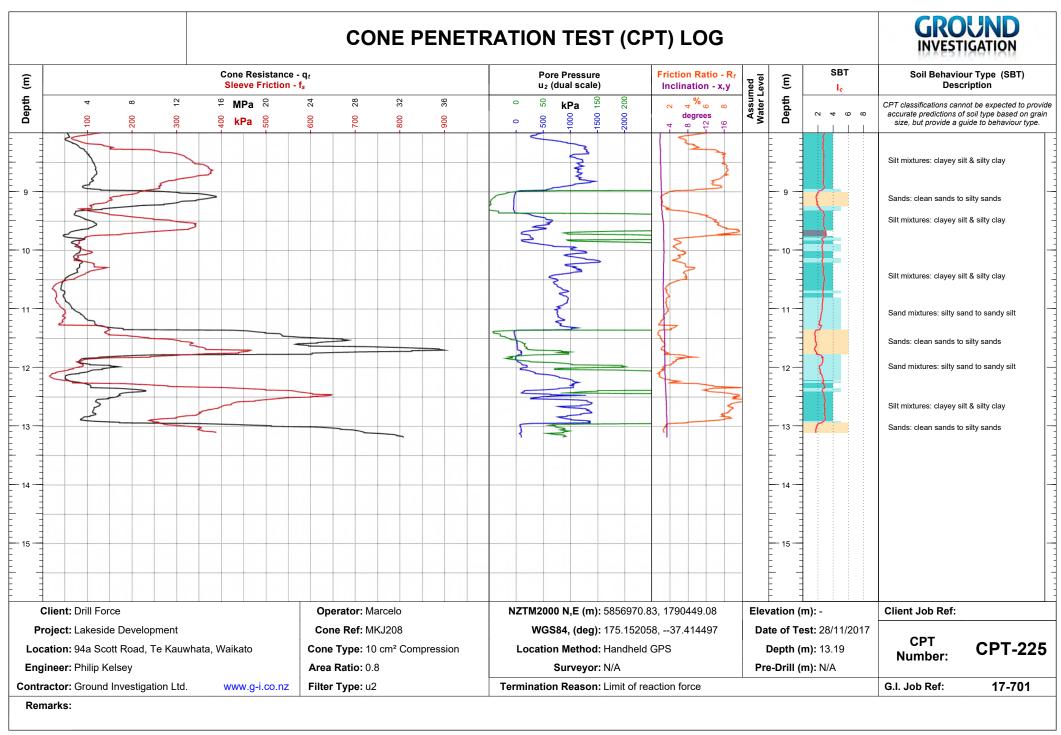


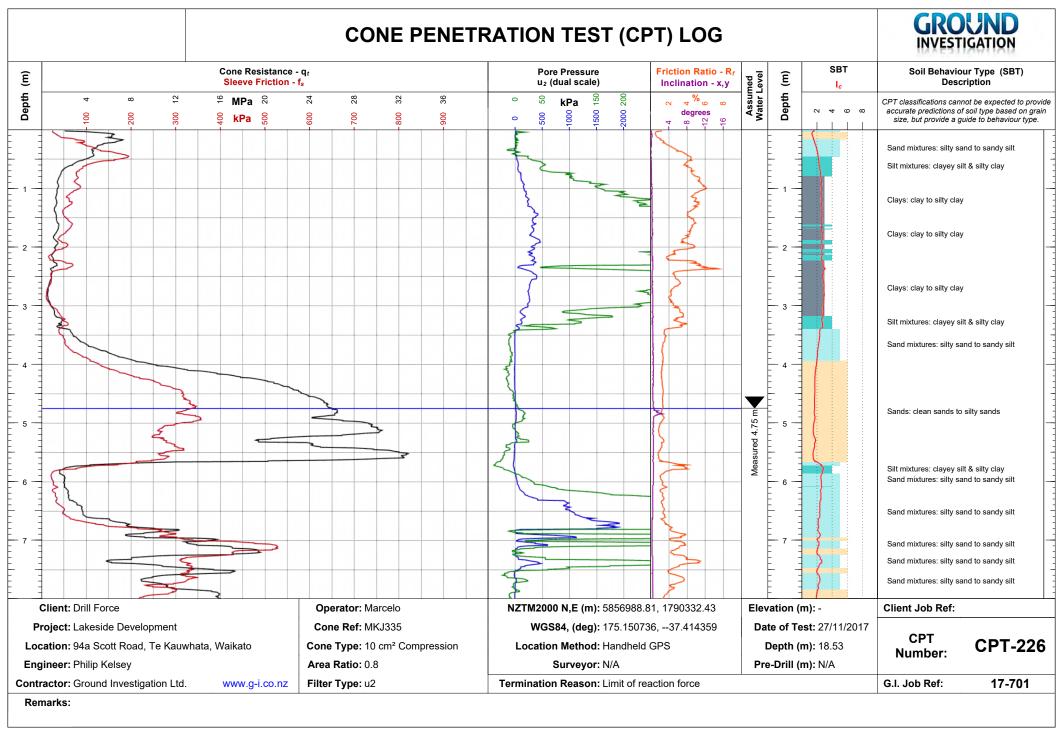


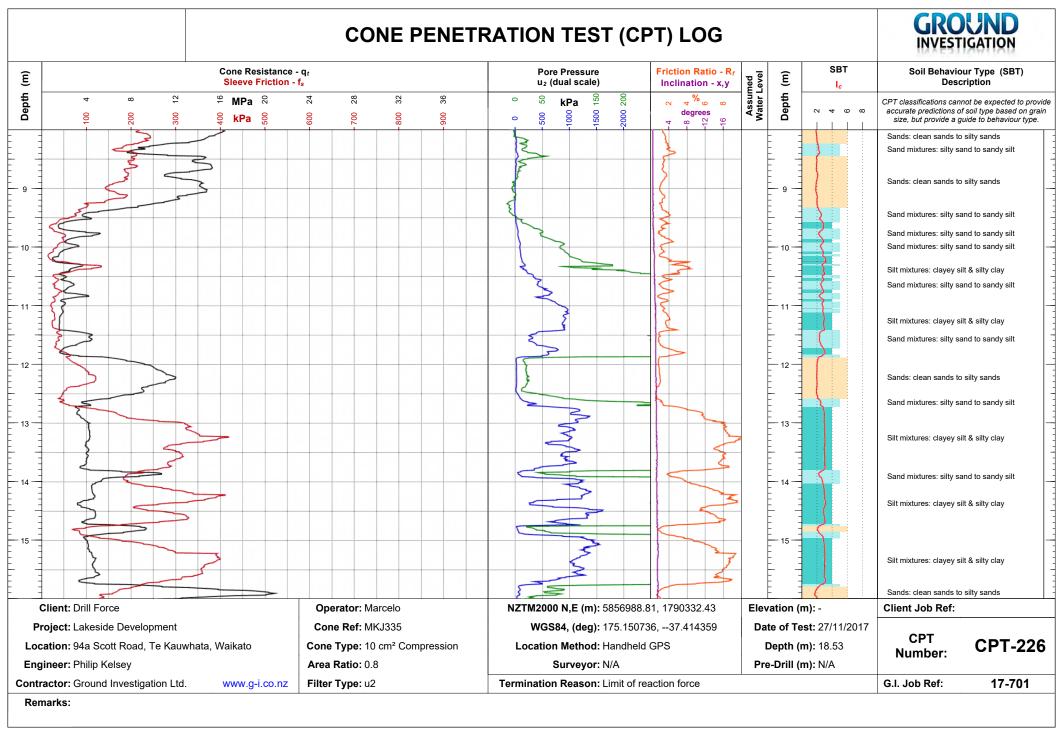


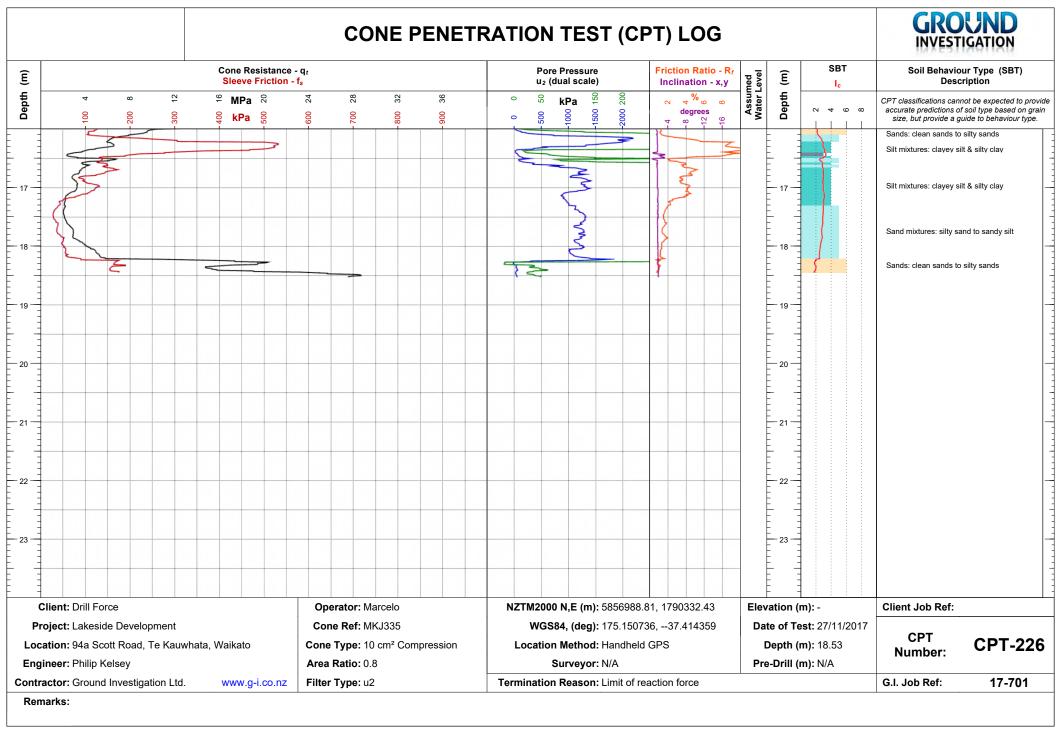


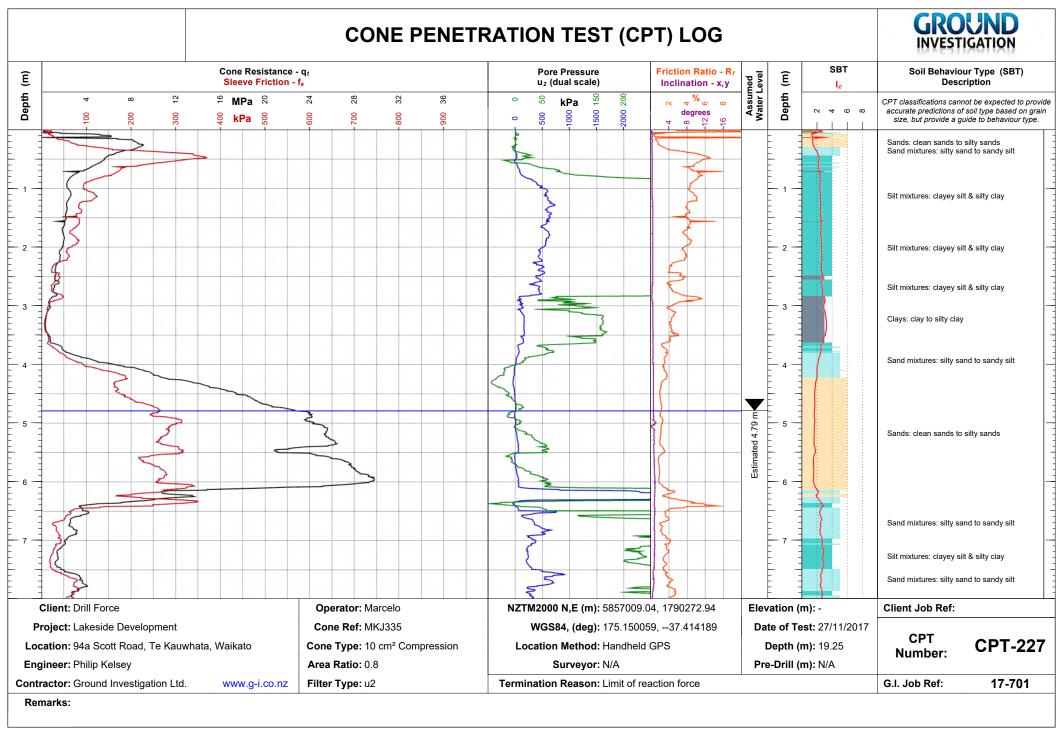


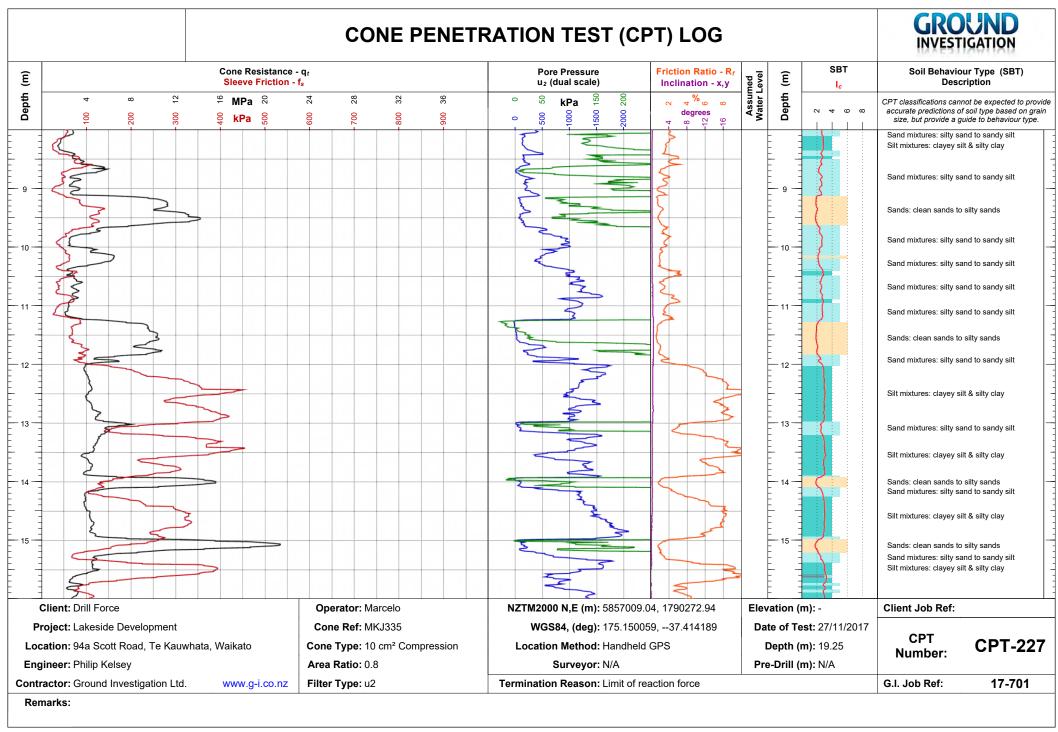


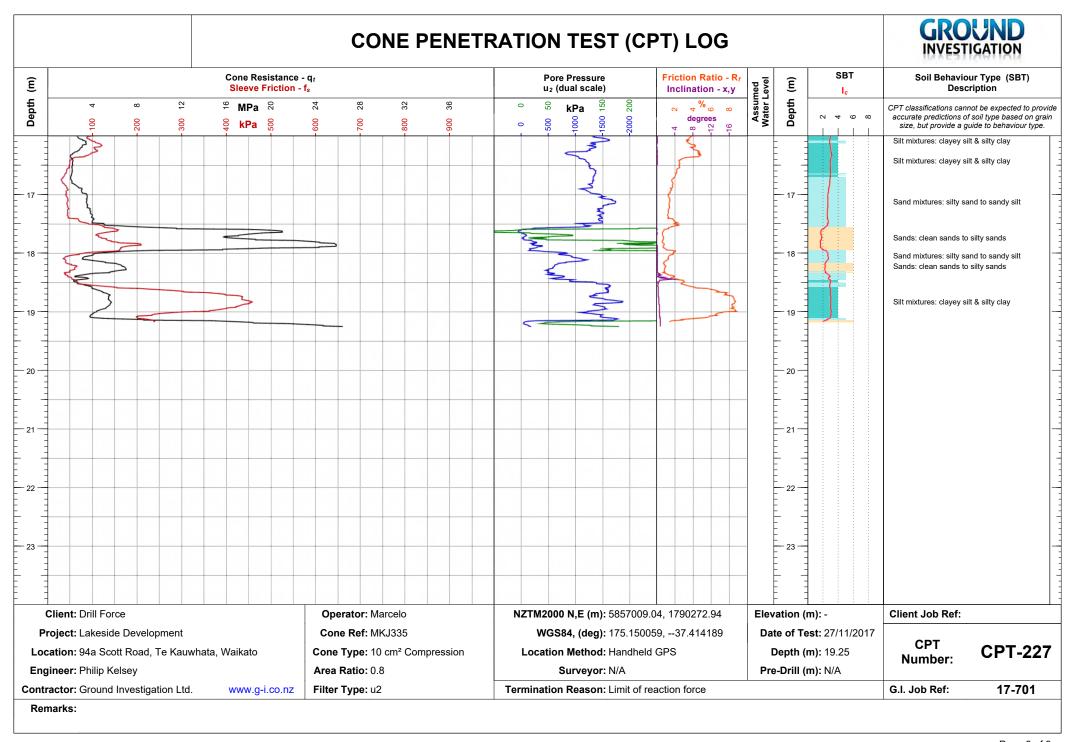


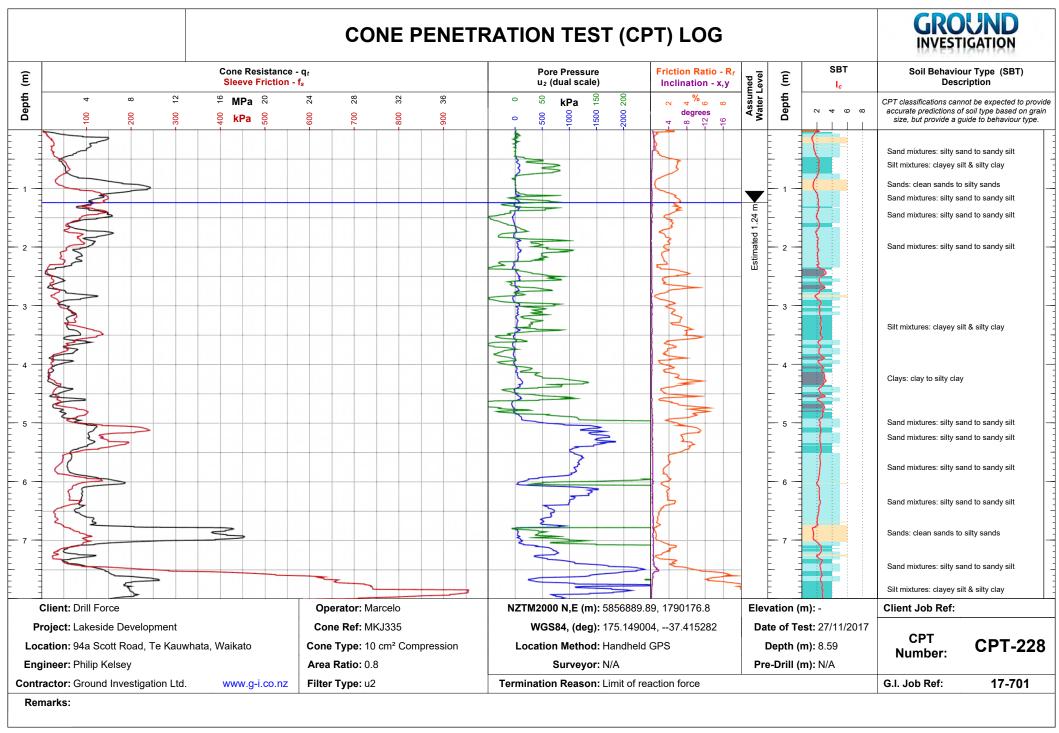


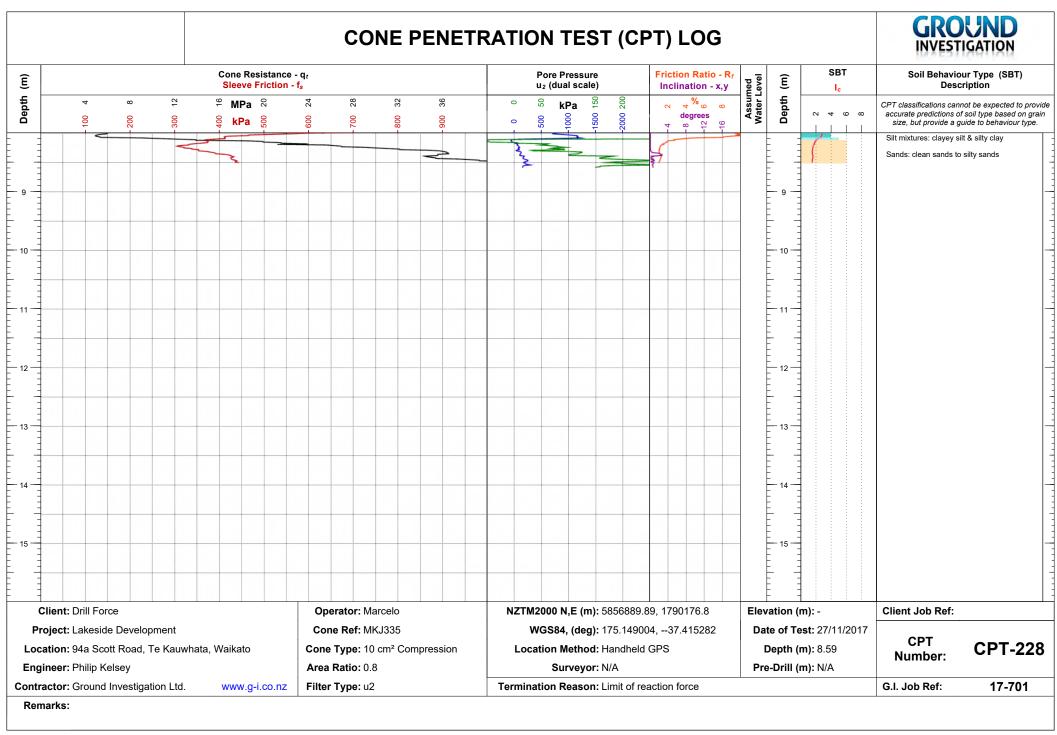


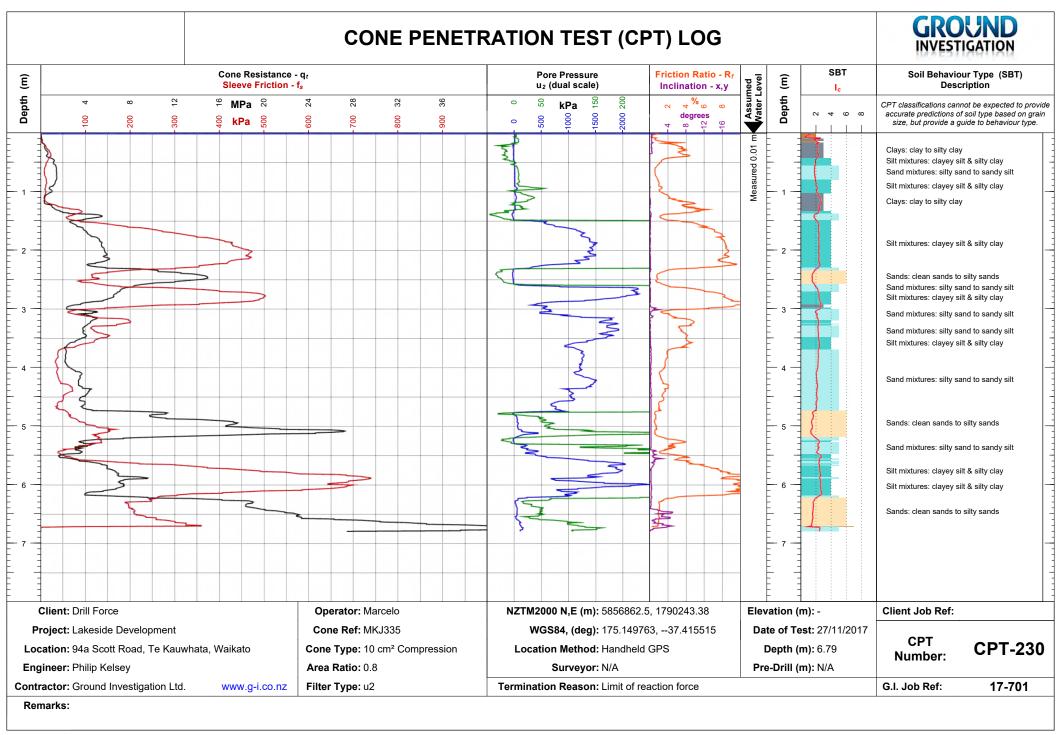


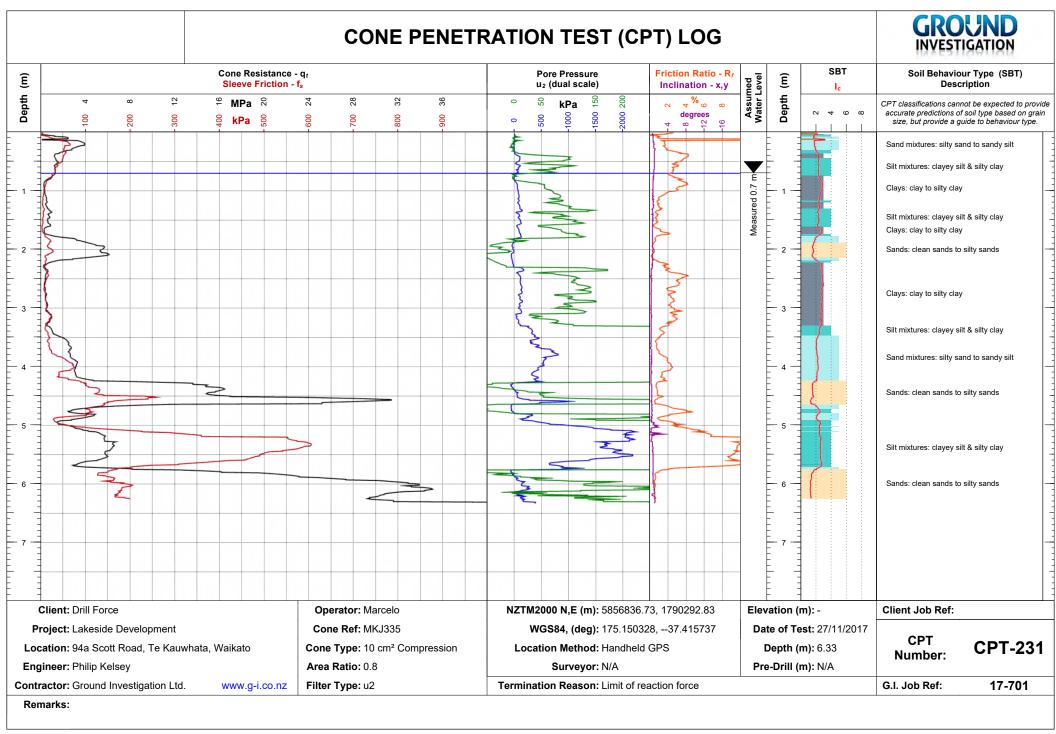


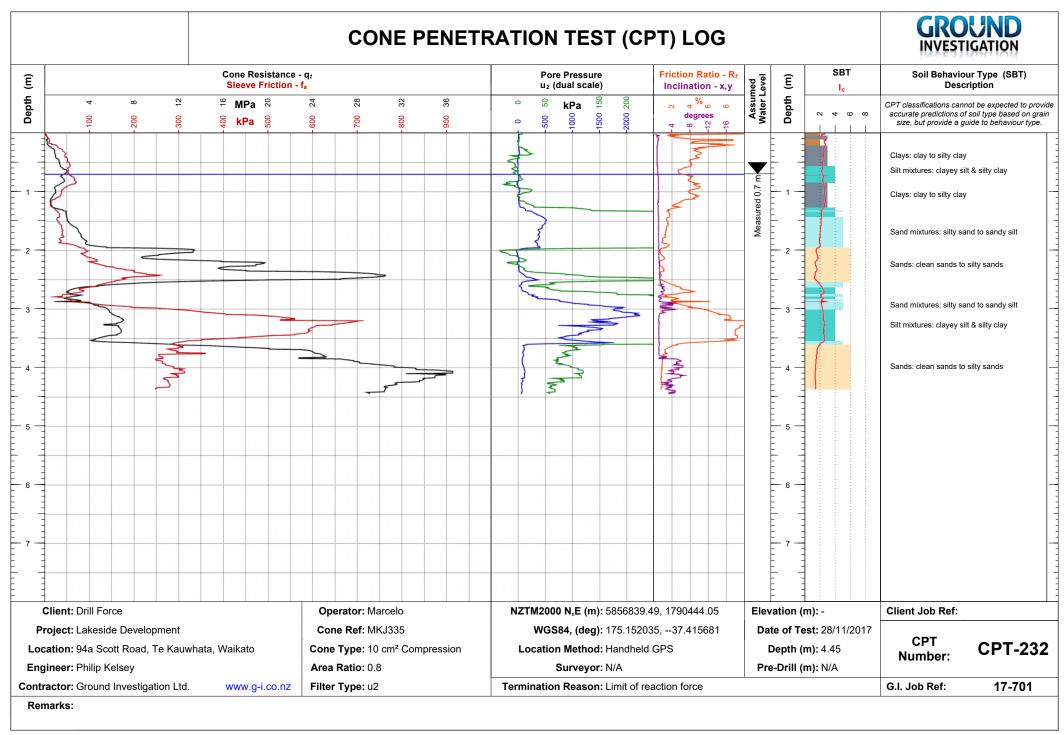


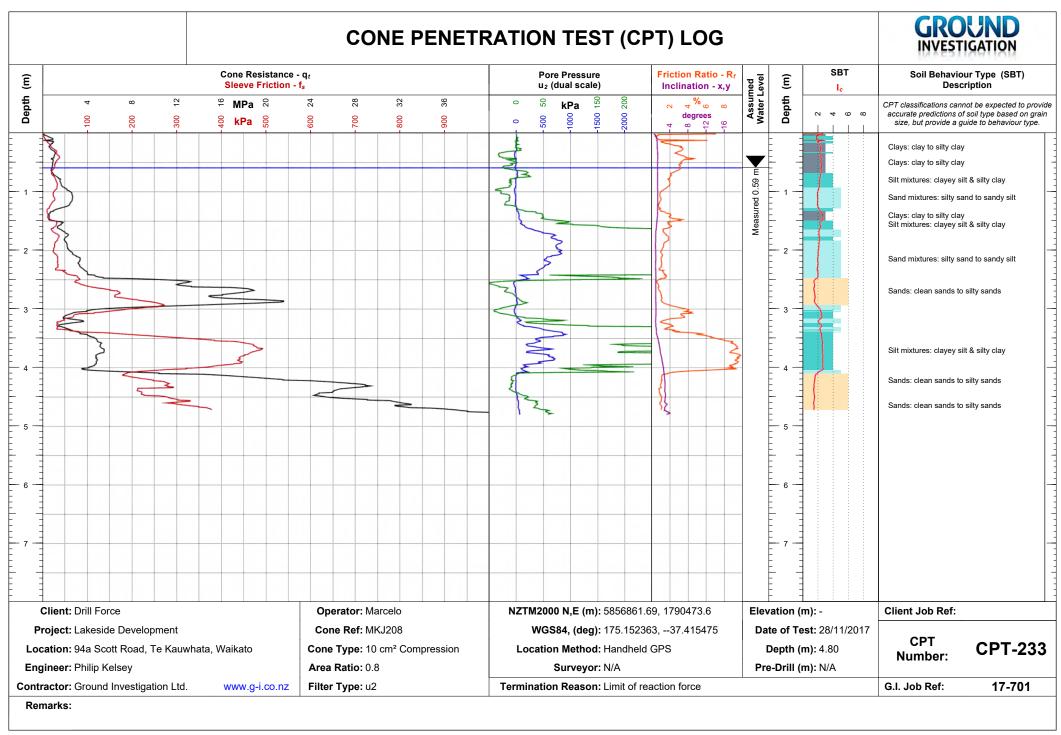


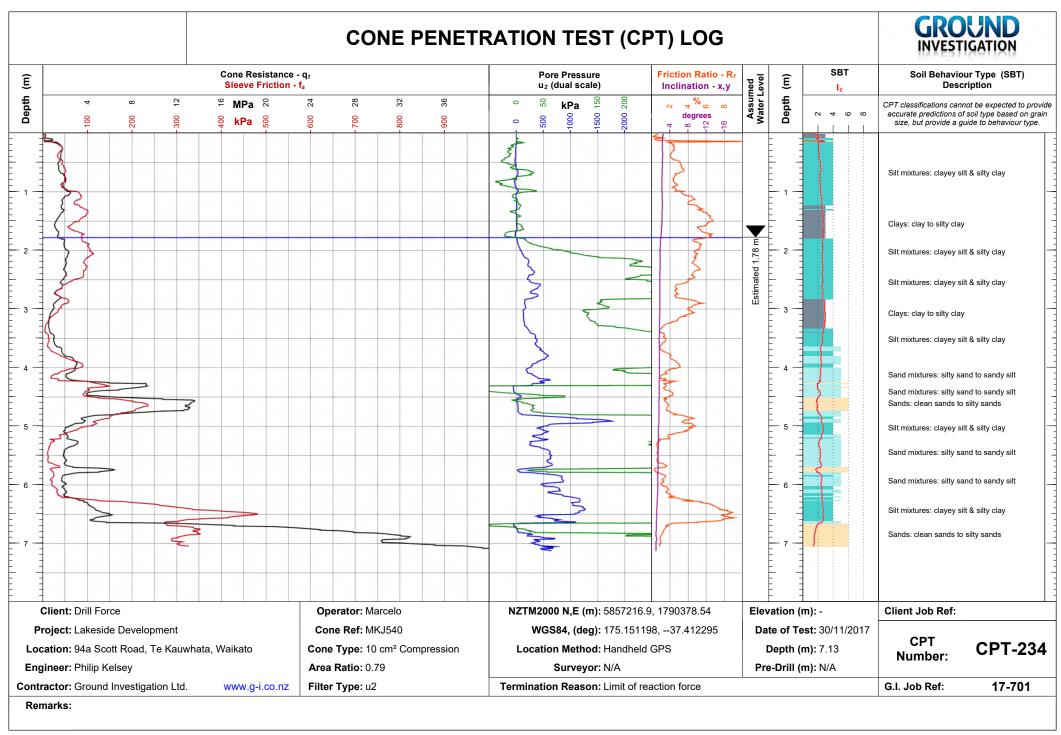


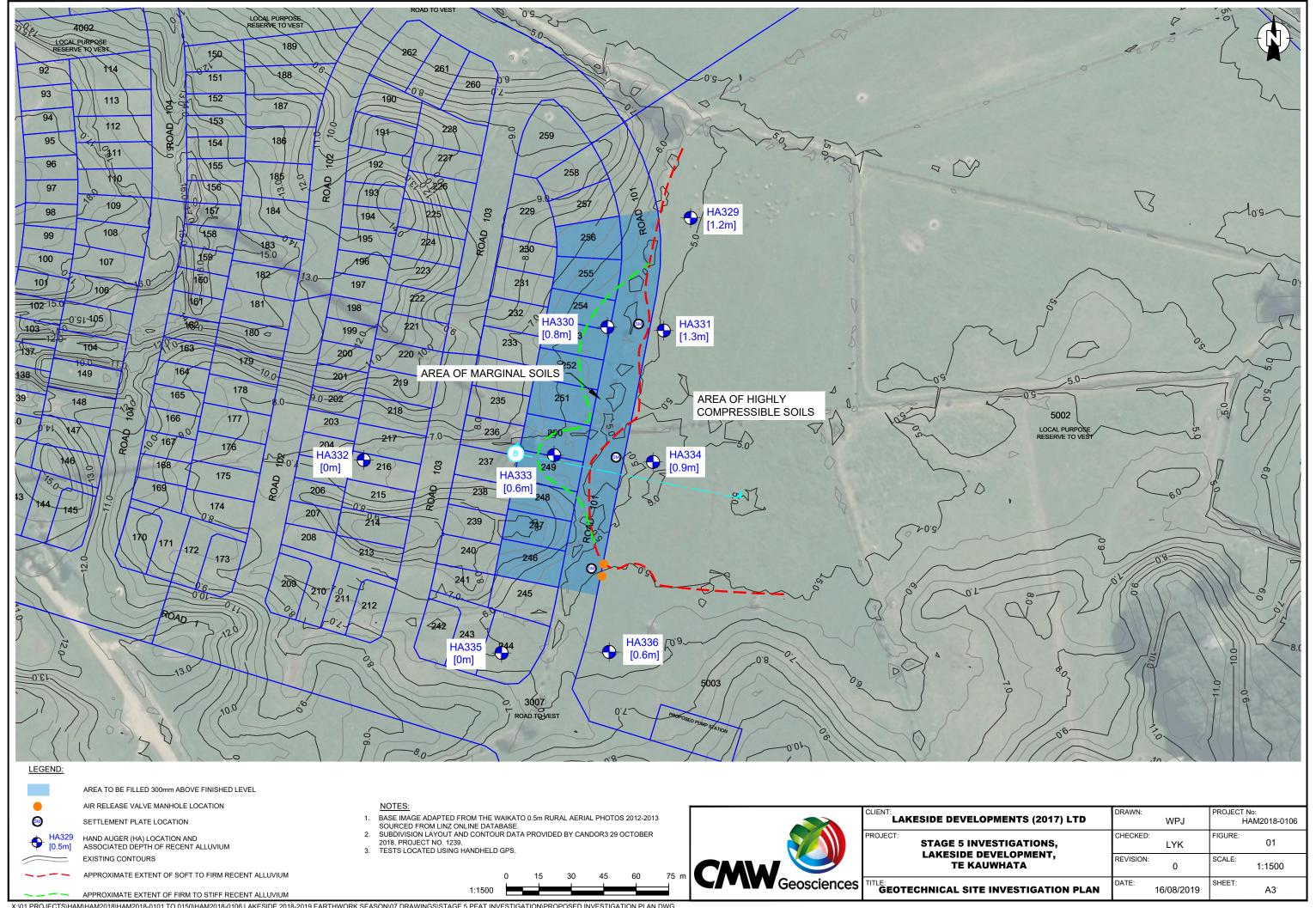












Client: Lakeside Developments (2017) Limited

Project: Lakeside Developments

Site Location: 98 Scott Road, Te Kauwhata

Project No.: HAM2018-0106

Date: 23/07/2019



1:25 Borehole Location: Stage 5 Alluvial Flats Sheet 1 of 1 Logged by: LK Position: E.434554.8m N.740577.9m Elevation: RI 5 00m Hand Held GPS Mount Eden Angle from horizontal: 90° Checked by: LYK Survey Source: Datum: Structure & Other Observations Consistency/ Relative Density Drilling Method/ Support Dynamic Cone Penetrometer Material Description Samples & Insitu Tests Moisture Condition 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) Recovery (Blows/100mm) Discontinuities: Depth: Defect Graphic L Well Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks Depth (Ground 꿉 10 Depth Type & Results Pt: Silty plastic PEAT: black 5.0 -20 (Recent Deposits)
ML: SILT: light greyish brown. Low plasticity, moderately 4.9 W 23207 sensitive to sensitive. (Recent Deposits)
... at 0.30m, Becoming brown, mottled orange. Peak = 55kPa Residual = 9kPa 0.3 Peak = 71kPa Residual = 18kPa 0.6 from 0.60m to 0.70m, Contains a lenses of completely decomposed wood fragments. Peak = 52kPa Residual = 15kPa 0.9 at 0.90m, Contains trace medium to coarse subrounded gravel.
Pt: Plastic PEAT: dark brown. 4.0 ala (Recent Deposits) sile 3.8 MH: Clayey SILT: light grey. High plasticity, sensitive. (Whangamarino Formation) 1.3 Peak = 95kPa Residual = 18kPa 3.5 CH: CLAY: light bluish grey. High plasticity. (Whangamarino Formation) Peak = UTP 1.6 Peak = UTP 2.0 2 2.2 Peak = UTP Borehole terminated at 2.2 m

Termination reason:

Refusal on hard clay.

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

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



Sheet 1 of 1 Logged by: RP Position: RI 5 50m Hole Diameter: 50mm Elevation: Checked by: LYK Survey Source: Mount Eden Angle from horizontal: 90° Site Plan Datum: Structure & Other Observations Consistency/ Relative Density Drilling Method/ Support Dynamic Cone Penetrometer Samples & Insitu Tests Material Description Moisture Condition Recovery 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) $\widehat{\mathbf{E}}$ (Blows/100mm) Discontinuities: Depth: Defect Graphic L Well Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks Depth (Groundy 꿉 10 Depth Type & Results 5.5 OL: Organic Clayey SILT: Black. Non plastic. (Topsoil) Peak = 86kPa Residual = 20kPa 0.3 5.2 ML: SILT: Light grey. Non plastic, sensitive. M to W St (Recent Alluvium) 23-07-2019 from 0.50m to 0.70m, Becoming brown. Peak = 58kPa Residual = 9kPa 0.6 4.8 ML: Gravelly clayey SILT: Light grey and mottled orange. Low plasticity; gravel, fine to medium, pumiceous. (Whangamarino Formation) 0.9 Peak = >200kPa Peak = UTP 1.2 s Peak = UTP 1.6 ... from 1.60m to 2.00m. Becoming blueish grev. 2 Borehole terminated at 2.0 m

Termination reason:

Target Depth Reached

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

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



Sheet 1 of 1 Position: E.434542.3m N.740525.9m Elevation: RI 5 00m Logged by: LYK Hole Diameter: 50mm Survey Source: Checked by: LYK Hand Held GPS Mount Eden Angle from horizontal: 90° Datum: Structure & Other Observations Consistency/ Relative Density Drilling Method/ Support Dynamic Cone Penetrometer Material Description Samples & Insitu Tests Moisture Condition 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) Recovery $\widehat{\mathbf{E}}$ (Blows/100mm) Discontinuities: Depth: Defect Graphic L Well Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks Ground Depth 꿉 10 Depth Type & Results Pt: Silty plastic PEAT: black (Recent Deposits) 5.0 -201 slk.× w Peak = 62kPa Residual = 9kPa 0.3 4.7 ML: SILT: fine to coarse sand; brown mottled orange. Low plasticity, sensitive (Recent Deposits) Peak = 62kPa Residual = 9kPa 0.6 Peak = 37kPa Residual = 9kPa 0.9 at 1.10m, Contains trace medium to coarse subrounded 1.3 Peak = 185kPa 3.7 ML: SILT: light grey. Low plasticity, extra sensitive. (Whangamarino Formation) Residual = 15kPa s VSt 3.5 CH: Silty CLAY: with some fine to coarse sand; light grey. Peak = >200kPa High plasticity, extra sensitive. (Whangamarino Formation) 1.6 Residual = 22kPa 3.1 CH: CLAY: light grey. High plasticity. (Whangamarino Formation) Peak = UTP 2.0 2 2.5 Peak = UTP Borehole terminated at 2.5 m

Termination reason:

Refusal on hard clay.

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

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



Sheet 1 of 1 Position: Logged by: AS Flevation: RI 6 50m Hole Diameter: 50mm Angle from horizontal: 90° Checked by: LYK Survey Source: Site Plan Datum: Mount Eden Structure & Other Observations Consistency/ Relative Density Drilling Method/ Support Dynamic Cone Penetrometer Material Description Samples & Insitu Tests Moisture Condition Recovery Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit)

Rock: Colour; fabric; rock name; additional comments. (origin/geological (Blows/100mm) Discontinuities: Depth: Defect Graphic L Well Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks Ground Depth 귐 10 Depth Type & Results 6.5 OL: Organic SILT: dark brown. No plasticity. (Topsoil) Peak = 164kPa Residual = 5kPa 0.3 6.2 М VSt ML: SILT: light grey. Low plasticity, quick. (Whangamarino Formation) Peak = 172kPa Residual = 27kPa 0.6 5.9 ML: Sandy SILT: light grey. Low plasticity, sensitive to extra sensitive; sand, medium to coarse, pumiceous. (Whangamarino Formation) VSt to . at 0.80m, contains minor medium to coarse sand, Peak = 191kPa Residual = 22kPa 0.9 5.4 ML: SILT with trace clay: light brown. Low plasticity, Peak = 191kPa Residual = 98kPa 1.2 (Whangamarino Formation) 5.2 ML: SILT with trace clay: light bluish grey mottled dark brown, sensitive. Low plasticity. (Whangamarino Formation) Peak = 191kPa НА 1.5 Residual = 30kPa М Peak = UTP 1.8 2.1 Peak = UTP 4.4 ML: SILT: dark brown. Low plasticity. (Whangamarino Formation)
SP: Silty fine SAND: light bluish grey. Poorly graded, sub 4.3 2.2-2.5m: poor recovery. rounded, pumiceous. S D 11 (Whangamarino Formation) 13 4.0 LIGNITE: dark brown. (Whangamarino Formation) 6 2.6 Peak = UTP М 7 3.8 ML: SILT: dark bluish grey. Low plasticity. 5 2.8 Peak = UTP 3.7 (Whangamarino Formation) LIGNITE: dark brown. 12 D (Whangamarino Formation) Borehole terminated at 3.0 m

Termination reason:

HA Refusal on hard lignite.

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

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



Sheet 1 of 1 Position: Logged by: AS Flevation: RI 5 50m Hole Diameter: 50mm Angle from horizontal: 90° Checked by: LYK Survey Source: Site Plan Datum: Mount Eden Consistency/ Relative Density Structure & Other Observations Drilling Method/ Support Dynamic Cone Penetrometer Material Description Samples & Insitu Tests Moisture Condition Recovery Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit)

Rock: Colour; fabric; rock name; additional comments. (origin/geological Ê (Blows/100mm) Discontinuities: Depth: Defect Graphic L Well Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks Ground Depth 귐 10 Depth Type & Results 5.5 OL: Organic SILT: dark brown. No plasticity. (Topsoil) Peak = 72kPa Residual = 19kPa 0.3 5.2 ML: Gravelly SILT: dark brown. Low plasticity, moderately sensitive; gravel, fine to medium, sub rounded, М St (Recent Alluvium) Peak = 107kPa Residual = 27kPa 0.6 4.9 MH: SILT: dark greyish brown. High plasticity, moderately sensitive. (Whangamarino Formation) VSt Peak = 87kPa Residual = 3kPa 0.9 4.6 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)
... at 1.10m, becoming bluish grey. Peak = 161kPa Residual = 36kPa 1.2 Peak = 191kPa 1.5 Residual = 41kPa Peak = 191kPa 3.9 1.6 MH: SILT: dark brown. High plasticity, sensitive. 3 Residual = 38kPa (Whangamarino Formation) VSt 8 Peak = UTP 1.8 at 1.80m, becoming bluish grey. 10 3.6 ML: Clayey SILT with some sand and minor gravel: light bluish grey. Low plasticity, sand, fine to coarse, НΑ 9 2 pumiceous; gravel, fine to medium, pumiceous. (Whangamarino Formation) 5 2.1 Peak = UTP 8 10 S 8 2.4 Peak = UTP 8 3.0 2.5-3.7m: no recovery, classification determined by SM: Silty fine SAND: light grey. Poorly graded. 8 (Whangamarino Formation) nearby hand augers. 6 8 2.8 Peak = 191kPa Residual = 55kPa 9 8 9 3.1 Peak = UTP D 10 8 10 9 6 9 1.8 CH: CLAY: light grey. High plasticity. Н 20 (Whangamarino Formation) Peak = UTP 3.8 Borehole terminated at 3.8 m

Termination reason:

HA refusal on hard clay.

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

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 Sheet 1 of 1 Position: E.434537.4m N.740465.2m Hole Diameter: 50mm RI 5 00m Logged by: LYK Flevation: Survey Source: Checked by: LYK Hand Held GPS Mount Eden Angle from horizontal: 90° Datum: Structure & Other Observations Consistency/ Relative Density Drilling Method/ Support Dynamic Cone Penetrometer Material Description Samples & Insitu Tests Moisture Condition 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) Recovery $\widehat{\mathbf{E}}$ (Blows/100mm) Discontinuities: Depth: Defect Well Graphic Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks Depth (Ground 귐 10 Depth Type & Results 5.0 Organic SILT: black. Low plasticity. 24-07-201 W (Topsoil) 4.8 Pt: Silty plastic PEAT: black. اد.× اد.× (Recent Deposits) 0.3m: shear vane fell through . ماد. ×. ماد. ×. ماد. × to 0.6m. vs Peak = UTP 4.4 GP: Silty medium to coarse GRAVEL: grey. Poorly graded, rounded, loosely packed. (Recent Deposits) Peak = 157kPa Residual = 12kPa 0.9 4.1 MH: Clayey SILT: light grey, mottled orange. High plasticity, extra sensitive. (Whangamarino Formation) Peak = UTP 1.2 3.8 ML: Sandy SILT with trace clay: light bluish grey. Low plasticity; Sand, fine to coarse. (Whangamarino Formation) Н Peak = 123kPa 1.6 3.4 SW: Fine to coarse SAND with some silt: grey. Well Residual = 40kPa (Whangamarino Formation) MD to 9 2 Borehole terminated at 2.0 m 5 12 11 3 5 3 3 3 6 4 6 11 11 5 5 4 5 5 6 5 6 8 9 9 8 4 5 5 5

Termination reason:

Time limit.

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

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



Sheet 1 of 1 Position: Logged by: RP RI 6 00m Hole Diameter: 50mm Elevation: Checked by: LYK Survey Source: Mount Eden Angle from horizontal: 90° Site Plan Datum: Structure & Other Observations Consistency/ Relative Density Drilling Method/ Support Dynamic Cone Penetrometer Samples & Insitu Tests Material Description Moisture Condition Recovery 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) $\widehat{\mathbf{E}}$ (Blows/100mm) Discontinuities: Depth: Defect Graphic L Well Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks Depth (Groundy 꿉 10 Depth Type & Results 6.0 OL: Organic SILT: Dark brown. Non plastic. (Topsoil) Peak = 104kPa Residual = 14kPa 0.3 ML: SILT: Light Grey. Low plasticity, sensitive. (Whangamarino Formation) 5.6 Peak = 173kPa Residual = 32kPa 0.6 Peak = 187kPa Residual = 35kPa 0.9 at 1.10m, contains 100mm thick lens of sandy silt; light Peak = 144kPa Residual = 35kPa 1.2 grey. Low plasticity; sand, fine to coarse. 4.5 SM: Silty fine to medium SAND: grey. Poorly graded. (Whangamarino Formation) s 2 2 Borehole terminated at 2.0 m

Termination reason:

Time limit.

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

Client: Lakeside Developments (2017) Limited

Project: Lakeside Developments

Site Location: 98 Scott Road, Te Kauwhata

Project No.: HAM2018-0106

Date: 23/07/2019

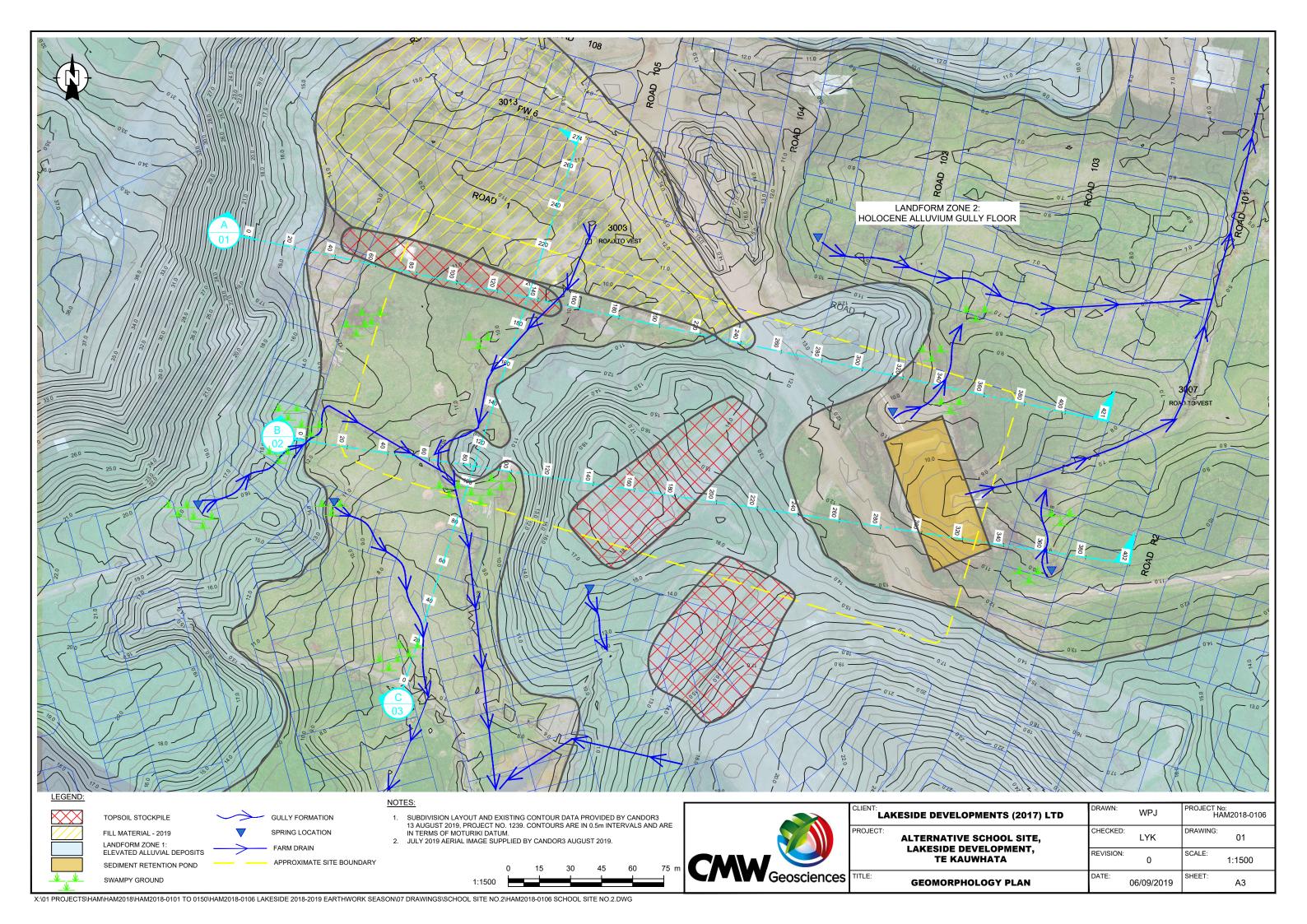


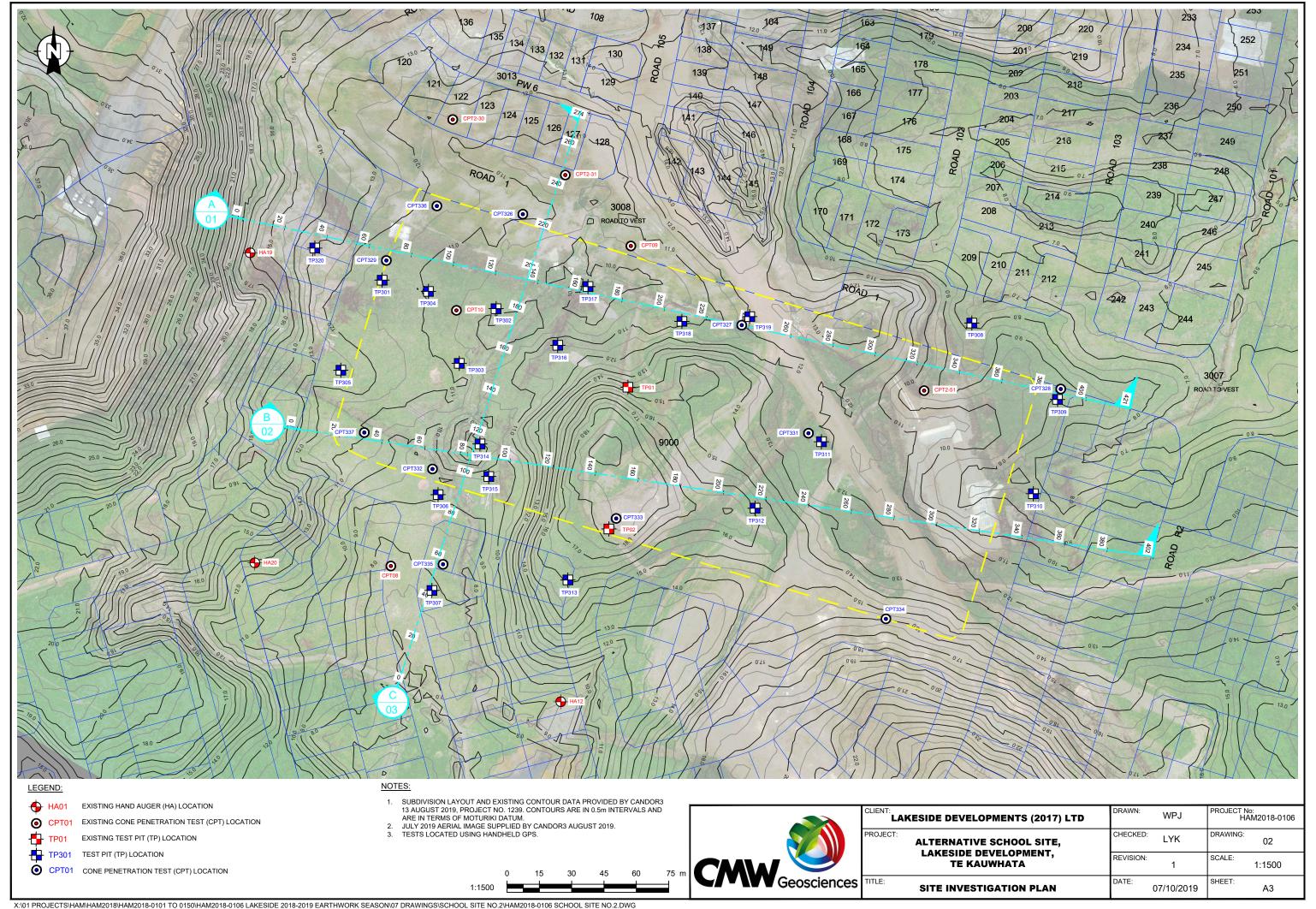
Borehole Location: Stage 5 Alluvial Flats Sheet 1 of 1 Position: E.444218.2m N.699483.7m RI 5 50m Logged by: LYK Flevation: Hole Diameter: 50mm Hand Held GPS Datum: Angle from horizontal: 90° Checked by: LYK Survey Source: Mount Eden Structure & Other Observations Consistency/ Relative Density Drilling Method/ Support Dynamic Cone Penetrometer Material Description Samples & Insitu Tests Moisture Condition Recovery 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) $\widehat{\mathbf{E}}$ (Blows/100mm) Discontinuities: Depth: Defect Graphic L Well Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks Ground Depth 귐 10 Depth Type & Results 5.5 OL: Organic SILT: black. Low plasticity. (Topsoil) 5.3 ML: SILT: dark grey mottled orange. Low plasticity, Peak = 132kPa Residual = 22kPa 0.3 sensitive М (Recent Deposits)
... from 0.30m to 0.40m, Contains a lens of medium to coarse subrounded gravel. Peak = 111kPa Residual = 31kPa 0.6 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 Peak = 111kPa Residual = 22kPa 0.9 Peak = >200kPa Residual = 46kPa 1.2 4.3 CH: Silty CLAY: with minor fine to coarse sand; light grey mottled orange. High plasticity, sensitive. (Whangamarino Formation) 23-07-2019 4.0 ML: Sandy SILT: grey. Low plasticity, sensitive, Sand, fine. (Whangamarino Formation) 1.6 Peak = 160kPa VSt Residual = 31kPa 3.7 s GP: Silty fine GRAVEL: grey. Poorly graded, rounded. (Whangamarino Formation) 2.0 Peak = >200kPa 2 Borehole terminated at 2.0 m

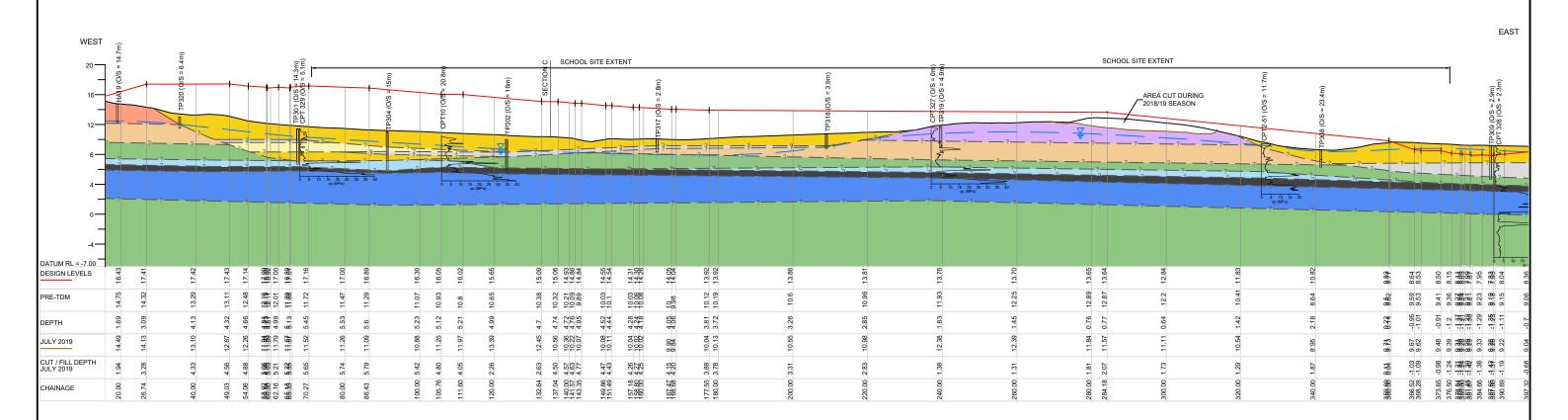
Termination reason:

Target Depth Reached

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







LEGEND: VERY STIFF CLAYEY SILT AND SANDY SILT (STRUCTURAL FILL) STIFF TO VERY STIFF CLAY/SILT (HOLOCENE ALLUVIUM) SOFT TO FIRM SILT WITH (RECENT ALLUVIUM) MEDIUM DENSE SAND (HOLOCENE ALLUVIUM) VERY STIFF TO HARD CLAYEY SILT/SILTY CLAY (WHANGAMARINO FORMATION) LOOSE TO MEDIUM DENSE SAND INTERBEDDED WITH STIFF TO VERY STIFF HALLOYSITE SILT (WHANGAMARINO FM) MEDIUM DENSE SAND (WHANGAMARINO FM) HARD LIGNITE INTERBEDDED WITH MEDIUM DENSE TO DENSE SAND (WHANGAMARINO FORMATION) VERY STIFF TO HARD CLAY AND SILT (WHANGAMARINO FM) DENSE TO VERY DENSE SAND (WHANGAMARINO FM) INFERRED HARD LIGNITE (WHANGAMARINO FM) LOOSE TO MEDIUM DENSE SAND INTERBEDDED WITH STIFF TO VERY

STIFF SILT (WHANGAMARINO FM)
VERY DENSE SAND (WHANGAMARINO FM)

NOTES:

- EXISTING AND PROPOSED CONTOUR DATA PROVIDED BY CANDOR3 AUGUST 2019, PROJECT NO. 1239.
- GEOLOGICAL BOUNDARIES, WHERE SHOWN, HAVE BEEN INFERRED BETWEEN KNOWN DATA POINTS TO ASSIST IN THE GEOLOGICAL INTERPRETATION AND SHOULD NOT BE CONSIDERED TO REPRESENT ACTUAL BOUNDARIES WHICH MAY VARY FROM THOSE SHOWN.
- 3. TESTS LOCATED USING HANDHELD GPS.

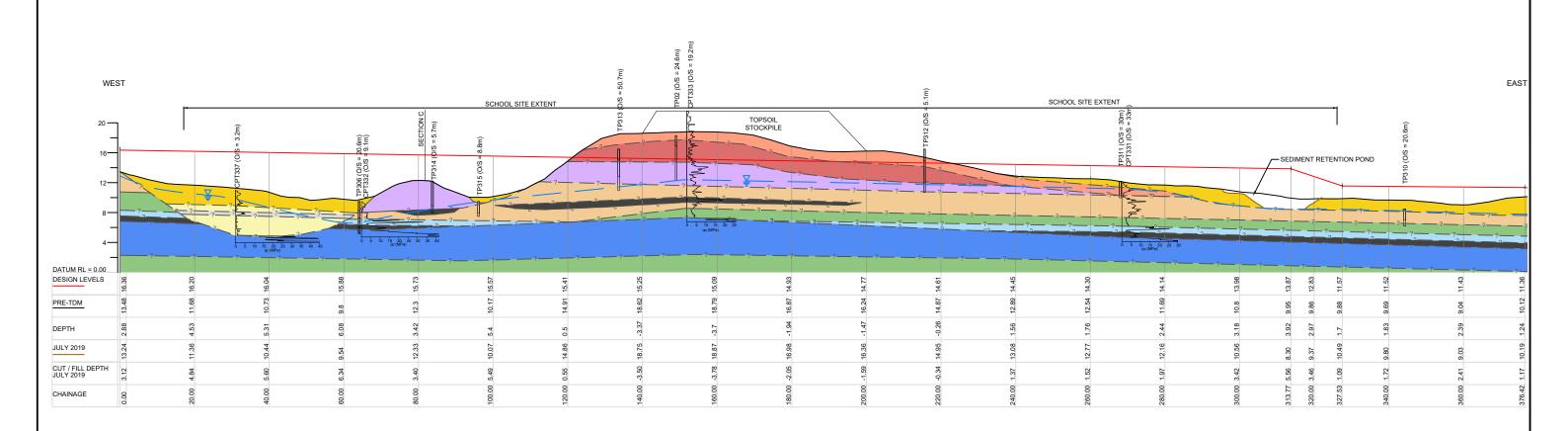
VERT: 1:500	0	5	10	15	20	25 m
HORI: 1:1000	0	10	20	30	40	50 m

m	
m	Geosciences

CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD		WPJ	PROJECT N	No: AM2018-0106
PROJECT: ALTERNATIVE SCHOOL SITE,	CHECKED:	LYK	DRAWING:	05A
LAKESIDE DEVELOPMENT, TE KAUWHATA	REVISION:	0	SCALE:	1:1000 h 1:500 v
GEOLOGICAL SECTION A	DATE:	06/09/2019	SHEET:	A3

INFERRED GEOLOGICAL BOUNDARY

GROUNDWATER TABLE



VERY STIFF CLAYEY SILT AND SANDY SILT (STRUCTURAL FILL) INFERRED GEOLOGICAL BOUNDARY GROUNDWATER TABLE STIFF TO VERY STIFF CLAY/SILT STIFF TO VERY STIFF OLA (HOLOCENE ALLUVIUM) SOFT TO FIRM SILT WITH TRACE LOGS (RECENT ALLUVIUM) MEDIUM DENSE SAND (HOLOCENE MEDIOWIDE. VERY STIFF TO HARD CLAYEY SILT/SILTY CLAY (WHANGAMARINO FORMATION) LOOSE TO MEDIUM DENSE SAND INTERBEDDED WITH STIFF TO VERY STIFF HALLOYSITE SILT (WHANGAMARINO FM) MEDIUM DENSE SAND (WHANGAMARINO FM) HARD LIGNITE INTERBEDDED WITH MEDIUM DENSE TO DENSE SAND (WHANGAMARINO FORMATION) VERY STIFF TO HARD CLAY AND SILT (WHANGAMARINO FM) DENSE TO VERY DENSE SAND (WHANGAMARINO FM)

INFERRED HARD LIGNITE (WHANGAMARINO FM)

LOOSE TO MEDIUM DENSE SAND INTERBEDDED WITH STIFF TO VERY STIFF SILT (WHANGAMARINO FM)

VERY DENSE SAND (WHANGAMARINO FM)

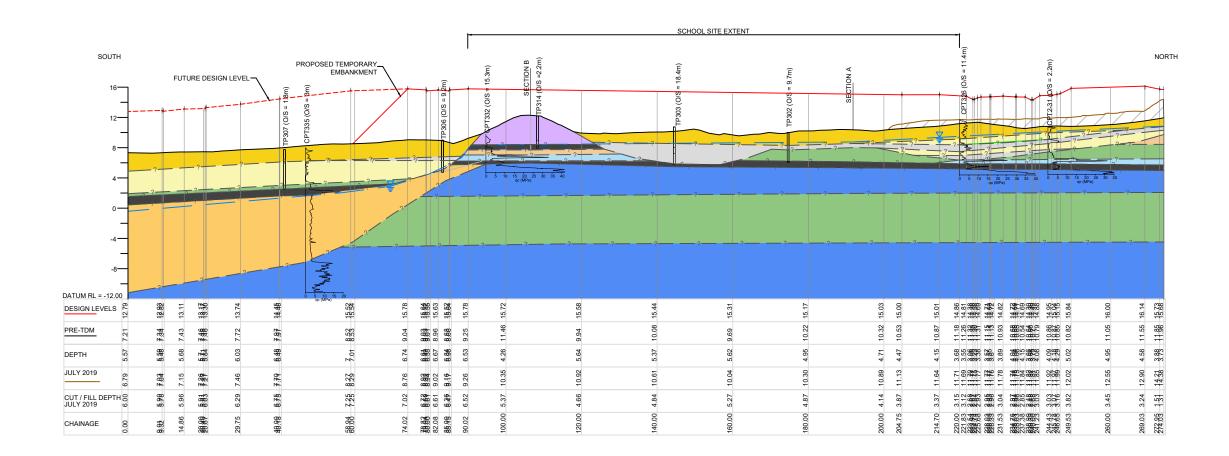
NOTES:

- 1. EXISTING AND PROPOSED CONTOUR DATA PROVIDED BY CANDOR3 AUGUST 2019, PROJECT NO. 1239.
- GEOLOGICAL BOUNDARIES, WHERE SHOWN, HAVE BEEN INFERRED BETWEEN KNOWN DATA POINTS TO ASSIST IN THE GEOLOGICAL INTERPRETATION AND SHOULD NOT BE CONSIDERED TO REPRESENT ACTUAL BOUNDARIES WHICH MAY VARY FROM THOSE SHOWN.

 3. TESTS LOCATED USING HANDHELD GPS.

VERT: 1:500	0	5	10	15	20	25 m
HORI: 1:1000	0	10	20	30	40	50 m

	CLIENT: LAKESIDE DEVELOPMENTS (2017) LTD	DRAWN:	WPJ	PROJECT N	lo: AM2018-0106
	PROJECT: ALTERNATIVE SCHOOL SITE,	CHECKED:	LYK	DRAWING:	06A
	LAKESIDE DEVELOPMENT, TE KAUWHATA	REVISION:	0	SCALE:	1:1000 h 1:500 v
Geosciences	GEOLOGICAL SECTION B	DATE:	06/09/2019	SHEET:	А3





VERY STIFF CLAYEY SILT AND SANDY SILT (STRUCTURAL FILL)

STIFF TO VERY STIFF CLAY/SILT (HOLOCENE ALLUVIUM)

SOFT TO FIRM SILT WITH TRACE LOGS
(RECENT ALLUVIUM)

 ${\tt MEDIUM\ DENSE\ SAND\ (HOLOCENE}$ ALLUVIUM)

VERY STIFF TO HARD CLAYEY SILT/SILTY CLAY
(WHANGAMARINO FORMATION)

LOOSE TO MEDIUM DENSE SAND INTERBEDDED WITH STIFF TO VERY STIFF HALLOYSITE SILT (WHANGAMARINO FM)

MEDIUM DENSE SAND (WHANGAMARINO FM)

HARD LIGNITE INTERBEDDED WITH MEDIUM DENSE TO DENSE SAND (WHANGAMARINO FORMATION) VERY STIFF TO HARD CLAY AND SILT (WHANGAMARINO FM)

DENSE TO VERY DENSE SAND (WHANGAMARINO FM)

INFERRED HARD LIGNITE (WHANGAMARINO FM)

LOOSE TO MEDIUM DENSE SAND INTERBEDDED WITH STIFF TO VERY STIFF SILT (WHANGAMARINO FM) VERY DENSE SAND (WHANGAMARINO FM)

— ?—— — INFERRED GEOLOGICAL BOUNDARY



GROUNDWATER TABLE

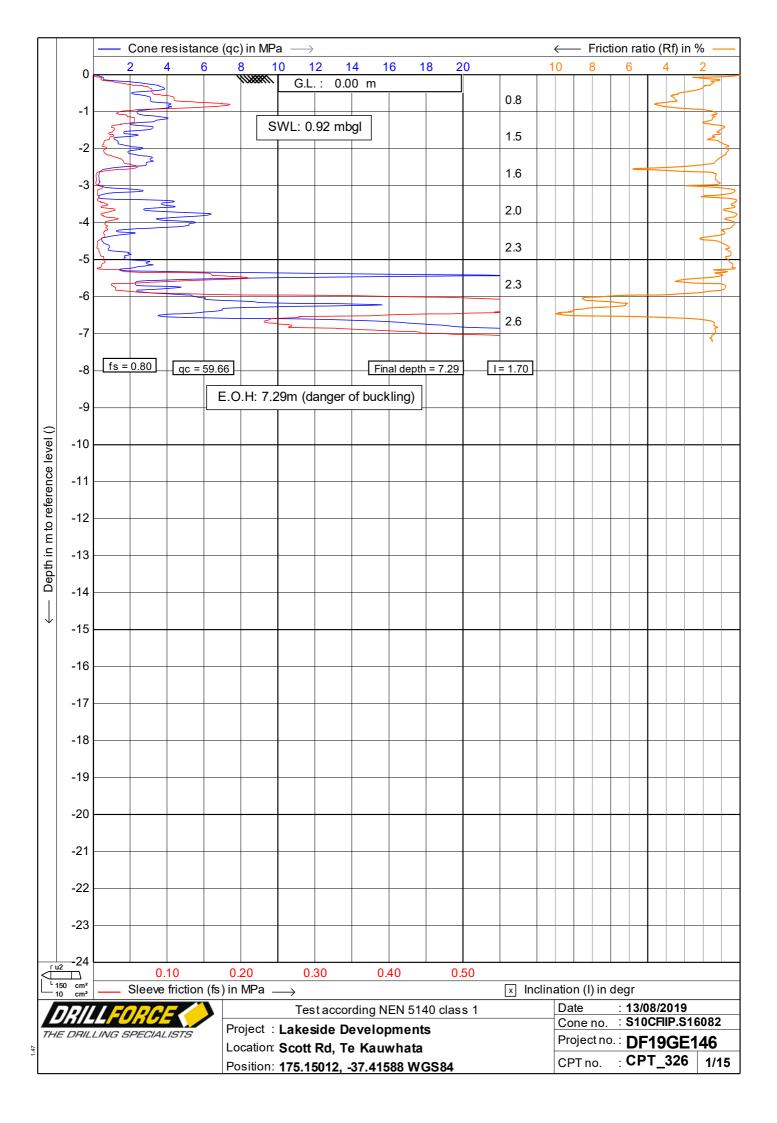
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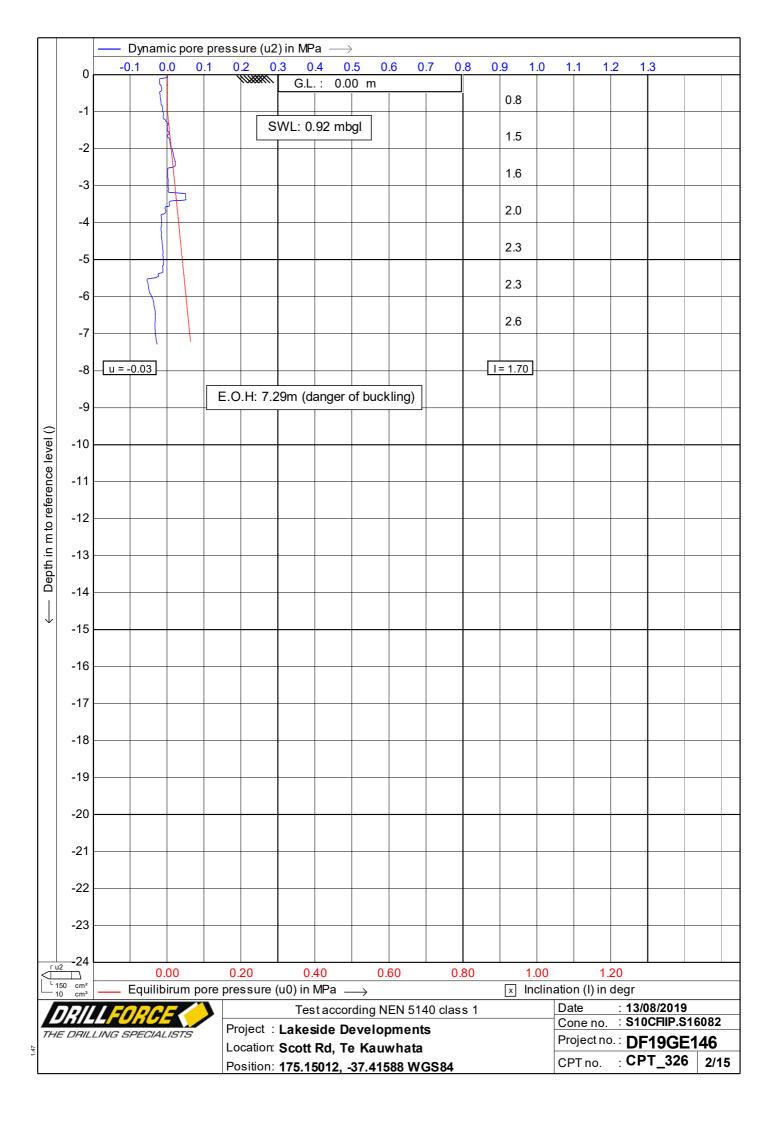
- EXISTING AND PROPOSED CONTOUR DATA PROVIDED BY CANDOR3 AUGUST 2019, PROJECT NO. 1239.
- GEOLOGICAL BOUNDARIES, WHERE SHOWN, HAVE BEEN INFERRED BETWEEN KNOWN DATA POINTS TO ASSIST IN THE GEOLOGICAL INTERPRETATION AND SHOULD NOT BE CONSIDERED TO REPRESENT ACTUAL BOUNDARIES WHICH MAY VARY FROM THOSE SHOWN.
- 3. TESTS LOCATED USING HANDHELD GPS

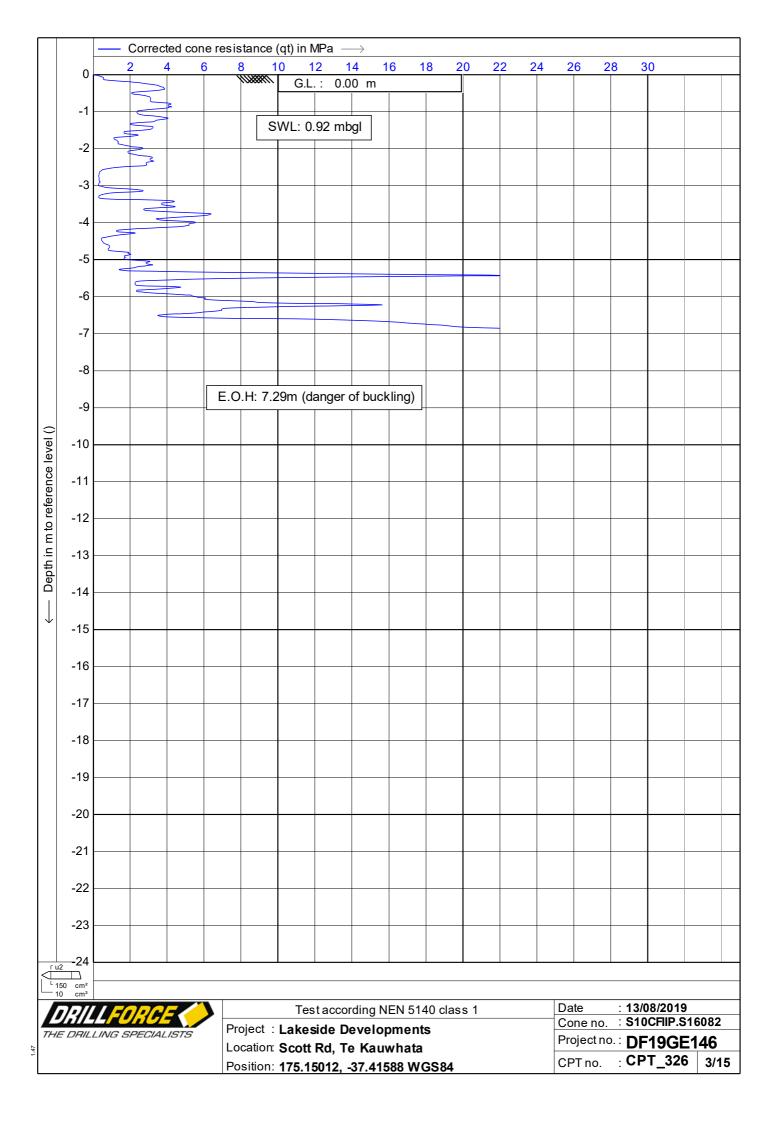


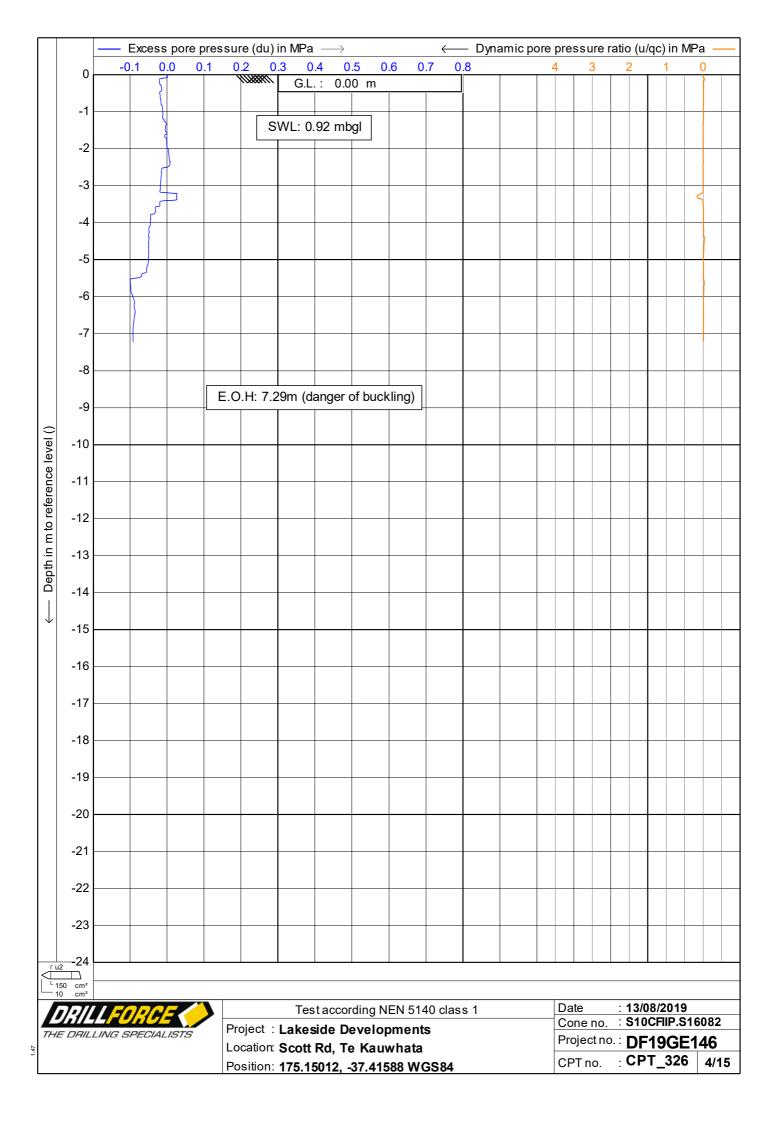
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m	Geosciences

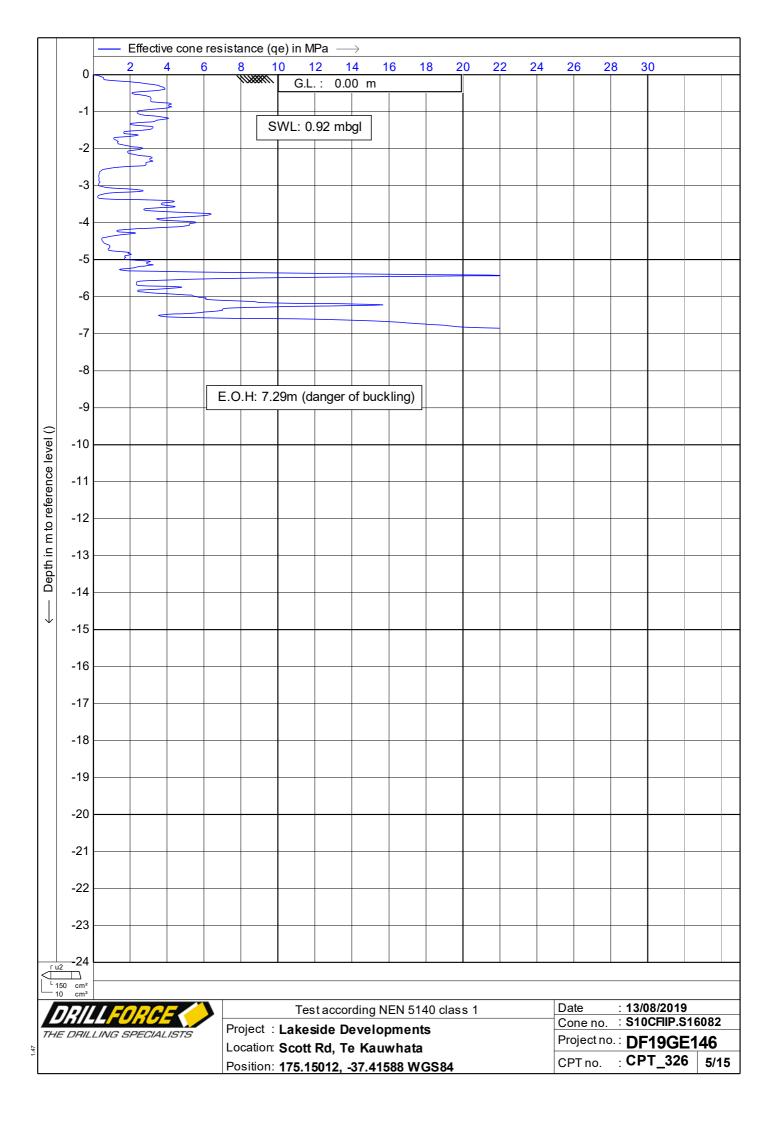
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	ALTERNATIVE SCHOOL SITE,	CHECKED:	LYK	DRAWING:	07
	LAKESIDE DEVELOPMENT, TE KAUWHATA	REVISION:	0	SCALE:	1:1000 h 1:500 v
	GEOLOGICAL SECTION C	DATE:	06/09/2019	SHEET:	A3

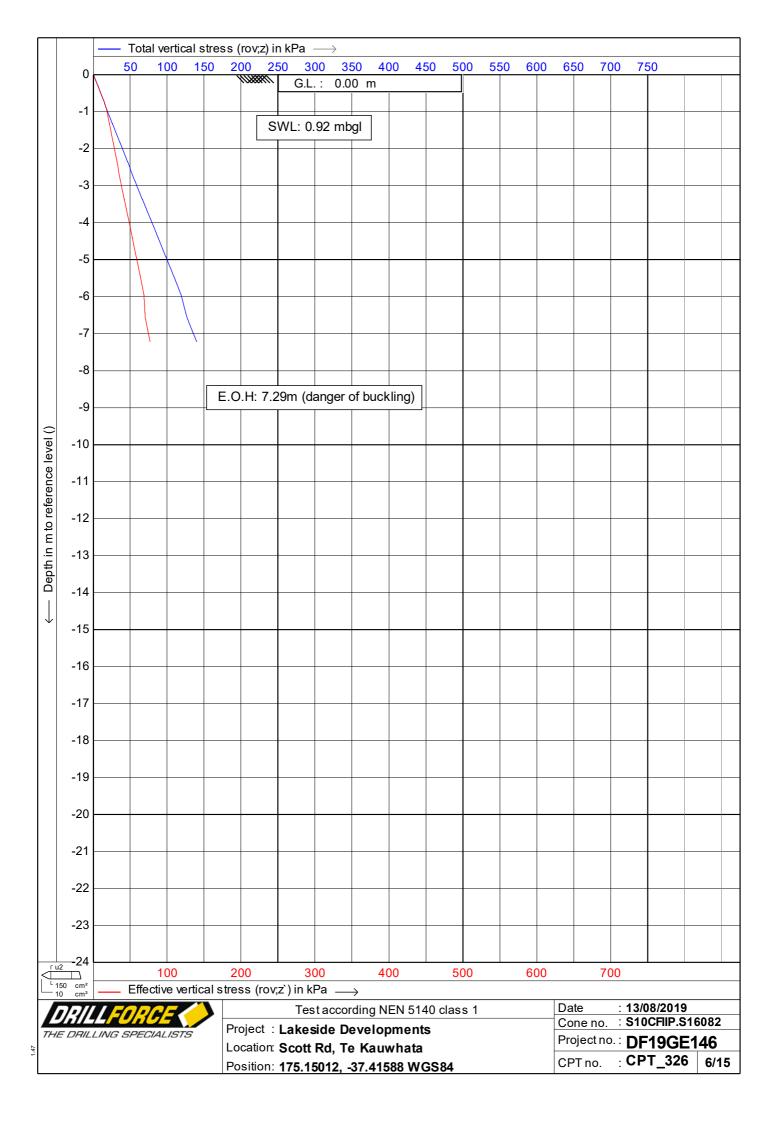


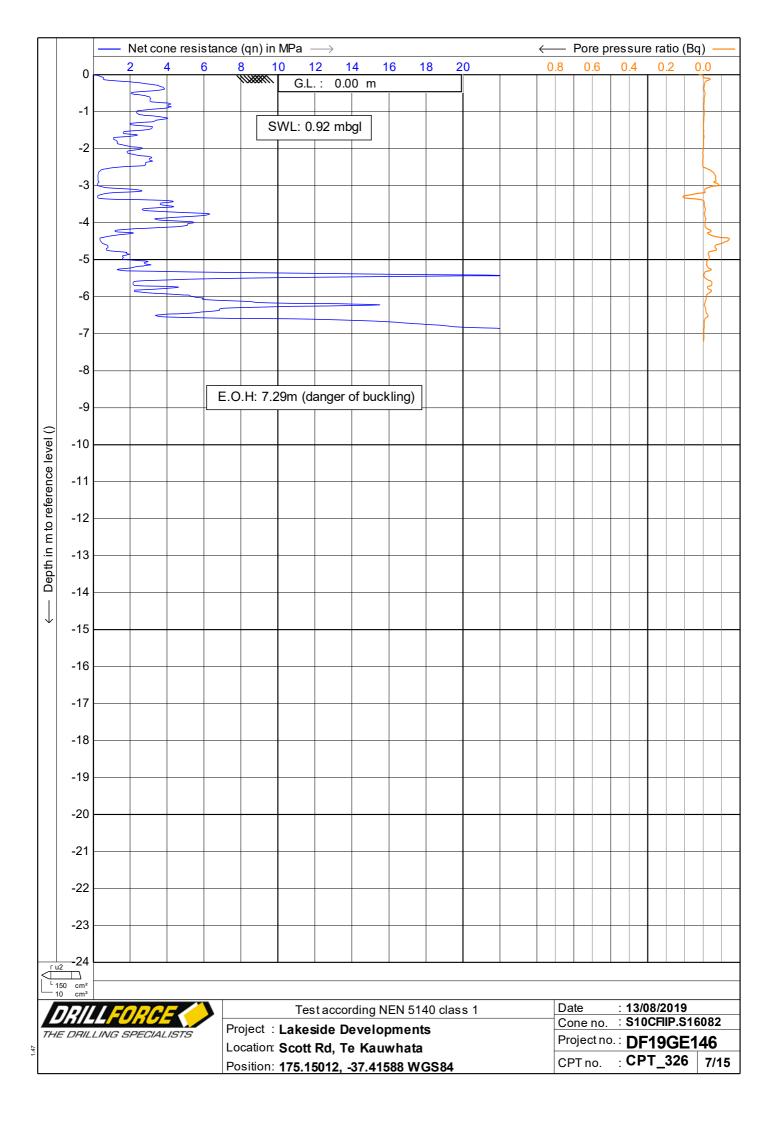


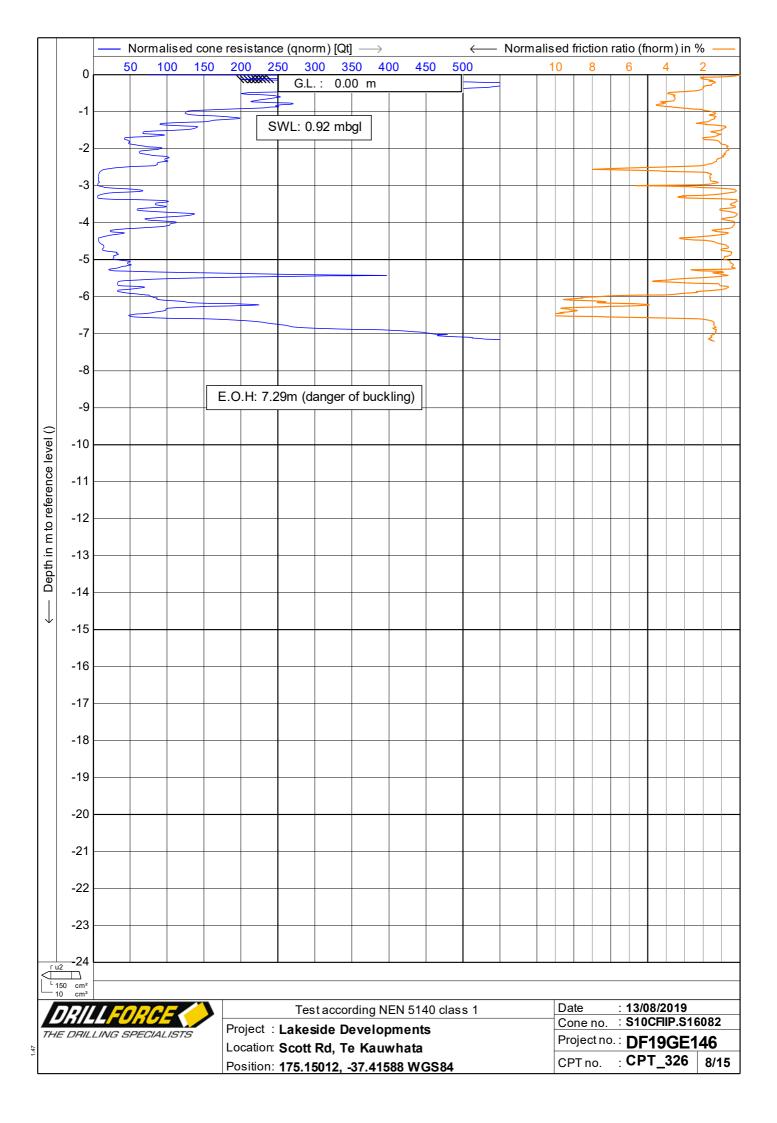


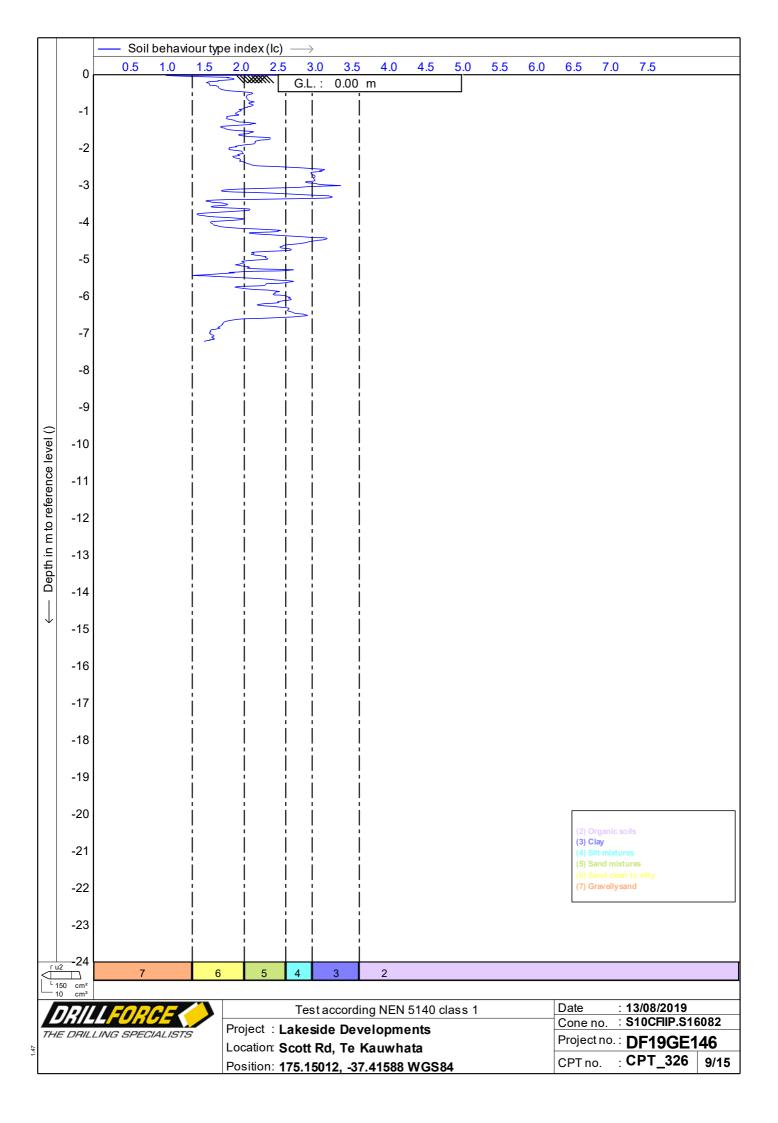


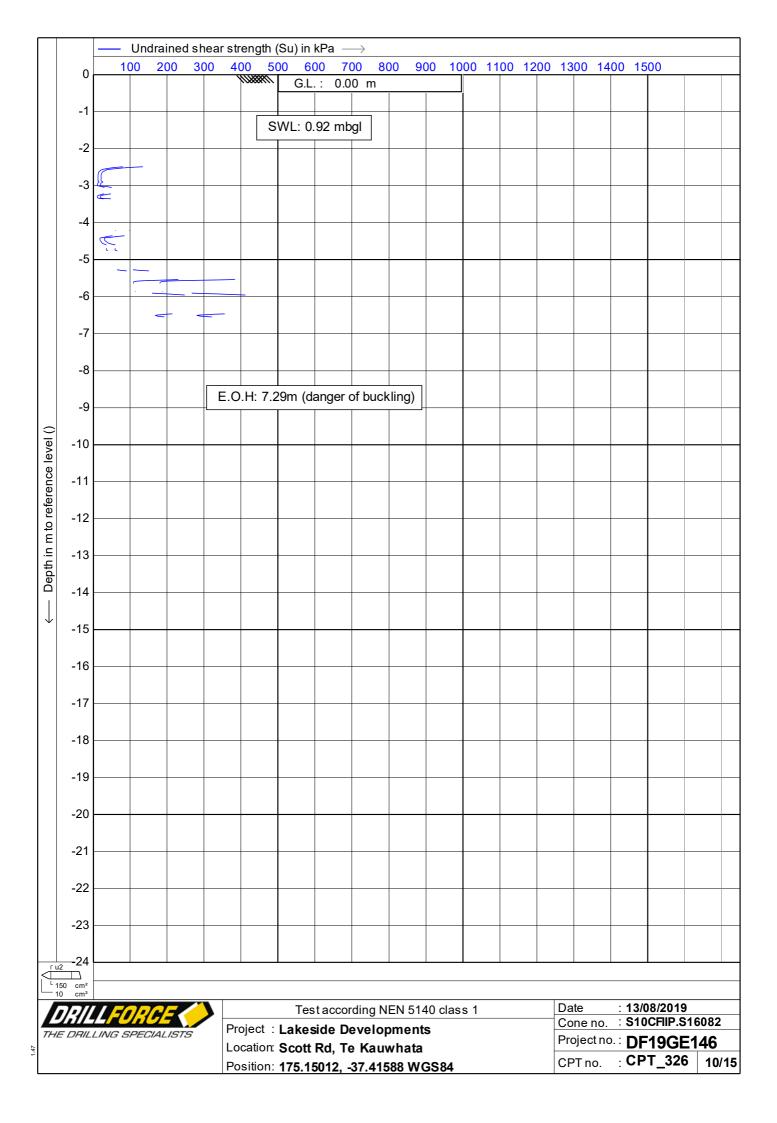


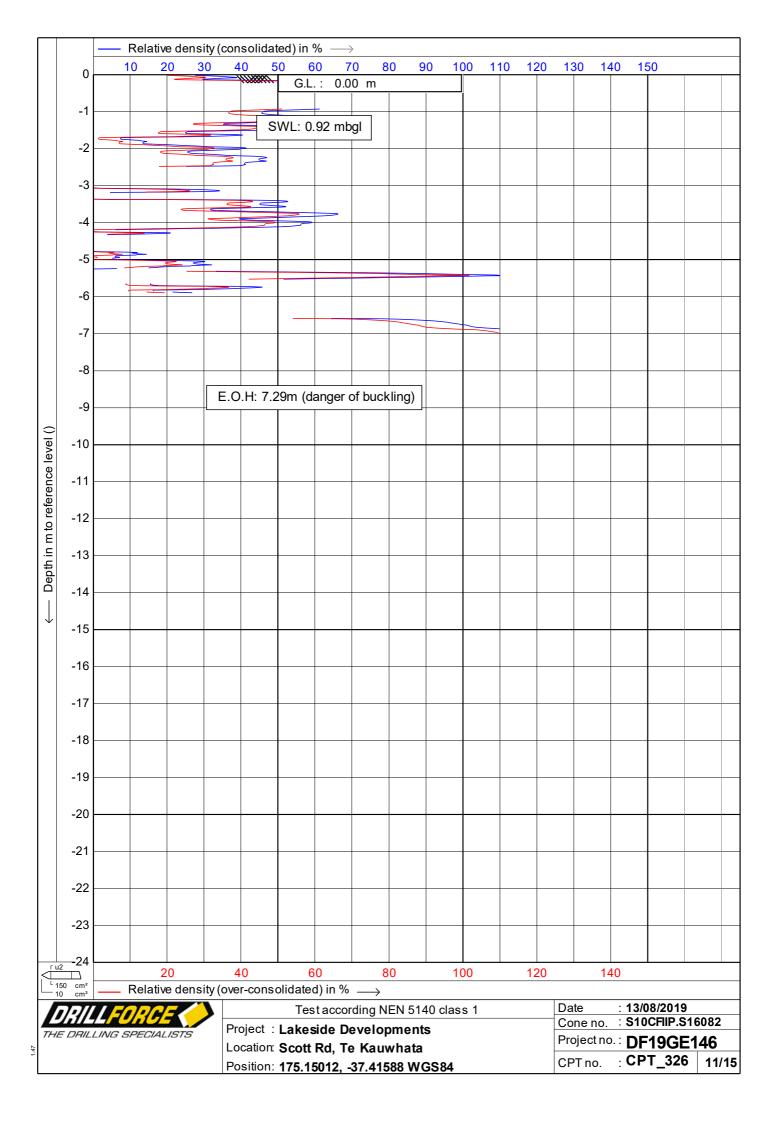


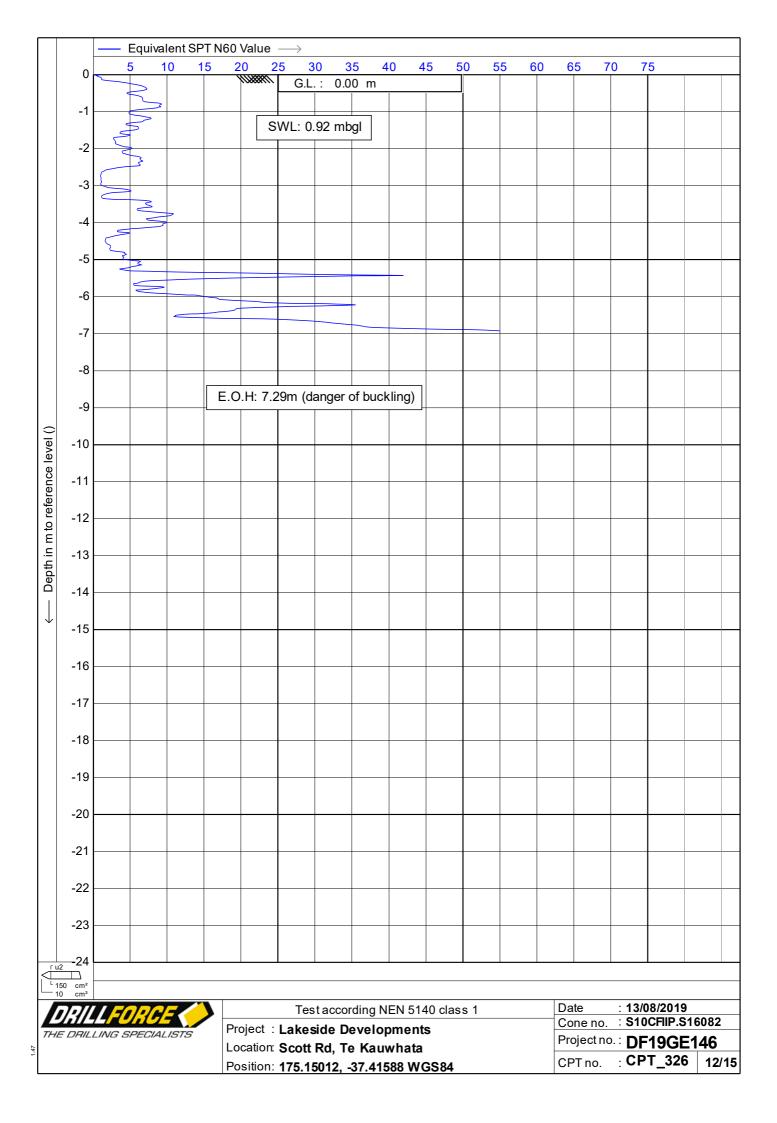


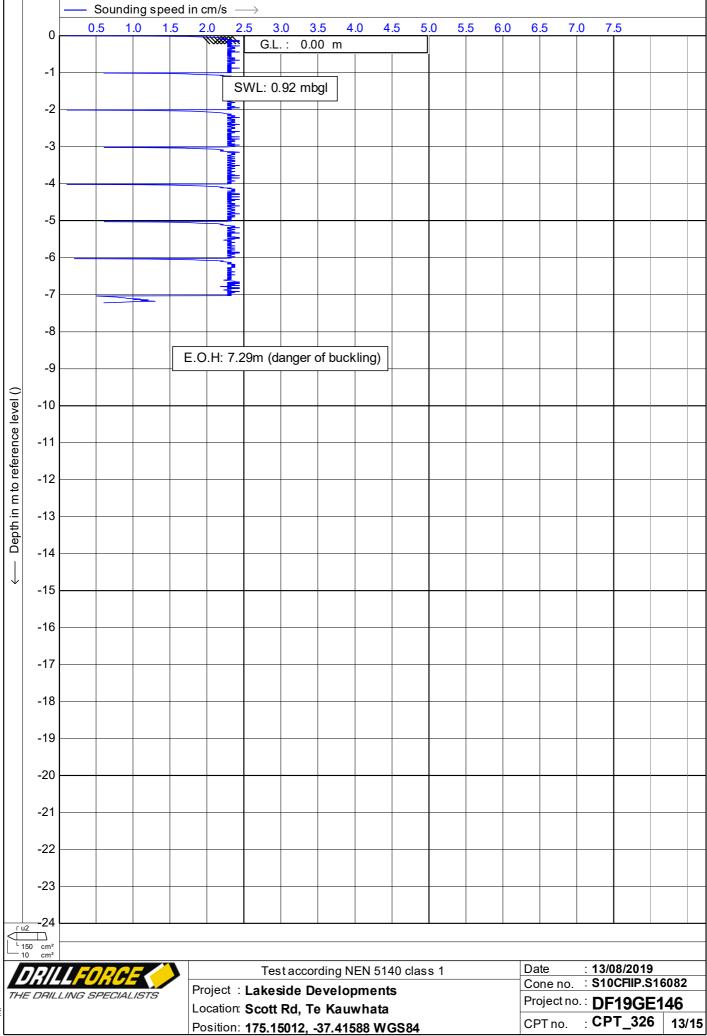




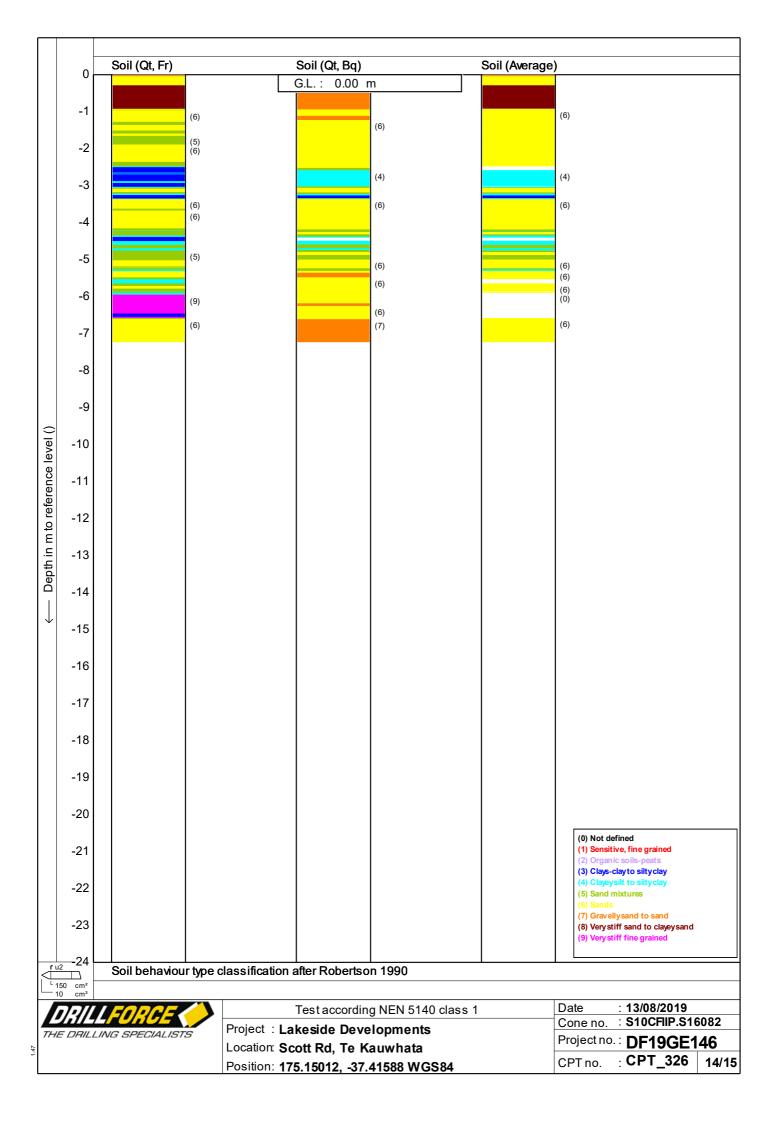


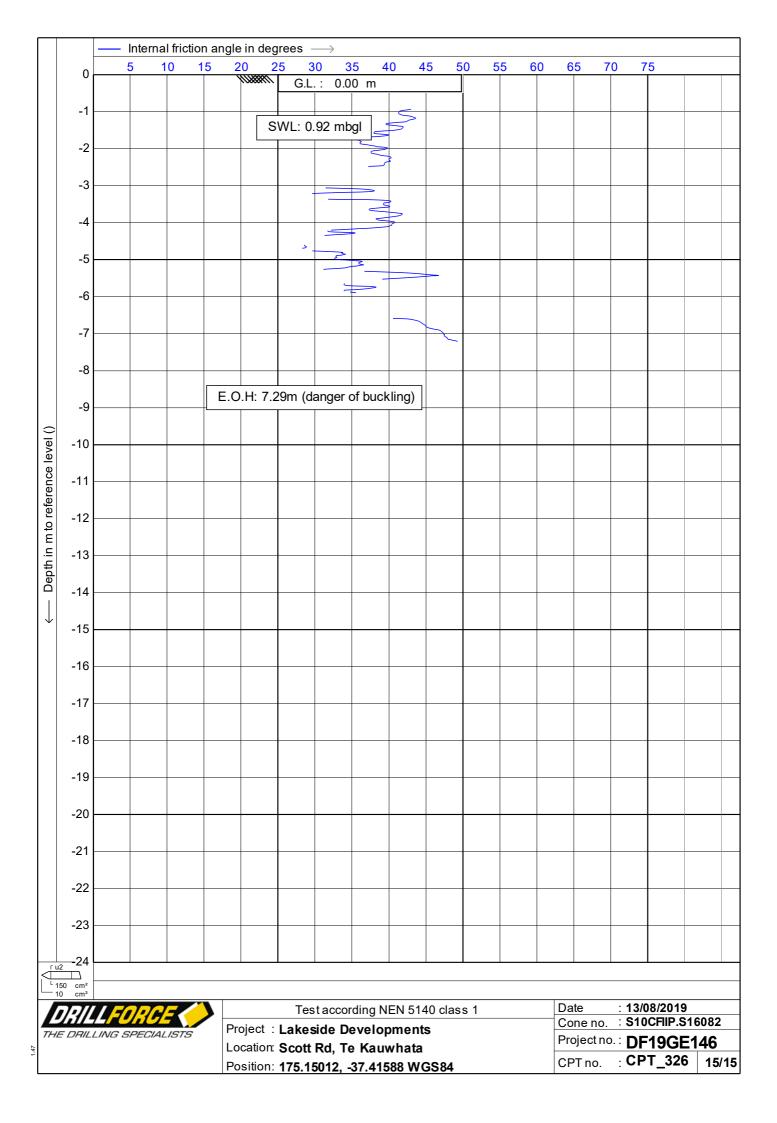


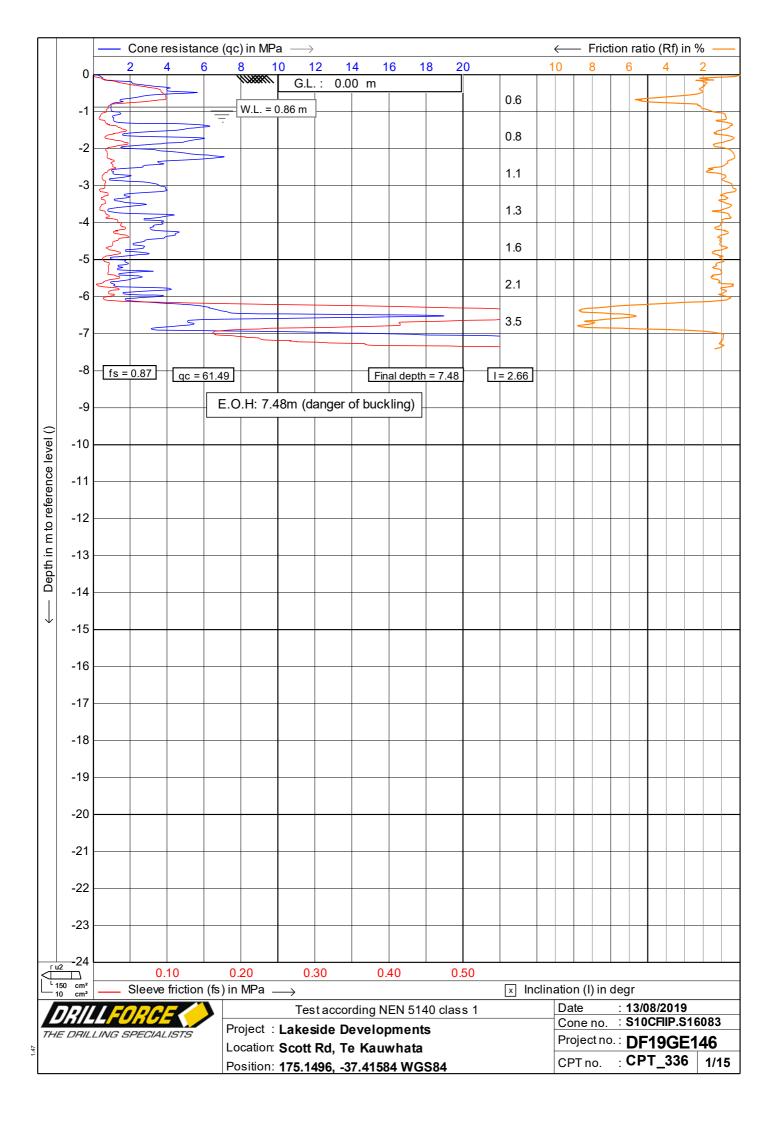


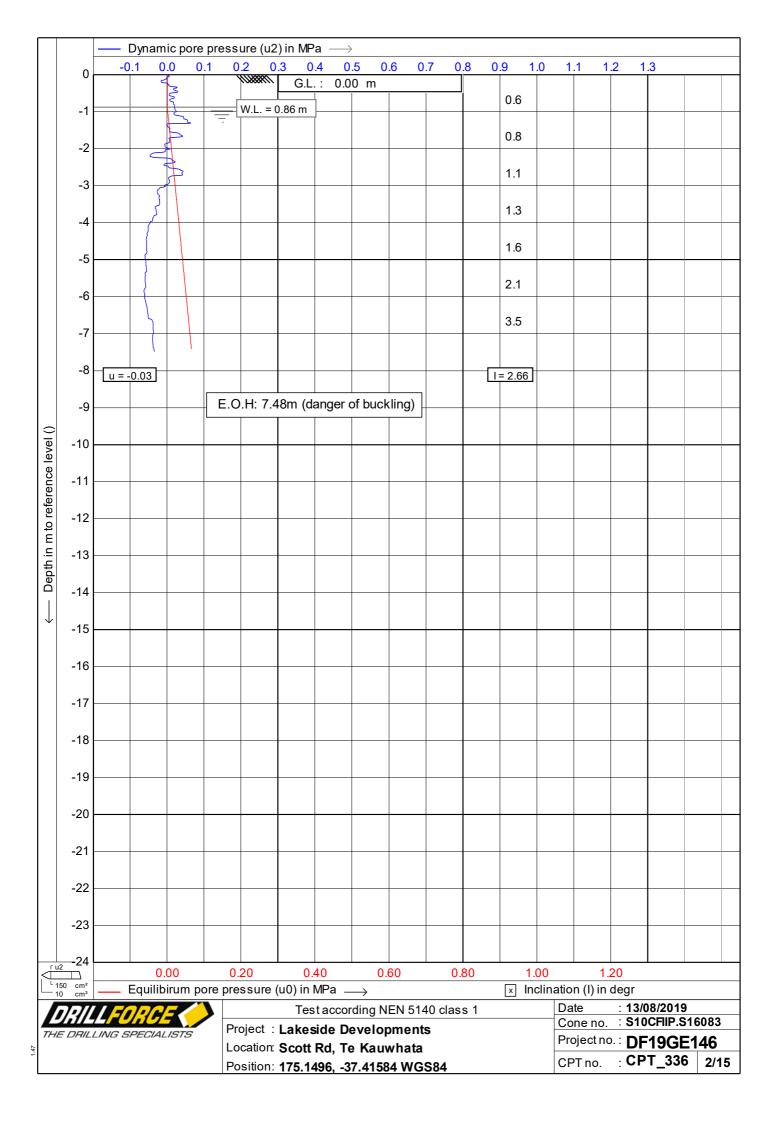


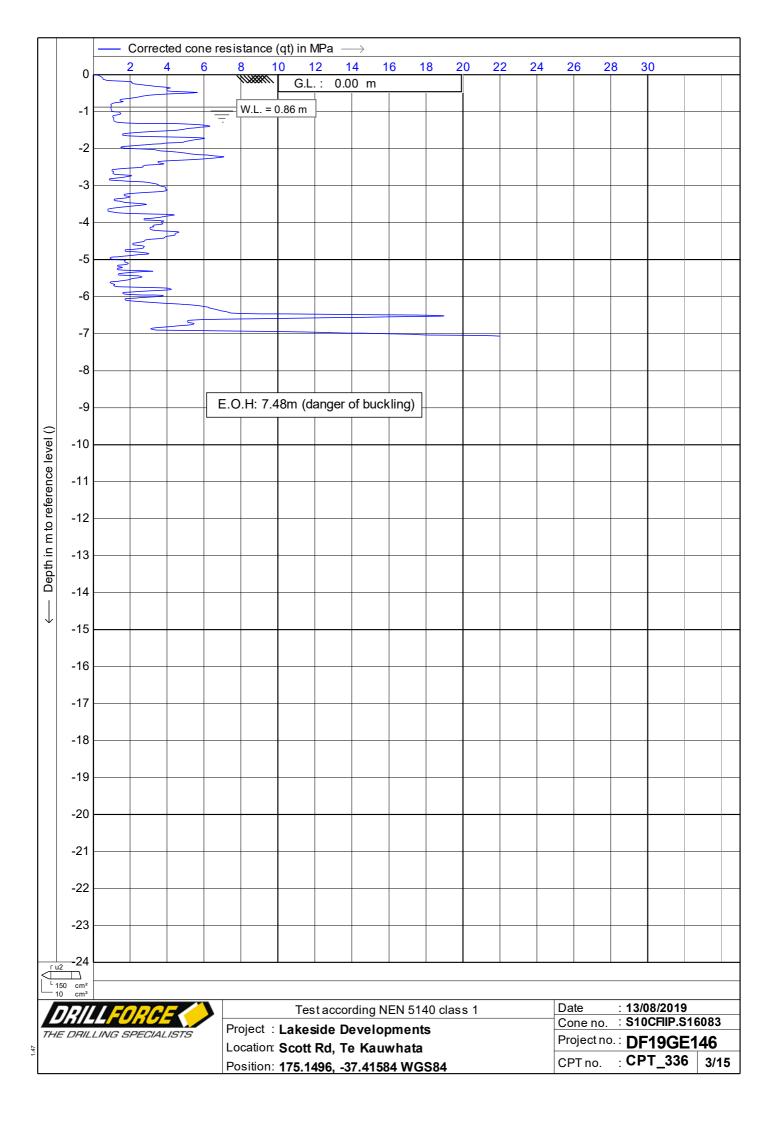
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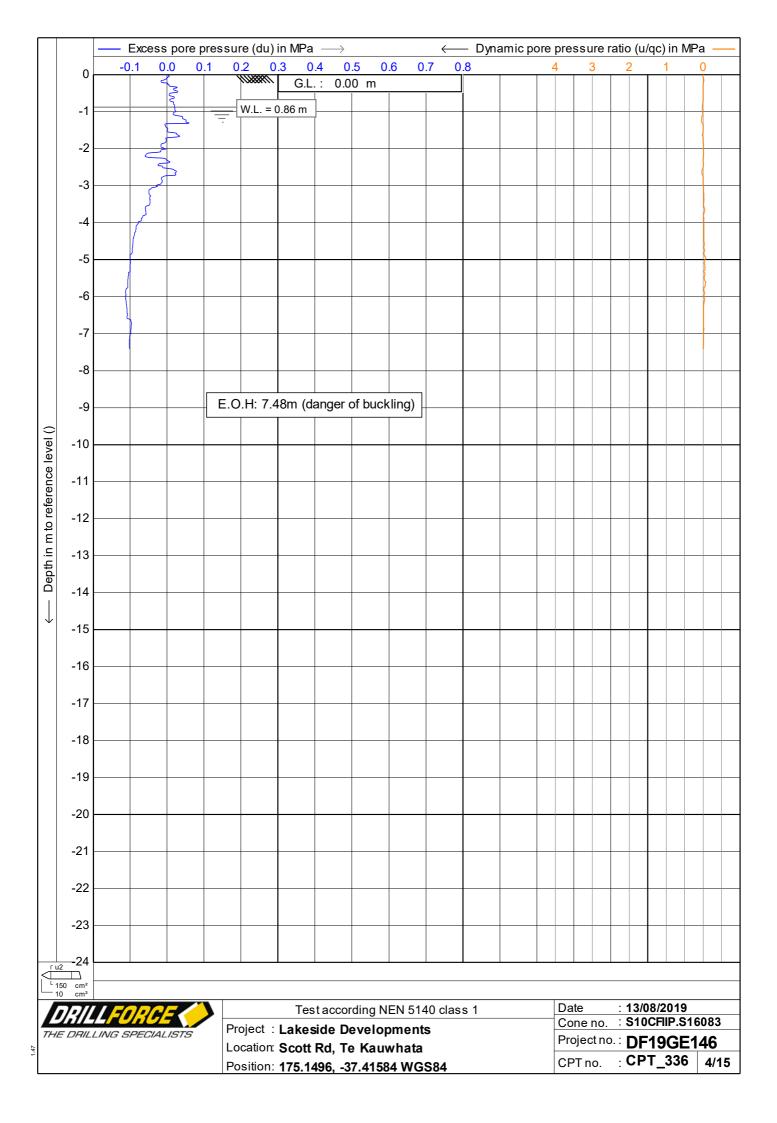


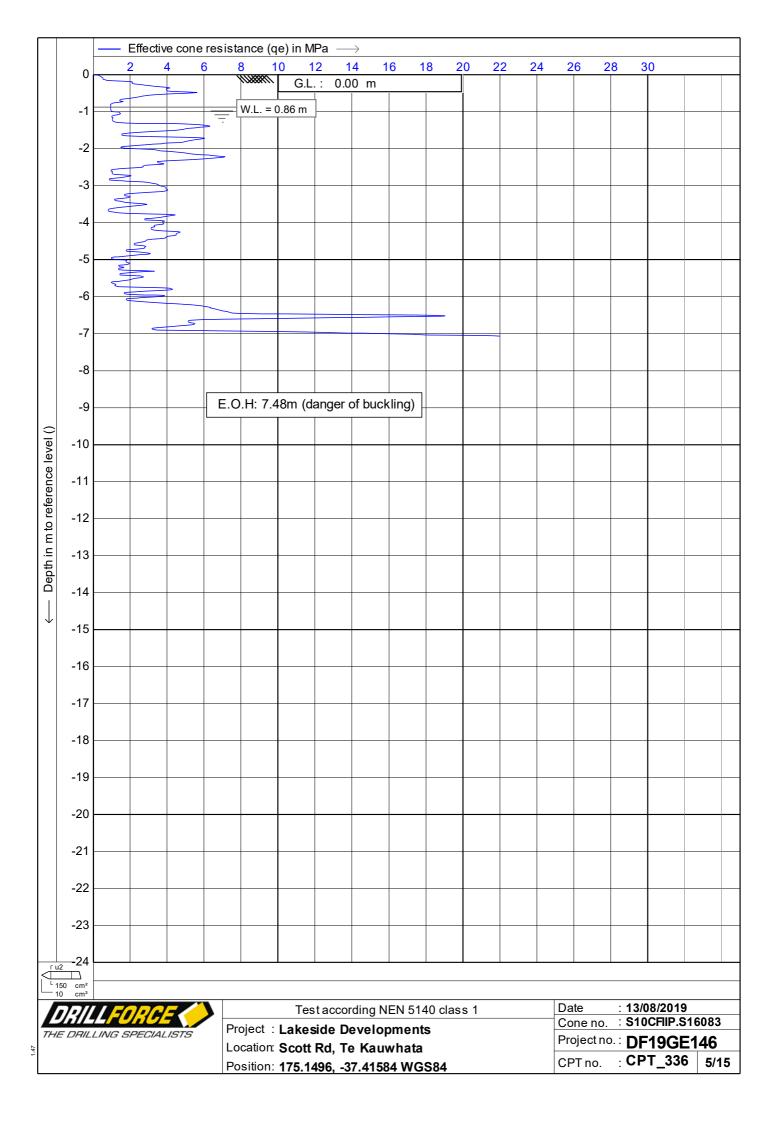


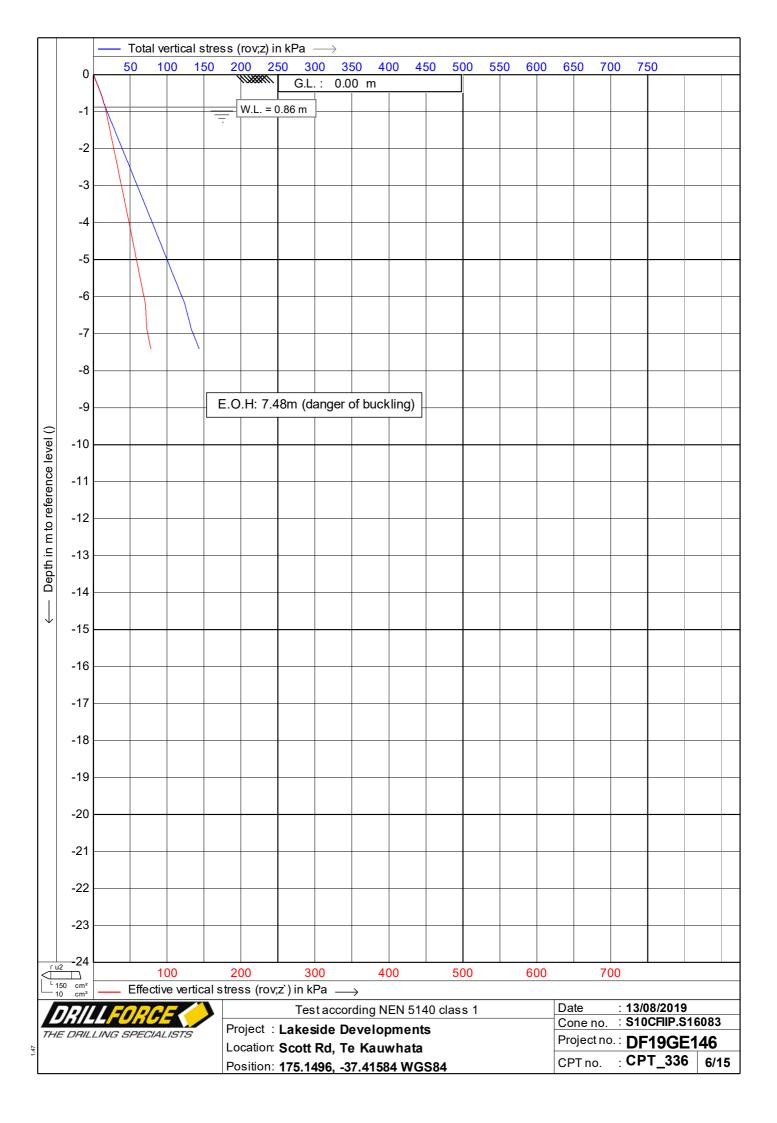


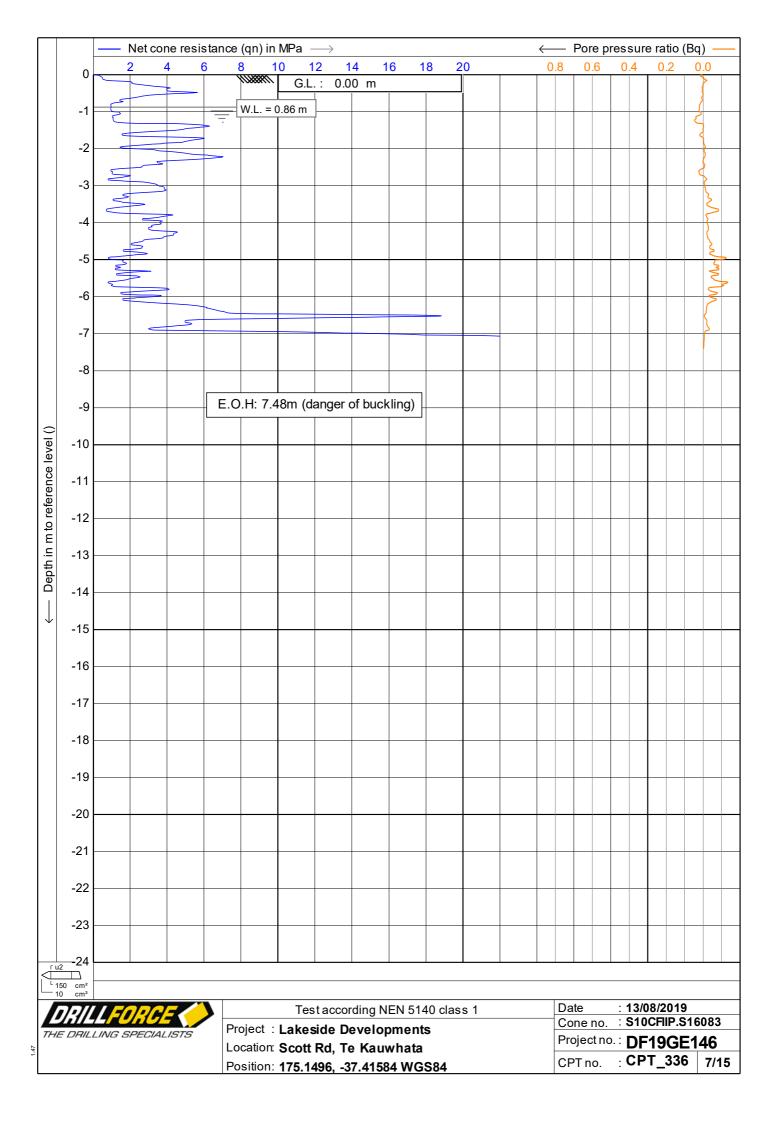


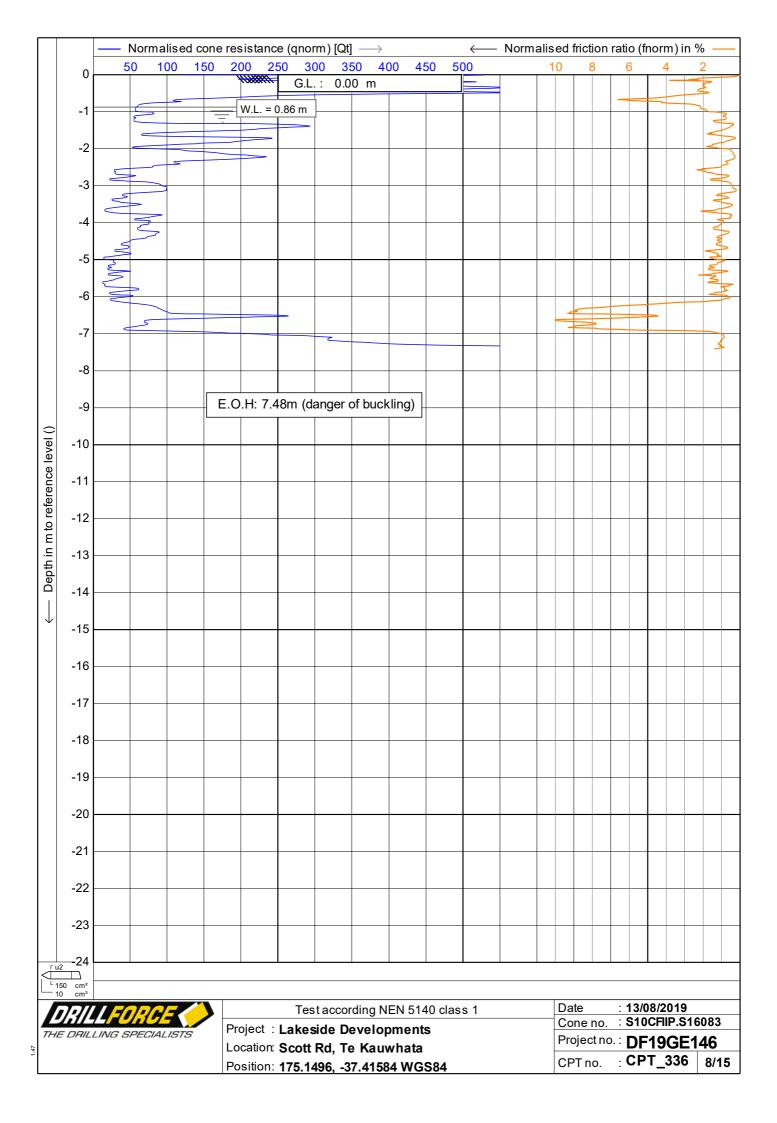


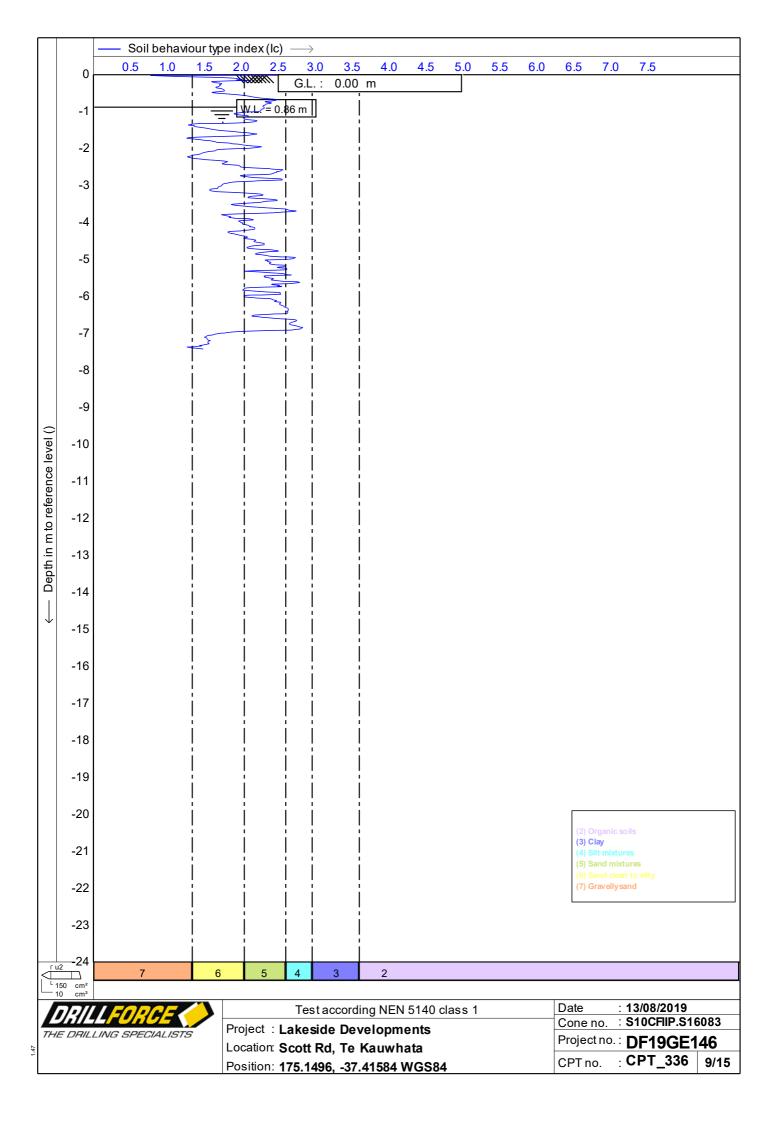


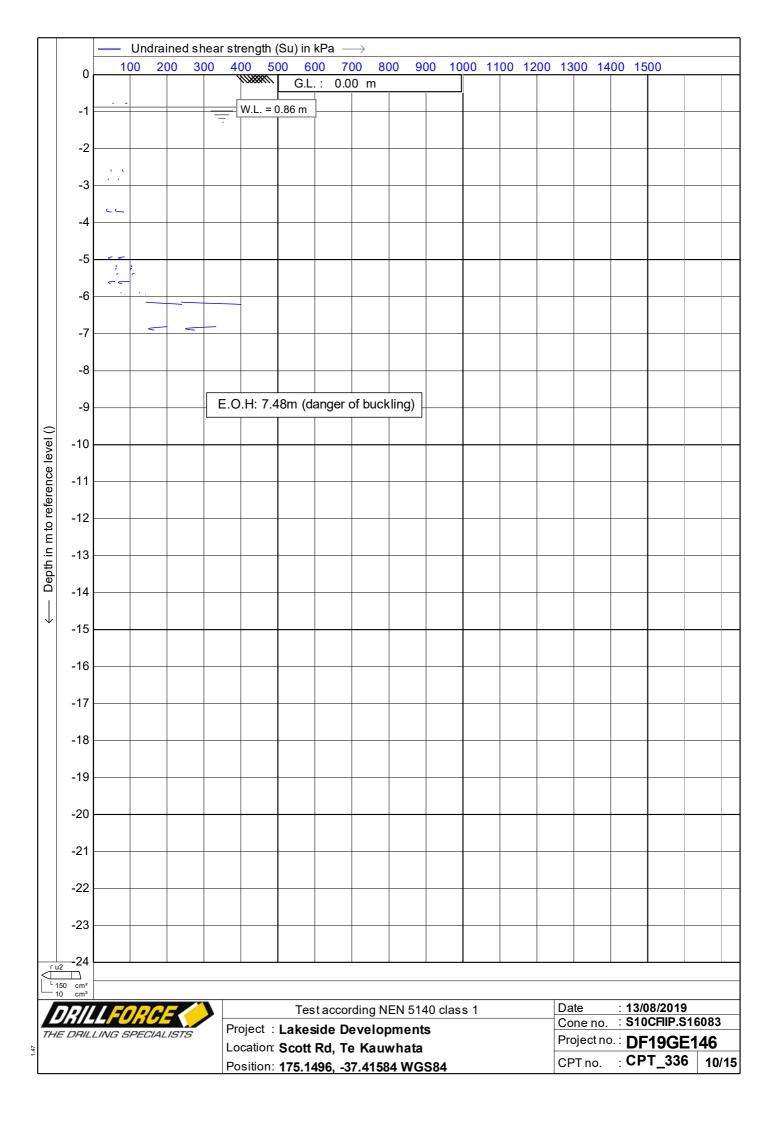


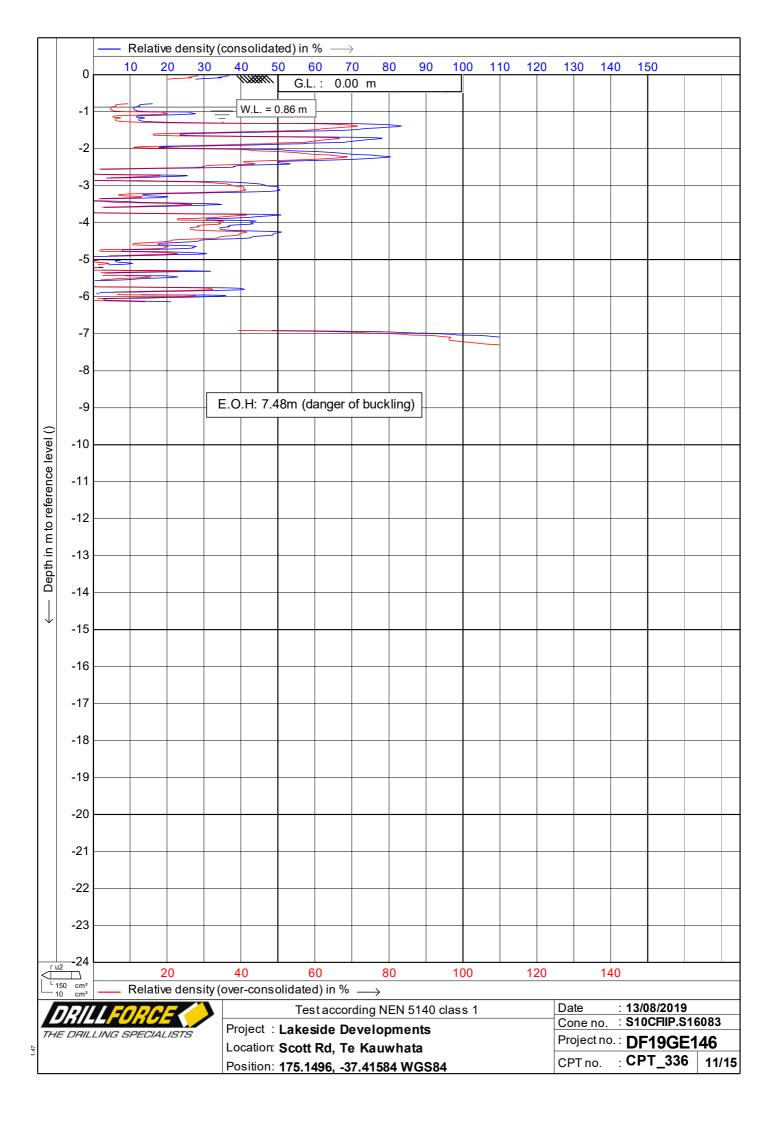


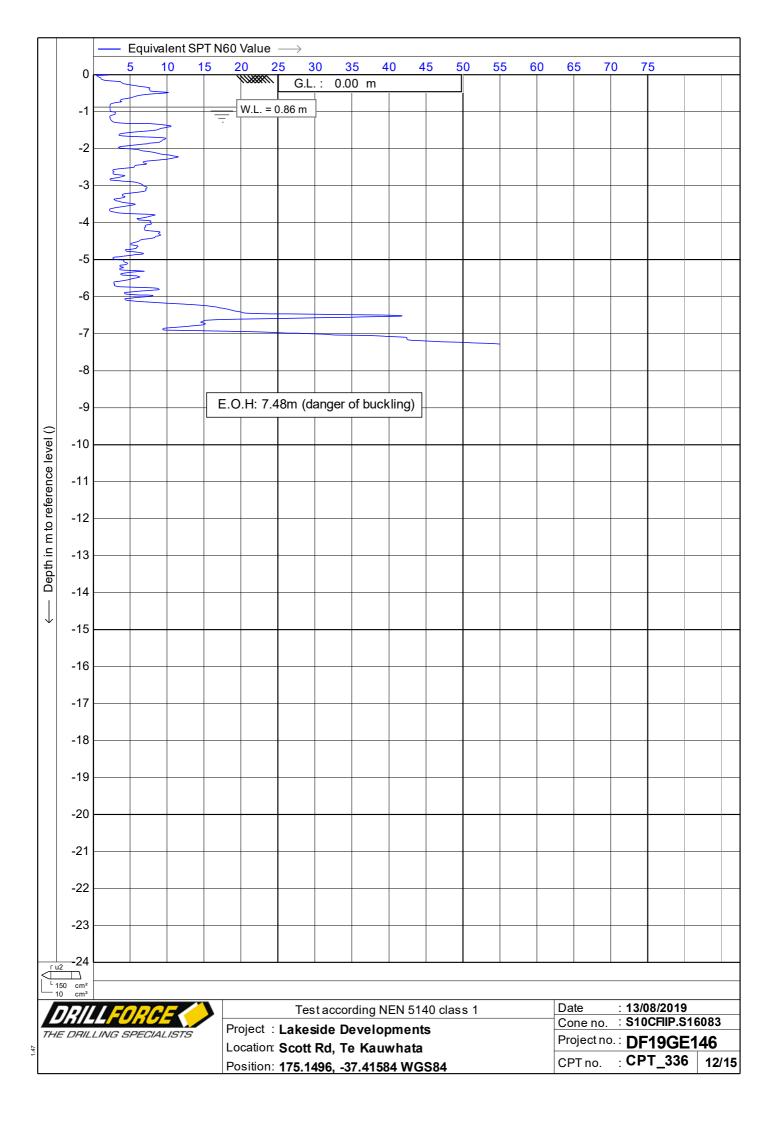


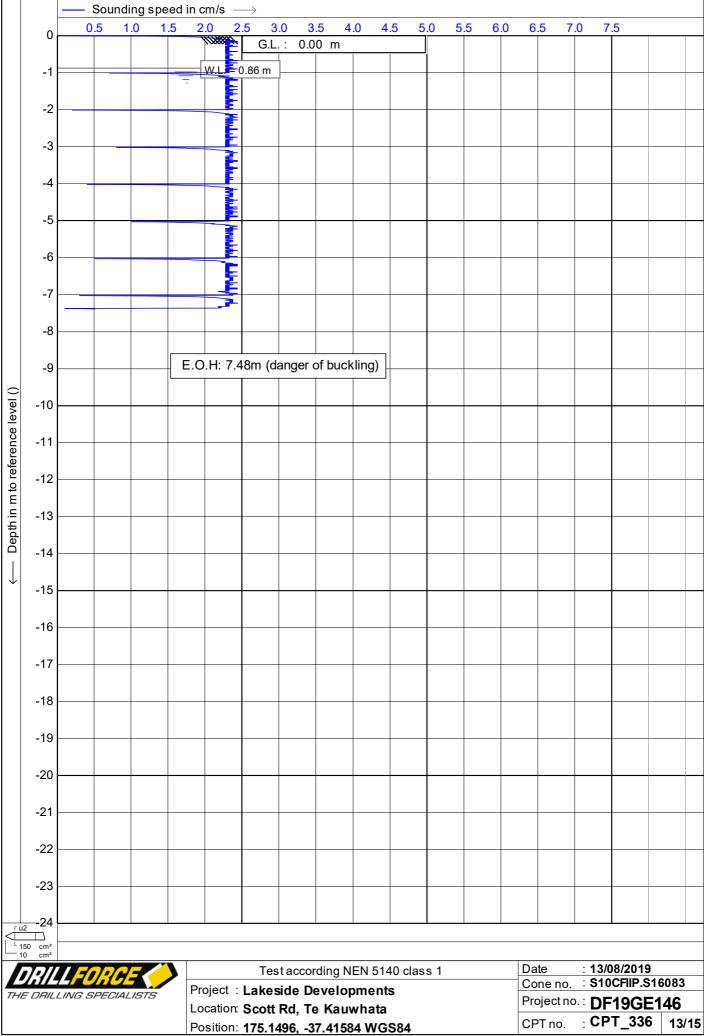




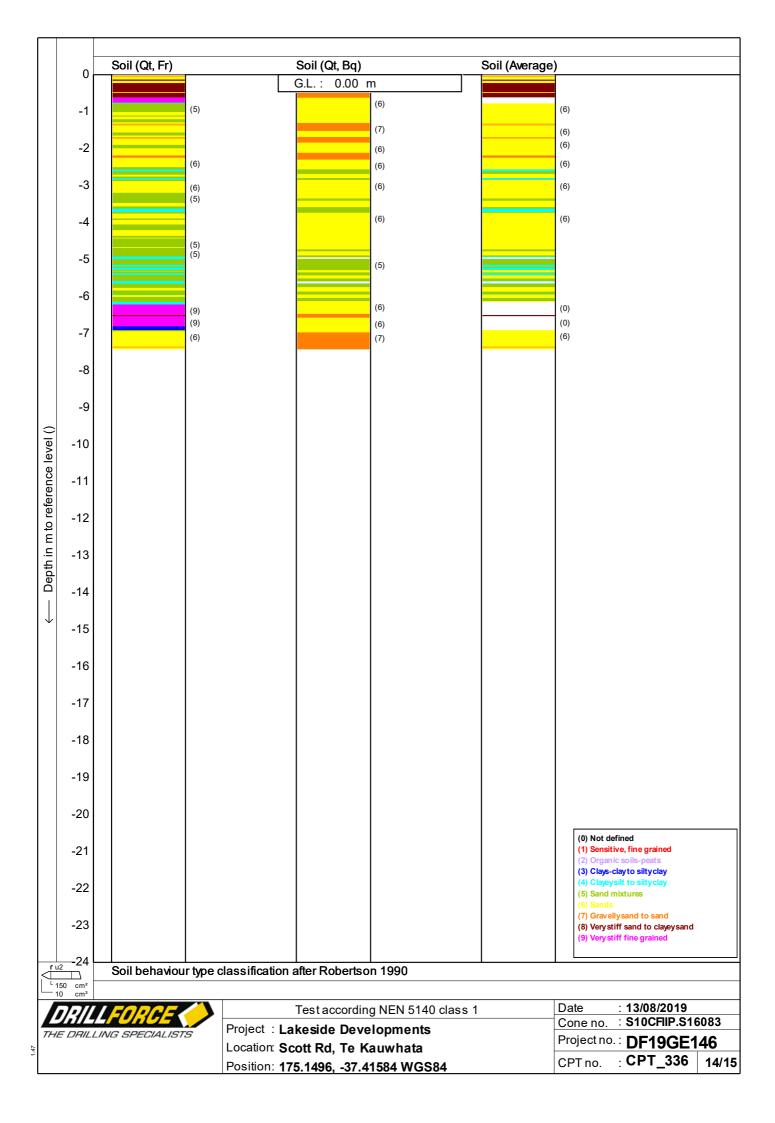


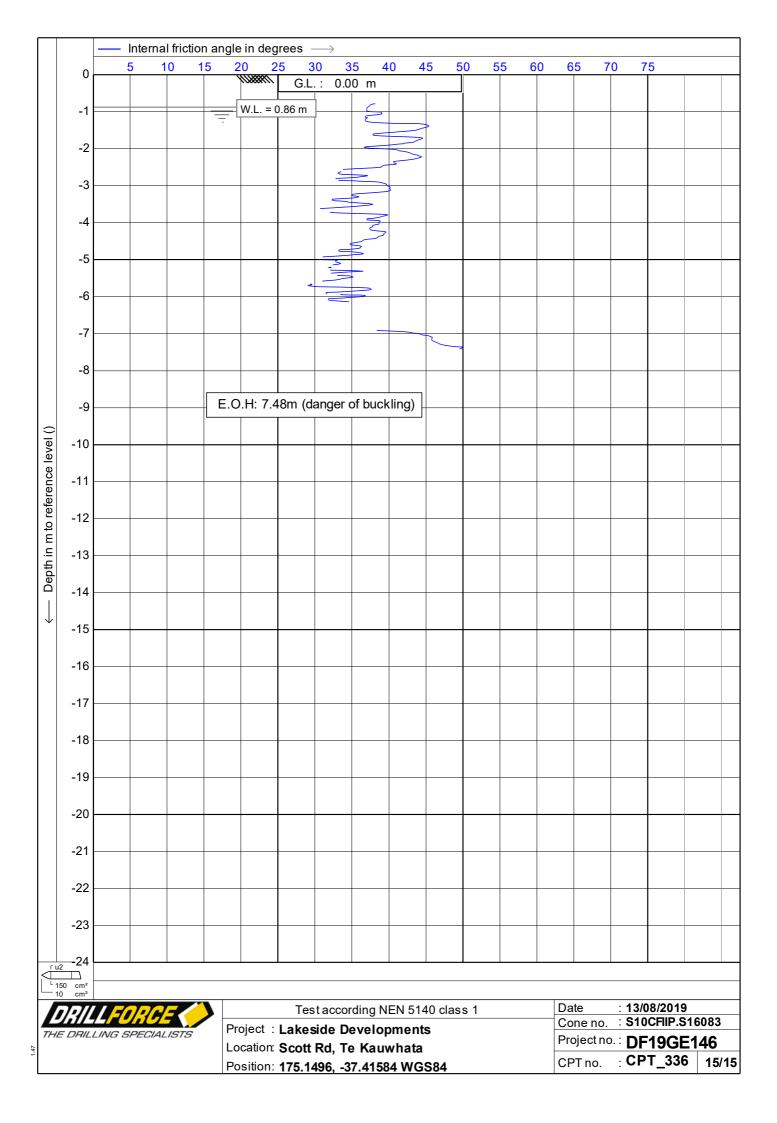


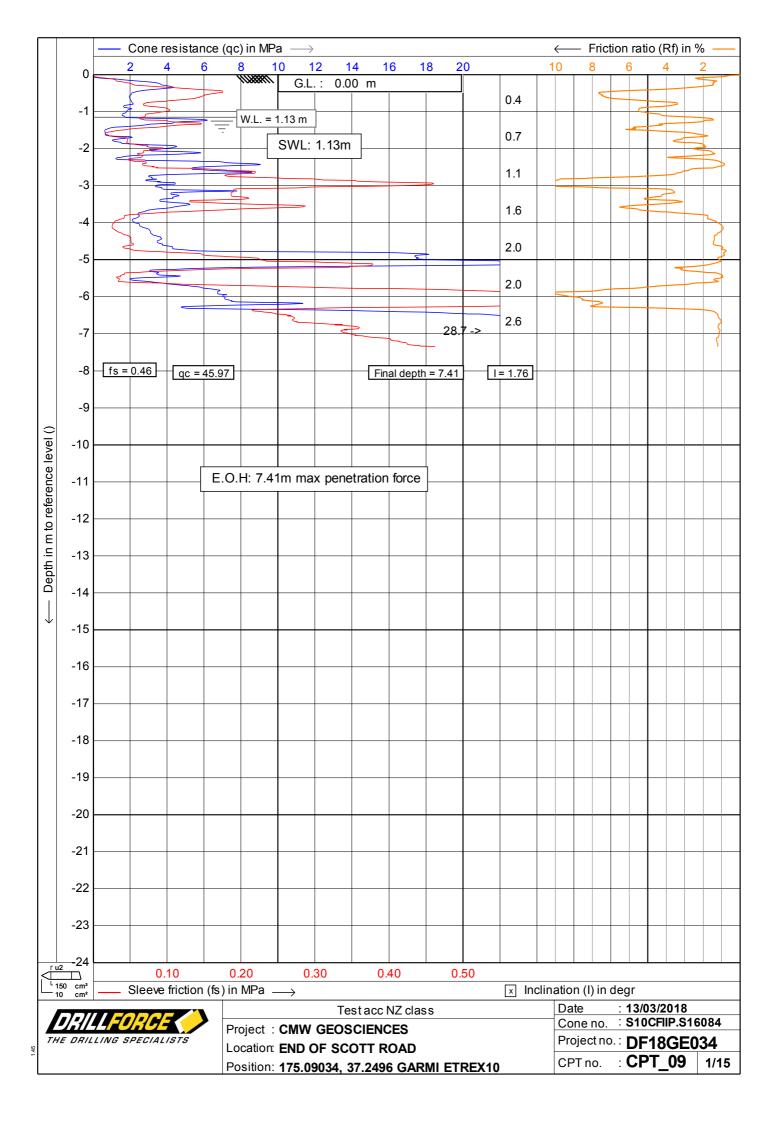


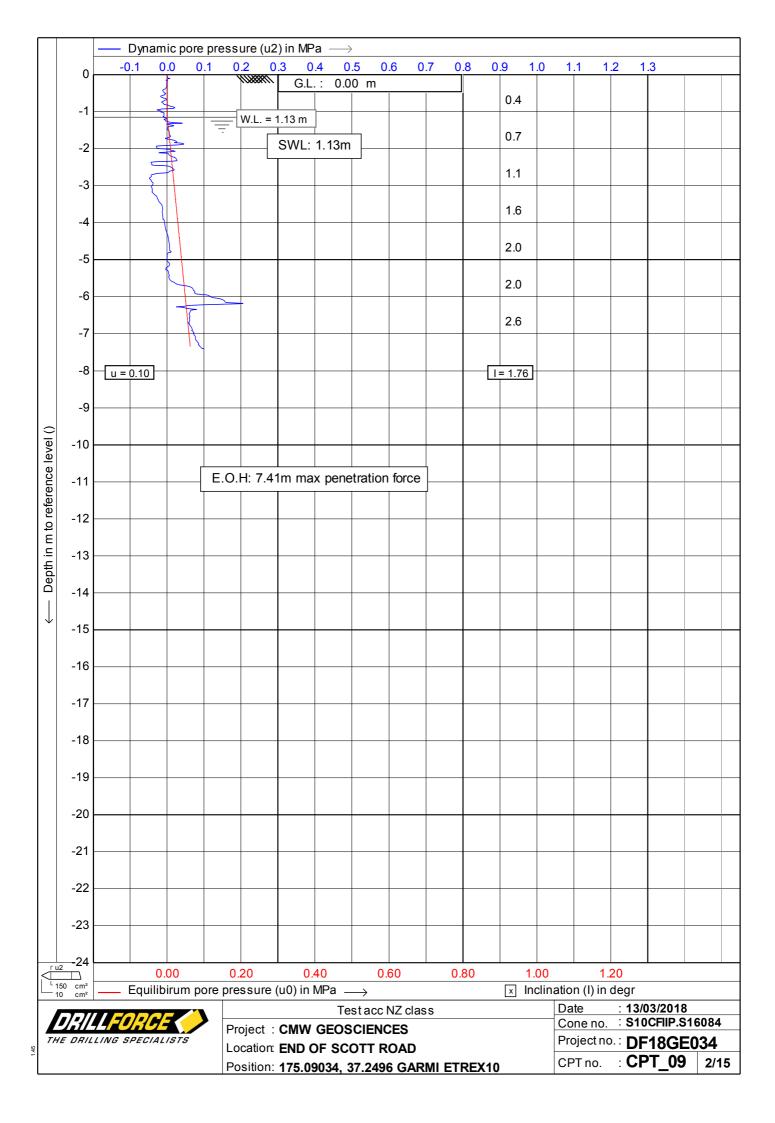


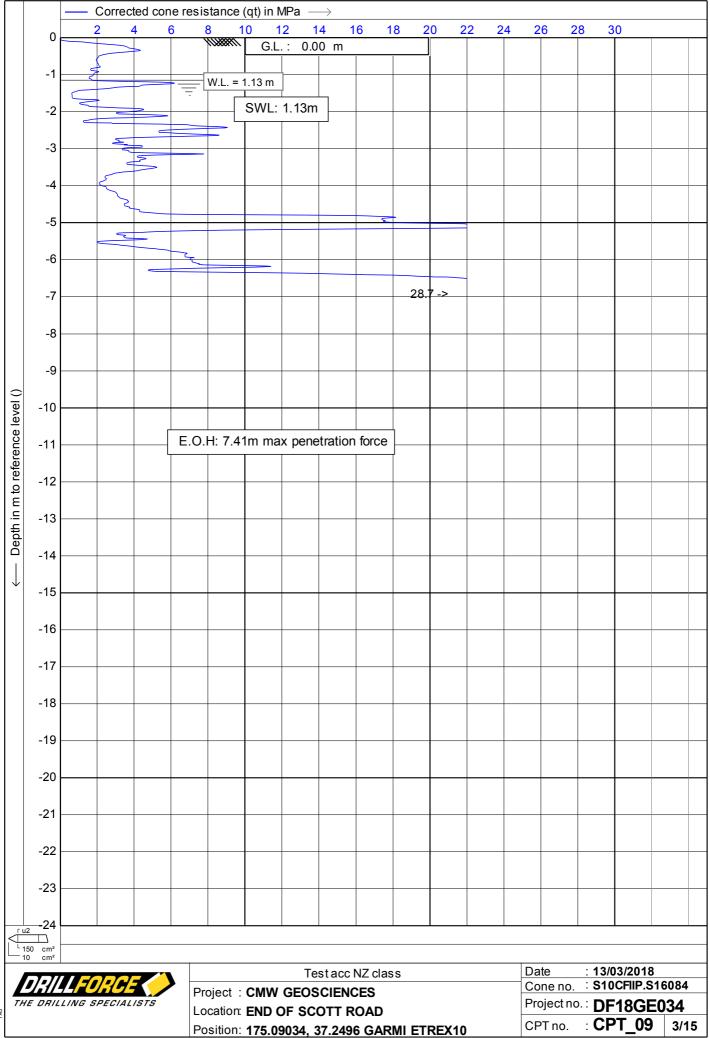
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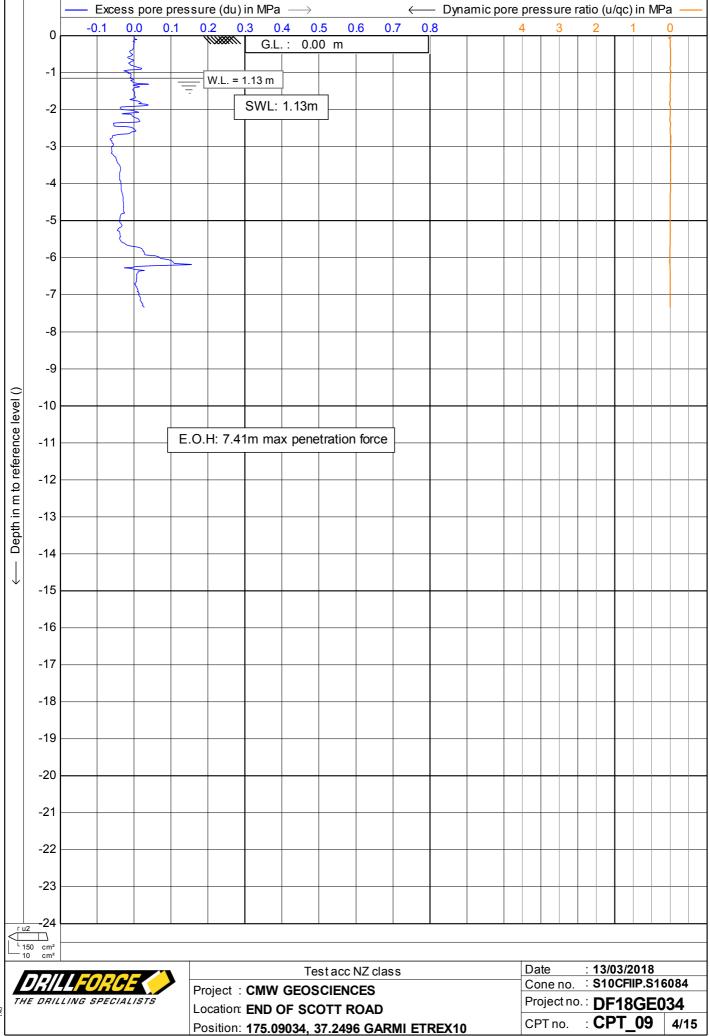


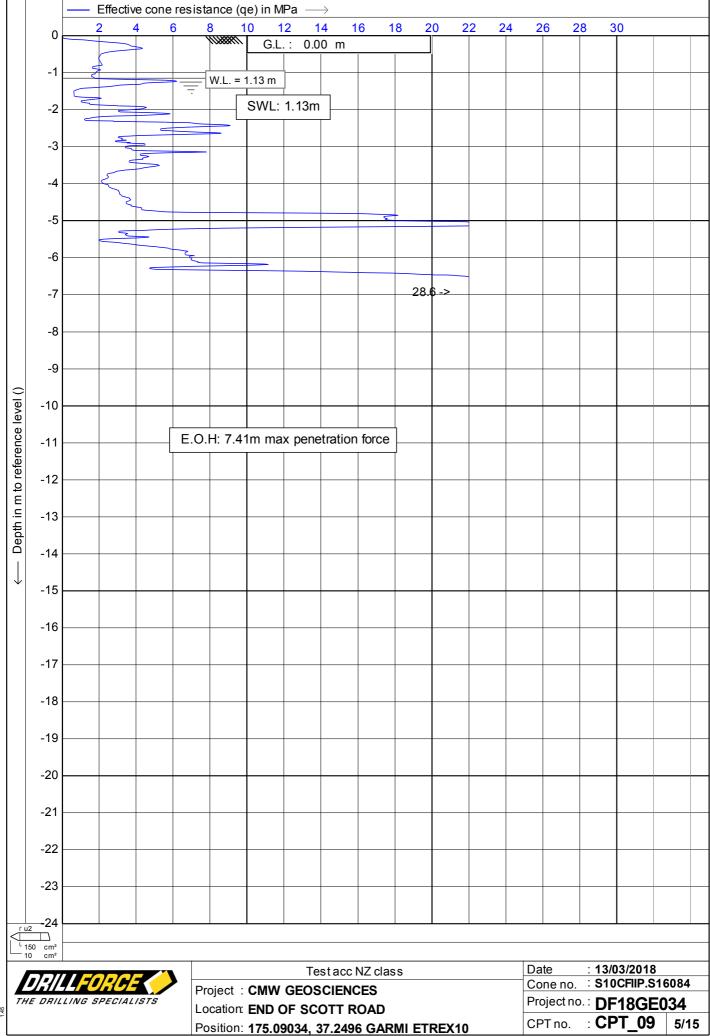


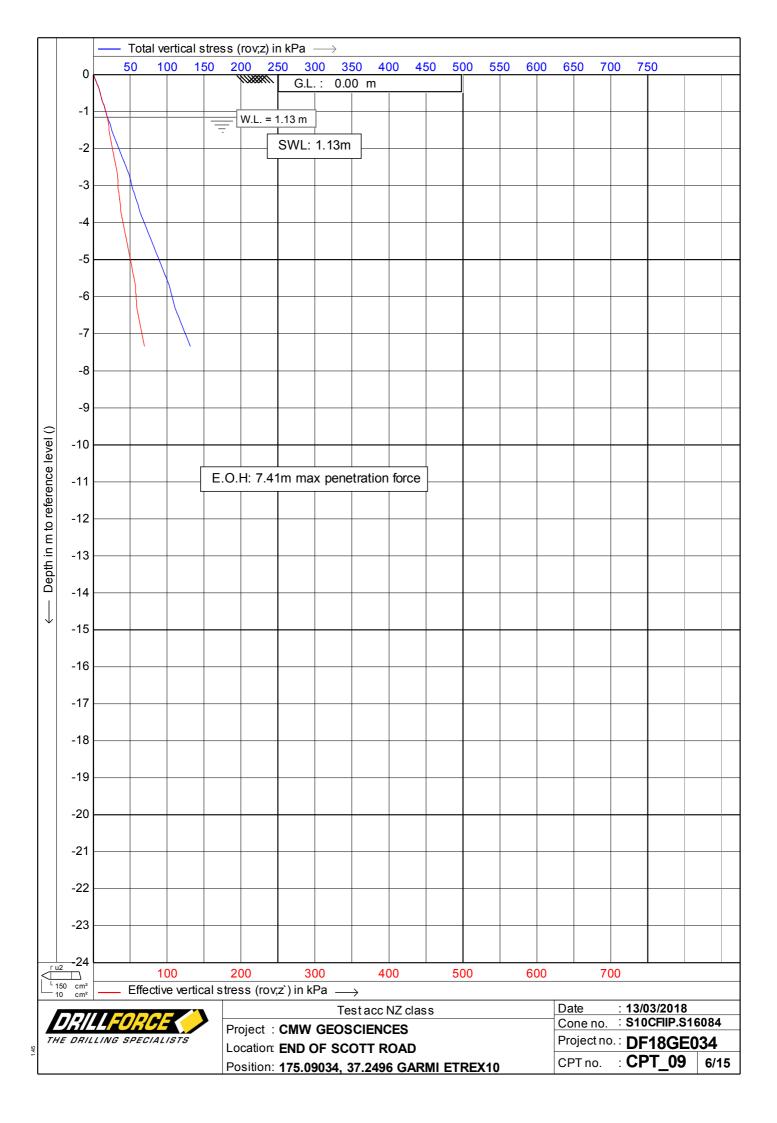


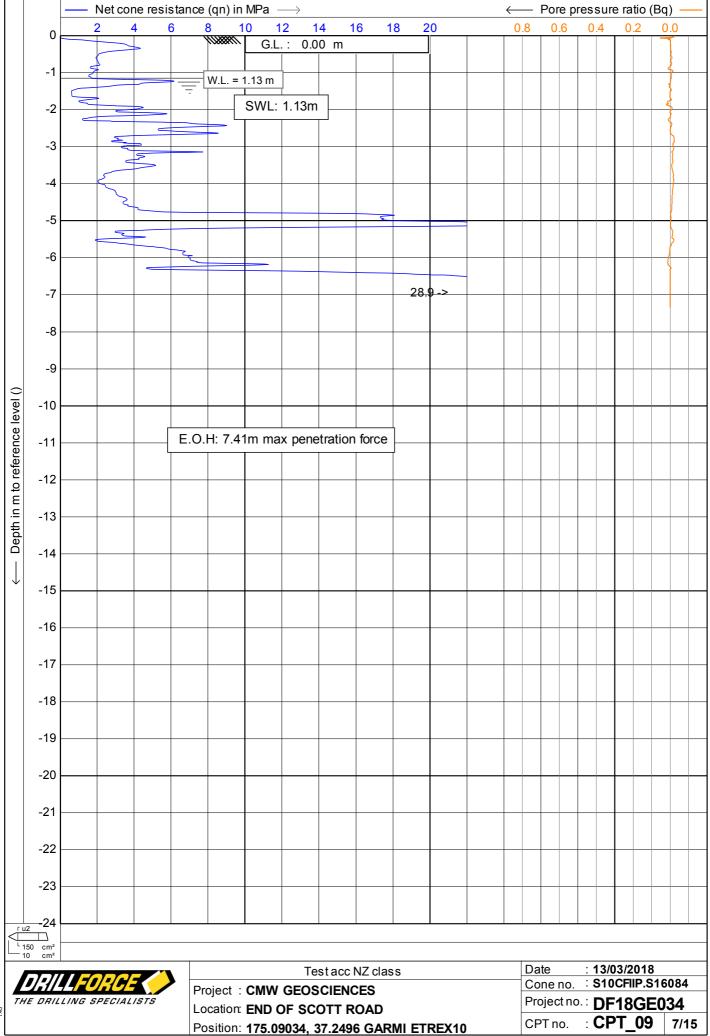


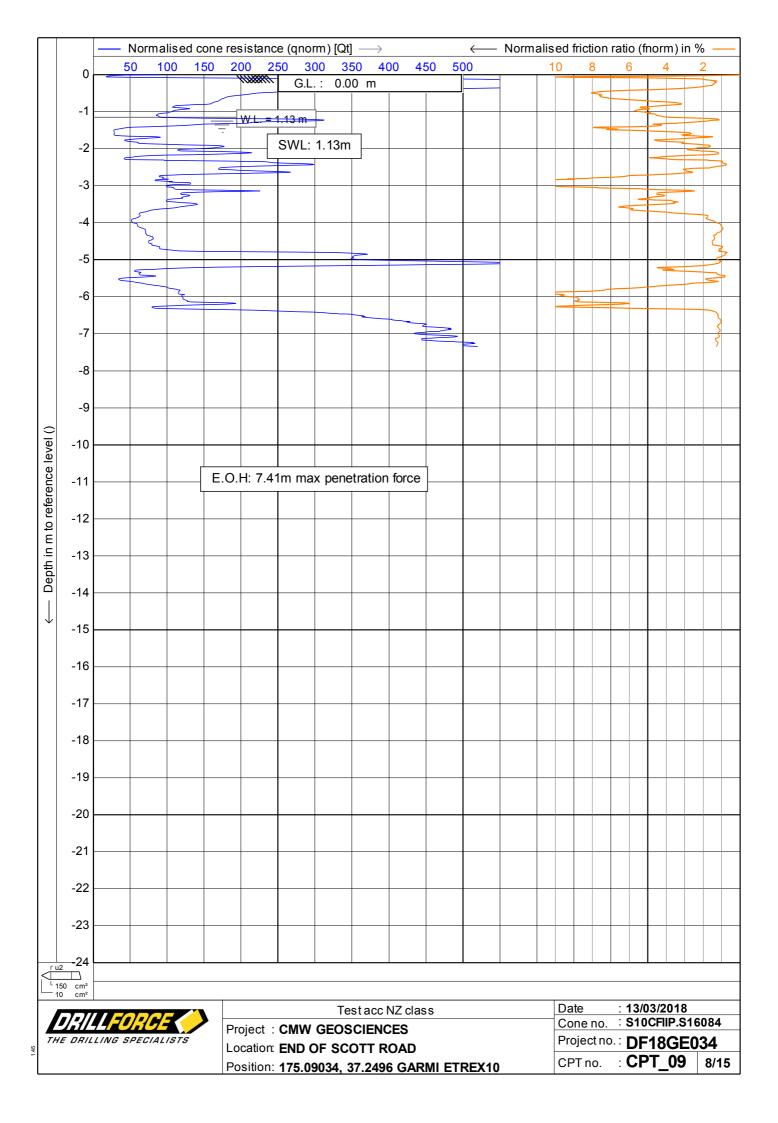
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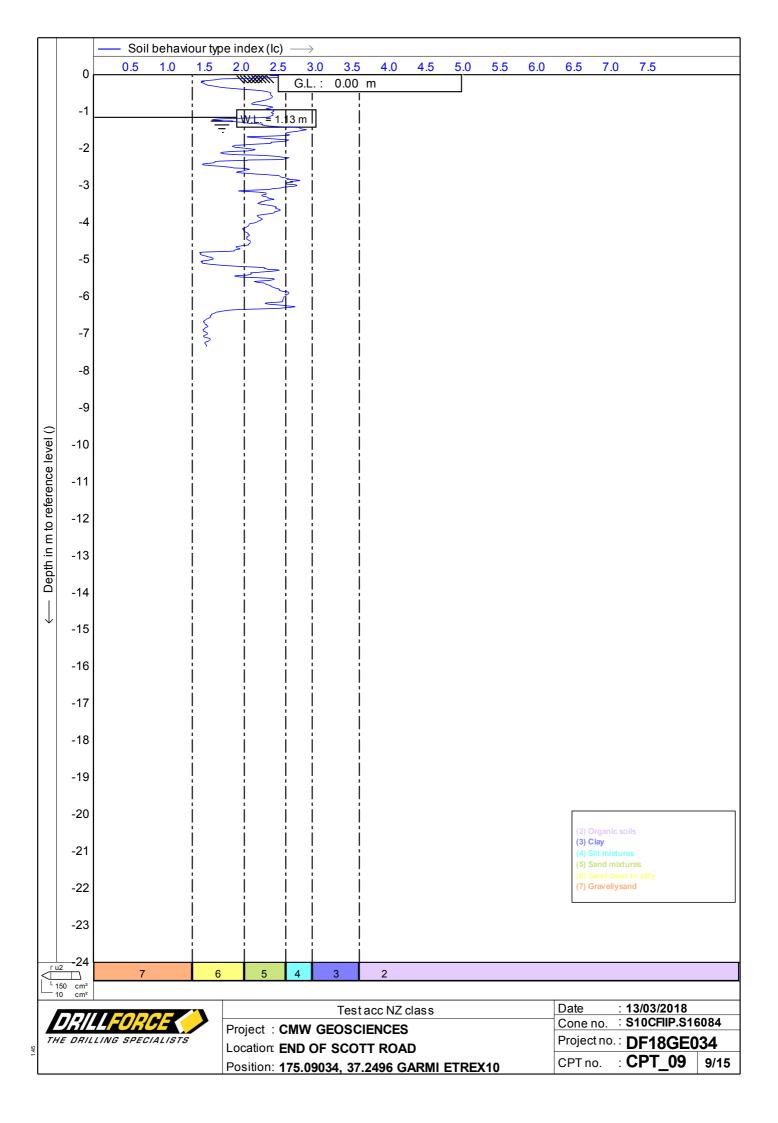


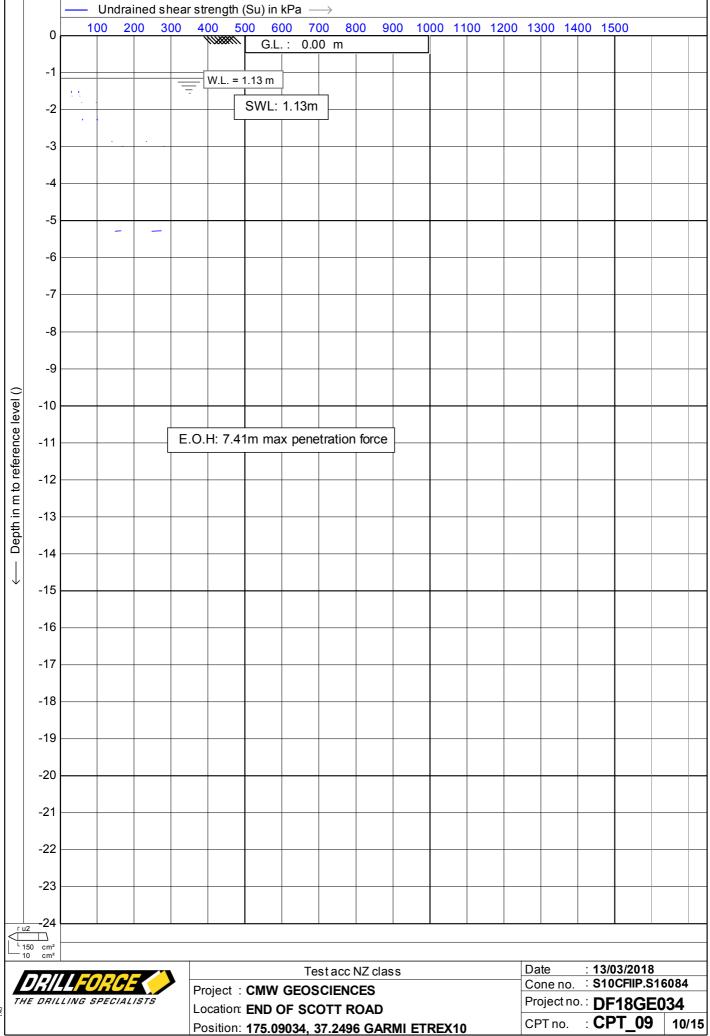


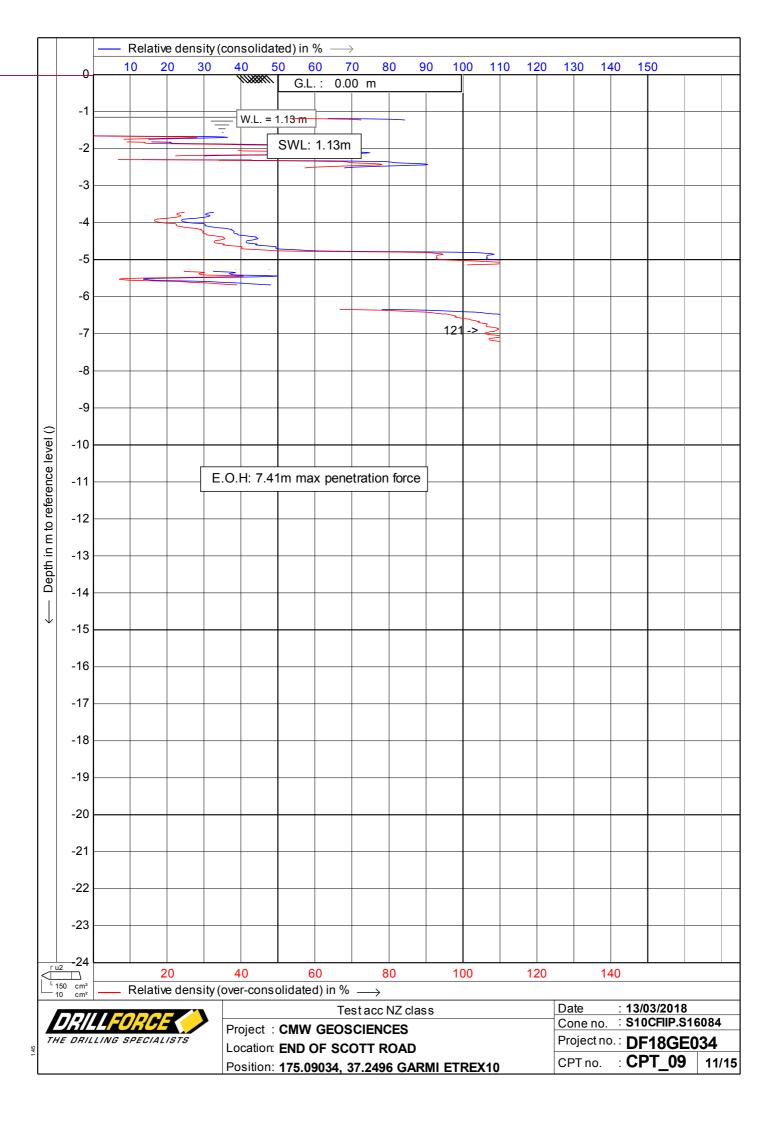


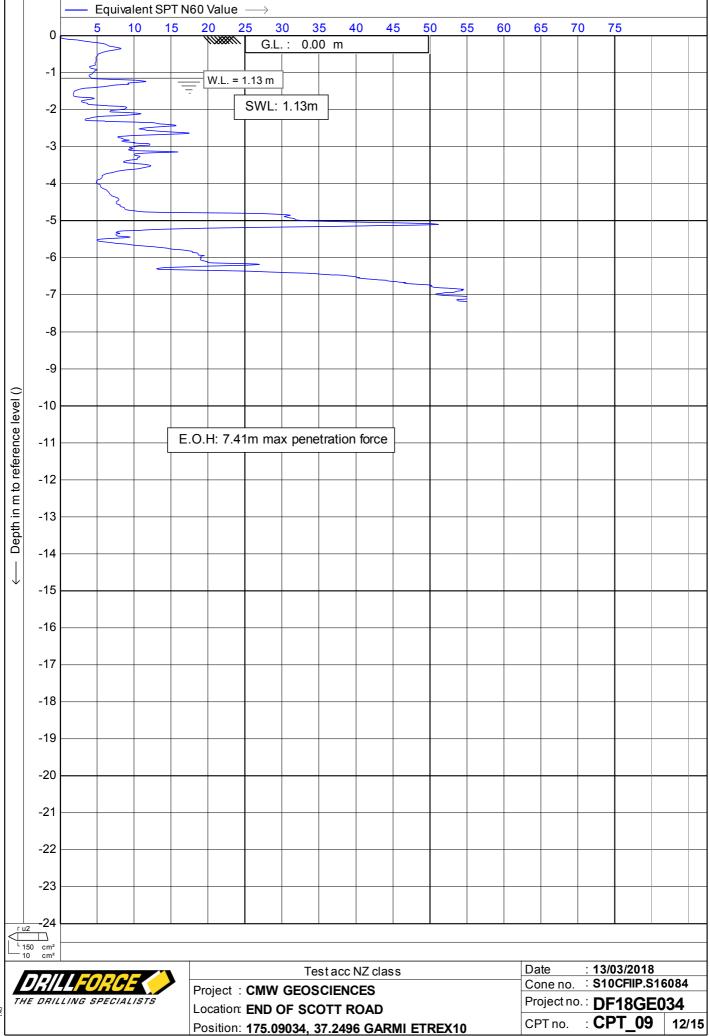


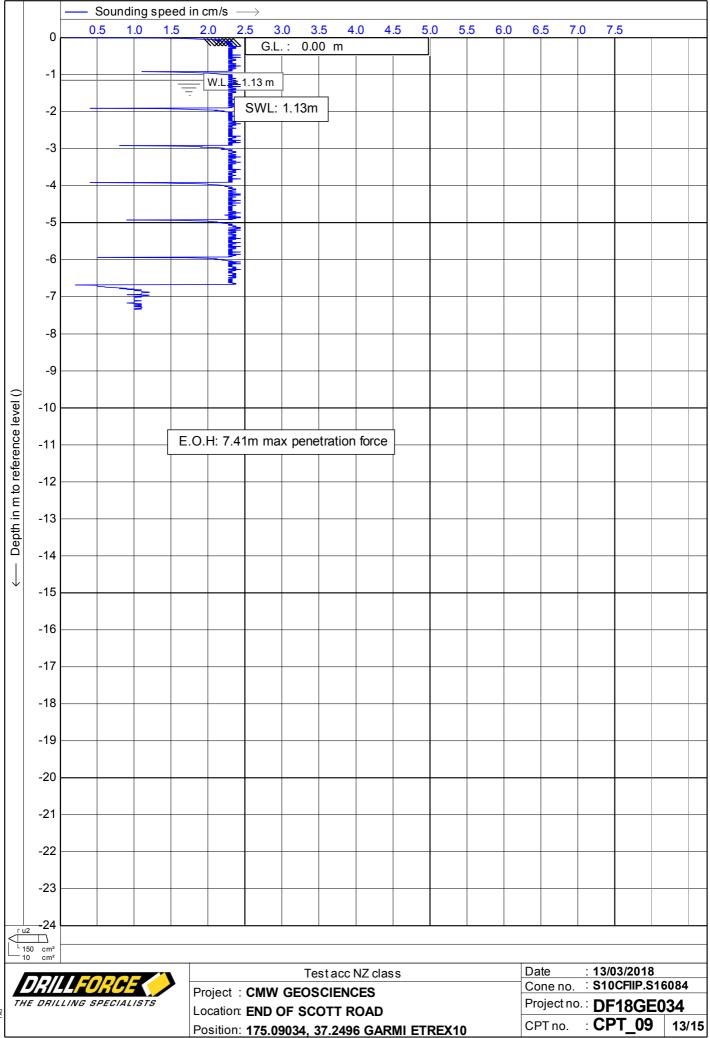




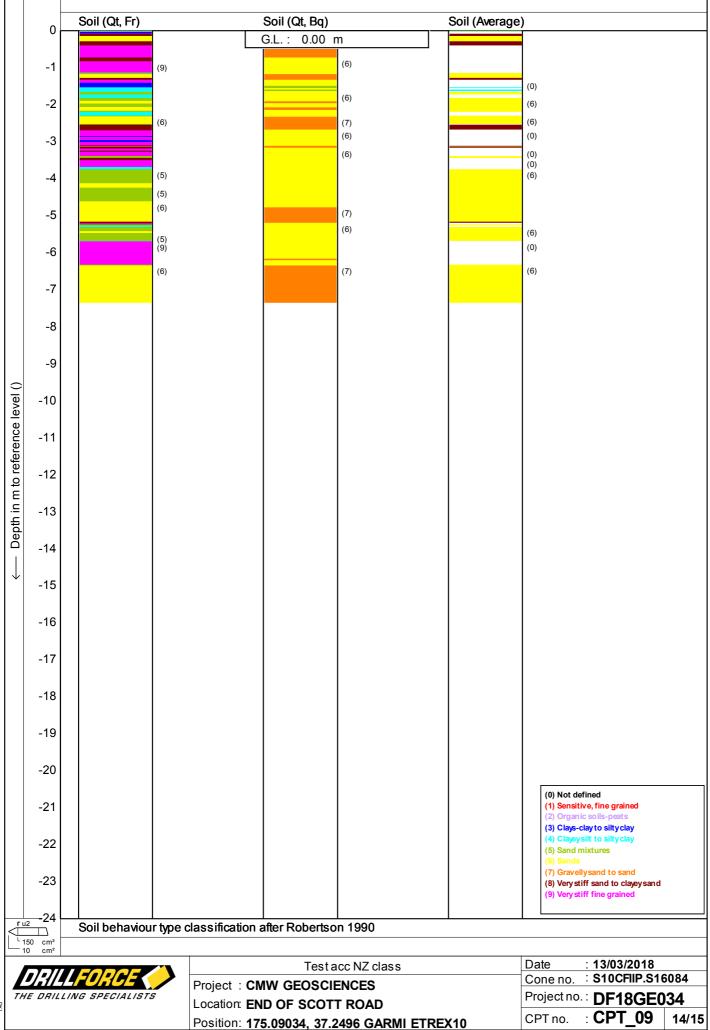


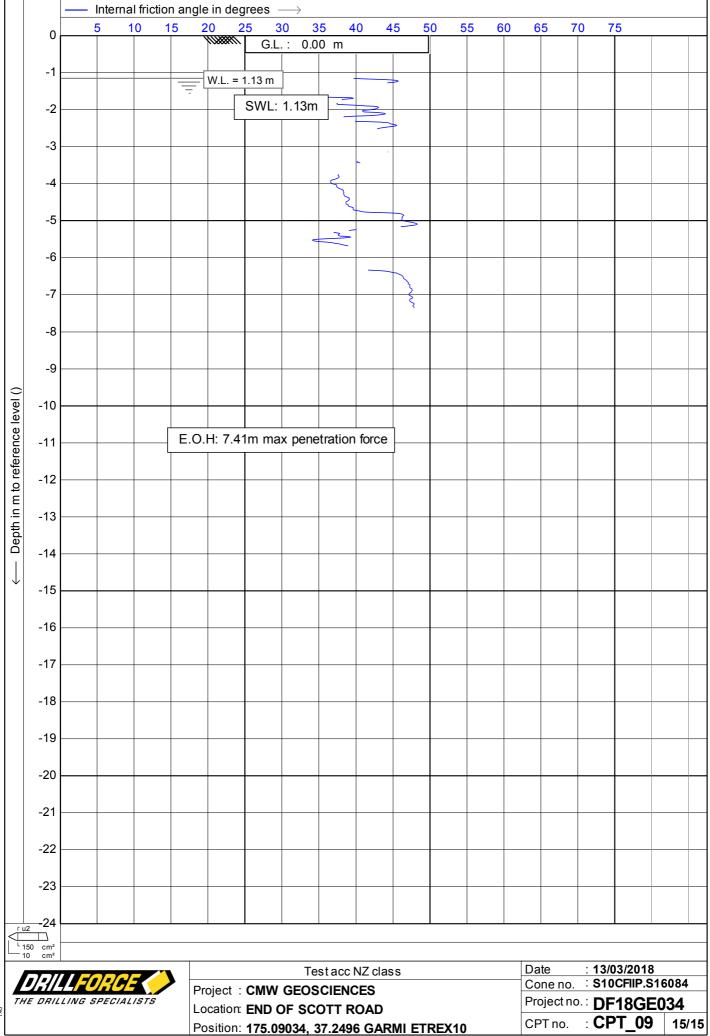


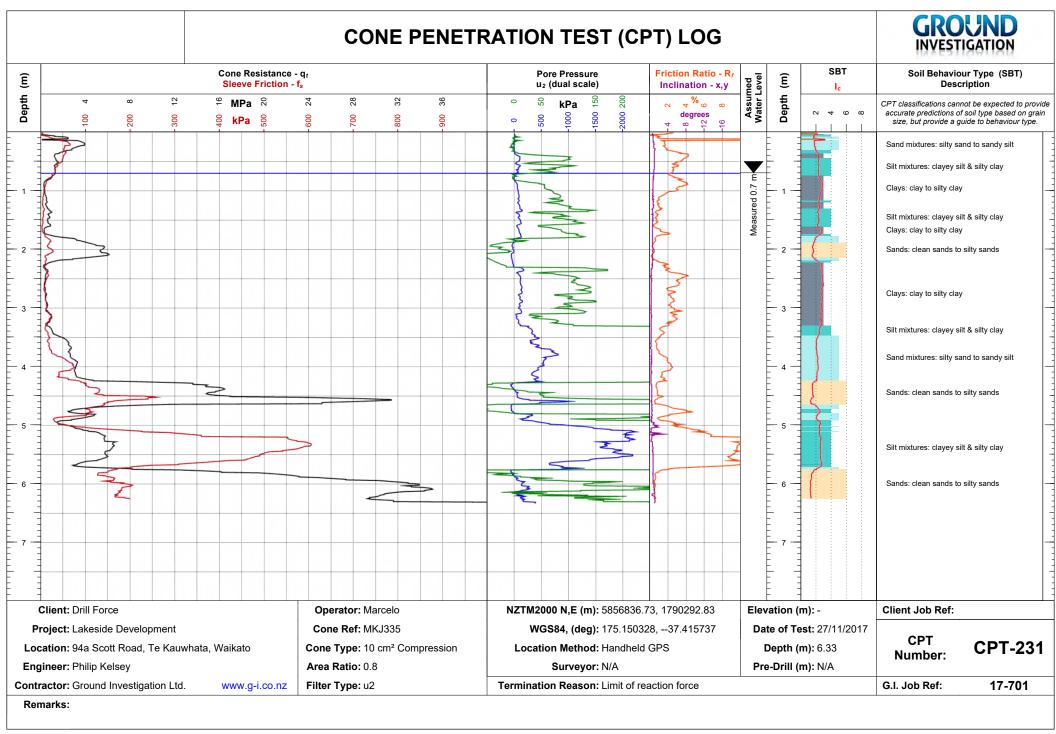




1.45







Appendix C: Laboratory Solid Density and Compaction Test Results



Private Bag 94000, Manukau City, Auckland 2241 www.stevenson.co.nz

Test Number:

172767

Report Number:

28802T

Date of Issue:

23rd November 2017

Page 1 of 2 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address:

PO Box 721

PUKEKOHE 2340

Attention:

Philip Kelsey

Reference:

No. 4036

Subject:

SOIL TESTING

Clients Instructions:

Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test

2.1: Determination of the Water Content

2.7.2: Determination of the Solid Density of Soil Particles

4.1.1: Dry Density/Water Content Relationship

- NZ Standard Compaction

2. NZ Geotechnical Society, Guideline

Determining the Shear Strength of a Cohesive Soil using a Hand Held

Shear Vane

Date Sampled:

9th November 2017

Date Received:

10th November 2017

Date of Test:

November 2017

Description of Sample:

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



Material:

TP202 (0.6 - 1.6 & 1.6 - 2.6m), Puketoka Silt/Clay

Source: Job: Lakeside Developments Te Kauwhata

Lakeside Developments

Test No.:

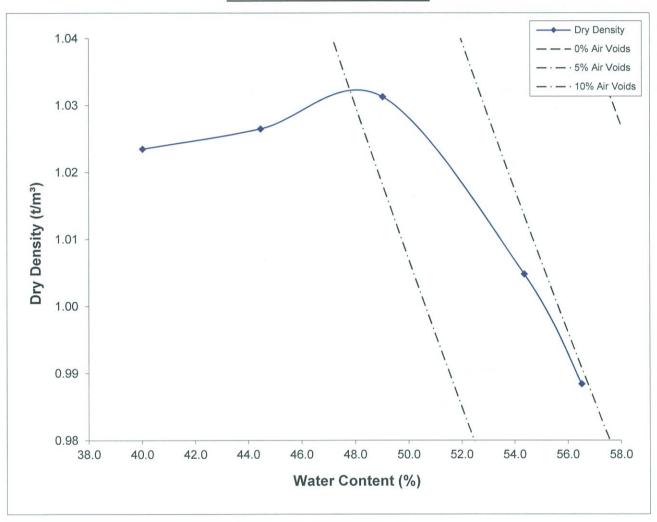
172767

Date Sampled: 9th November 2017

Reference No.:

4036

NZ STANDARD COMPACTION



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

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



Private Bag 94000, Manukau City, Auckland 2241 www.stevenson.co.nz

Test Number:

172768

Report Number:

28876T

Date of Issue:

30th November 2017

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address:

PO Box 721

PUKEKOHE 2340

Attention:

Philip Kelsey

Reference:

No. 4036

Subject:

SOIL TESTING

Clients Instructions:

Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test

2.1: Determination of the Water Content

2.2: Determination of Liquid Limit

2.3: Determination of Plastic Limit

2.4: Determination of Plasticity Index 2.6: Determination of Linear Shrinkage

2.7.2: Determination of Solid Density of Soil Particles

4.1.1: Dry Density/Water Content Relationship

- NZ Standard Compaction

6.1.1: Determination of the California Bearing Ratio

2. NZ Geotechnical Society, Guideline

Determining the Shear Strength of a Cohesive Soil using a Hand Held

Shear Vane

Date Sampled:

8th November 2017

Date Received:

10th November 2017

Date of Test:

November 2017

Description of Sample:

TP203 (0.3 - 1.0 & 1.0 to 1.7m) Brown Ash

Source:

Lakeside Developments Te Kauwhata

Notes:

i. Field sample received in its natural state.

ii. Sample taken by P.Kelsley of Earthtech Consulting Ltd by an unknown method.

iii. Sampling of soil is not covered by this report.

for STEVENSON CONSTRUCTION MATERIALS LTD

T A WHITMORE IANZ APPROVED SIGNATORY



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

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

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

CALIFORNIAN BEARING RATIO

		Result
Compaction effort		NZ Standard Compaction
Sample condition		Soaked
Surcharge mass	(kg)	6.7
Period of Soaking	(Days)	4
Compacted dry density	(t/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%

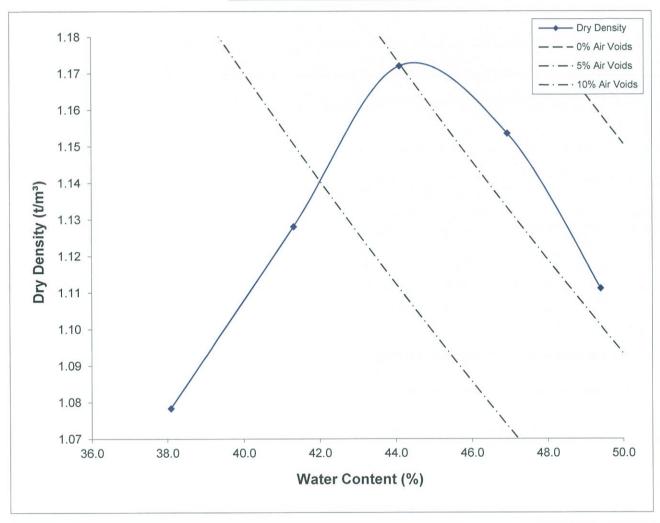
- i. Negative Swell implies shrinkage.
- ii. Test performed on material passing the 19.0mm Test Sieve (100%).

Material: TP203 (0.3 – 1.0 & 1.0 to 1.7m) Brown Ash

Source: Lakeside Developments Te Kauwhata Date Sampled: 8th November 2017

Job: Lakeside Developments Reference No.: 4036

NZ STANDARD COMPACTION



Maximum Dry	Optimum Water	Solid Density	Natural
Density	Content	Measured	Water Content
(t/m³)	(%)	t/m³	%
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

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



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

Page 1 of 2 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address:

PO Box 721

PUKEKOHE 2340

Attention:

Philip Kelsey

Reference:

No. 4036

Subject:

SOIL TESTING

Clients Instructions:

Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test

2.1: Determination of the Water Content4.1.1: 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





Private Bag 94000, Manukau City, Auckland 2241 www.stevenson.co.nz

Test Number:

172770

Report Number:

28877T

Date of Issue:

30th November 2017

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address:

PO Box 721

PUKEKOHE 2340

Attention:

Philip Kelsey

Reference:

No. 4036

Subject:

SOIL TESTING

Clients Instructions:

Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test

2.1: Determination of the Water Content

2.2: Determination of Liquid Limit2.3: Determination of Plastic Limit

2.4: Determination of Plasticity Index2.6: 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





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

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

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

CALIFORNIAN BEARING RATIO

		Resulf
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%

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

Material: Source: TP204 (1.0 - 2.0 & 2.0 to 3.0m) Puketoka Silt/Clay

Source: Lakeside D Job: Lakeside D

Lakeside Developments Te Kauwhata

Lakeside Developments

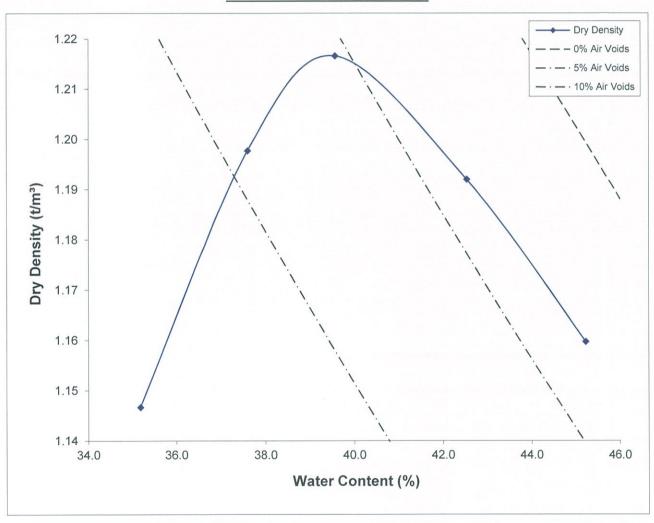
Test No.: 172770

Date Sampled: 7th N

7th November 2017

Reference No.: 4036

NZ STANDARD COMPACTION



Maximum Dry	Optimum Water	Solid Density	Natural
Density (t/m³)	Content (%)	Measured t/m³	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

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



Private Bag 94000, Manukau City, Auckland 2241 www.stevenson.co.nz

Test Number:

172772

Report Number:

28858T

Date of Issue:

28th November 2017

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address:

PO Box 721

PUKEKOHE 2340

Attention:

Philip Kelsey

Reference:

No. 4036

Subject:

SOIL TESTING

Clients Instructions:

Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test

2.1: Determination of the Water Content

2.7.2: Determination of the Solid Density of Soil Particles

4.1.1: Dry Density/Water Content Relationship

- NZ Standard Compaction

6.1.1: Determination of the California Bearing Ratio

2. NZ Geotechnical Society, Guideline

Determining the Shear Strength of a Cohesive Soil using a Hand Held

Shear Vane

Date Sampled:

8th November 2017

Date Received:

10th November 2017

Date of Test:

November 2017

Description of Sample:

TP205 (2.3 - 3.3 & 3.3 - 4.3m), Puketoka Sand

Source:

Lakeside Developments Te Kauwhata

Notes:

i. Field sample received in its natural state.

ii. Sample taken by P.Kelsley of Earthtech Consulting Ltd by an unknown method.

iii. Sampling of soil is not covered by this report.

for STEVENSON CONSTRUCTION MATERIALS LTD

T A WHITMORE

IANZ APPROVED SIGNATORY



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

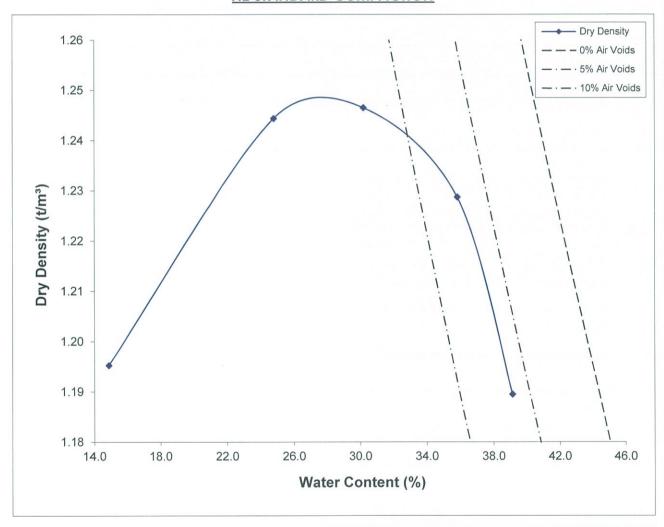
CALIFORNIAN BEARING RATIO

		Result
Compaction effort		NZ Standard Compaction
Sample condition		Soaked
Surcharge mass	(kg)	6.7
Period of Soaking	(Days)	4
Compacted dry density	(†/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%

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

Material:TP205 (2.3 – 3.3 & 3.3 – 4.3m), Puketoka SandTest No.:172772Source:Lakeside Developments Te KauwhataDate Sampled:8th November 2017Job:Lakeside DevelopmentsReference No.:4036

NZ STANDARD COMPACTION



Maximum Dry	Optimum Water	Solid Density	Natural
Density	Content	Measured	Water Content
(t/m³)	(%)	(t/m³)	%
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

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



Private Bag 94000, Manukau City, Auckland 2241 www.stevenson.co.nz

Test Number:

172773

Report Number:

28856T

Date of Issue:

23rd November 2017

Page 1 of 2 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address:

PO Box 721

PUKEKOHE 2340

Attention:

Philip Kelsey

Reference:

No. 4036

Subject:

SOIL TESTING

Clients Instructions:

Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test

2.1: Determination of the Water Content4.1.1: 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



TP 205 (4.8 – 5.5m) Puketoka Silt (Sensitive) Material: Source:

Lakeside Developments Te Kauwhata

Lakeside Developments

Job:

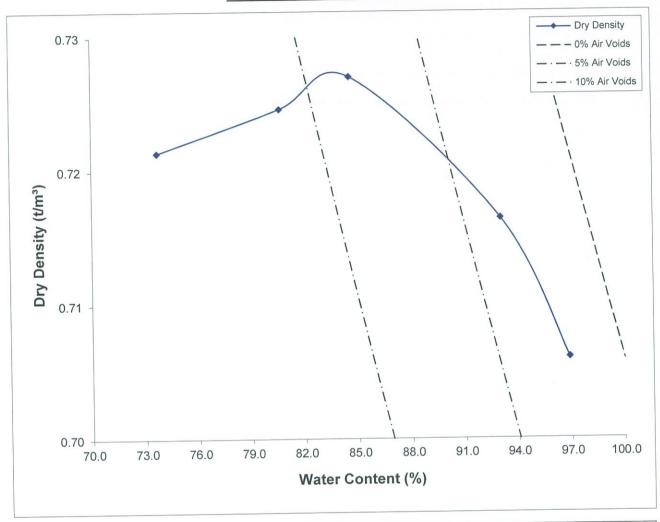
172773 Test No.:

Date Sampled:

8th November 2017

4036 Reference No.:

NZ STANDARD COMPACTION



Maximum Dry Density (t/m³)	Optimum Water	Solid Density	Natural
	Content	Assumed	Water Content
	(%)	t/m³	%
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 Streng	jth (kPa)	12	27	24	3	0

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



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

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address:

PO Box 721

PUKEKOHE 2340

Attention:

Philip Kelsey

Reference:

No. 4036

Subject:

SOIL TESTING

Clients Instructions:

Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test

2.1: Determination of the Water Content4.1.1: 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



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%

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

Material:

TP206 (0.3 – 1.5 & 1.5 – 3.0m), Puketoka Silt & Sand

Test No.:

172774

Source: Job: Lakeside Developments Te Kauwhata

Lakeside Developments

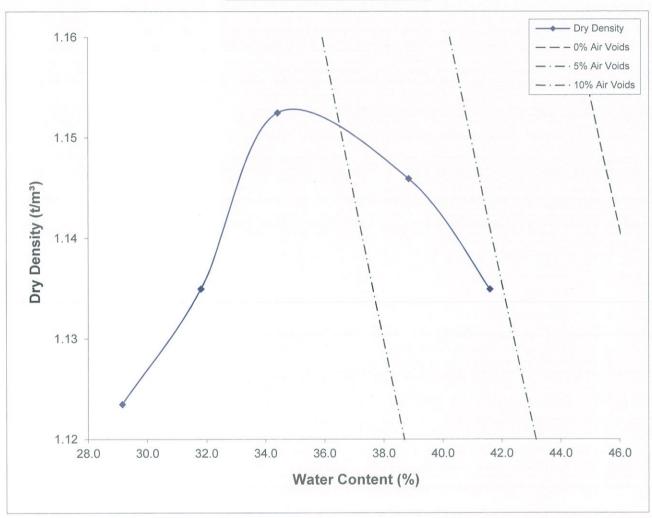
Date Sampled:

7th November 2017

Reference No.:

4036

NZ STANDARD COMPACTION



Maximum Dry	Optimum Water	Solid Density	Natural
Density	Content	Assumed	Water Content
(t/m³)	(%)	t/m³	%
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

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



Private Bag 94000, Manukau City, Auckland 2241 www.stevenson.co.nz

Test Number:

172775

Report Number:

28860T

Date of Issue:

28th November 2017

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address:

PO Box 721

PUKEKOHE 2340

Attention:

Philip Kelsey

Reference:

No. 4036

Subject:

SOIL TESTING

Clients Instructions:

Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test

2.1: Determination of the Water Content

2.7.2: Determination of the Solid Density of Soil Particles

4.1.1: Dry Density/Water Content Relationship

- NZ Standard Compaction

6.1.1: Determination of the California Bearing Ratio

2. NZ Geotechnical Society, Guideline

Determining the Shear Strength of a Cohesive Soil using a Hand Held

Shear Vane

Date Sampled:

7th November 2017

Date Received:

10th November 2017

Date of Test:

November 2017

Description of Sample:

TP206 (4.0 - 5.0 & 5.0 - 5.6m), Puketoka Sand

Source:

Lakeside Developments Te Kauwhata

Notes:

i. Field sample received in its natural state.

ii. Sample taken by P.Kelsley of Earthtech Consulting Ltd by an unknown method.

iii. Sampling of soil is not covered by this report.

for STEVENSON CONSTRUCTION MATERIALS LTD

T A WHITMORE

IANZ APPROVED SIGNATORY



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

CALIFORNIAN BEARING RATIO

		Result
Compaction effort		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)]
Depth CBR recorded	(mm)	5.0
California Bearing Ratio	CBR	18%

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

Material:

TP206 (4.0 – 5.0 & 5.0 – 5.6m), Puketoka Sand

Source:

Lakeside Developments Te Kauwhata

Job: Lakeside Developments

Test No.:

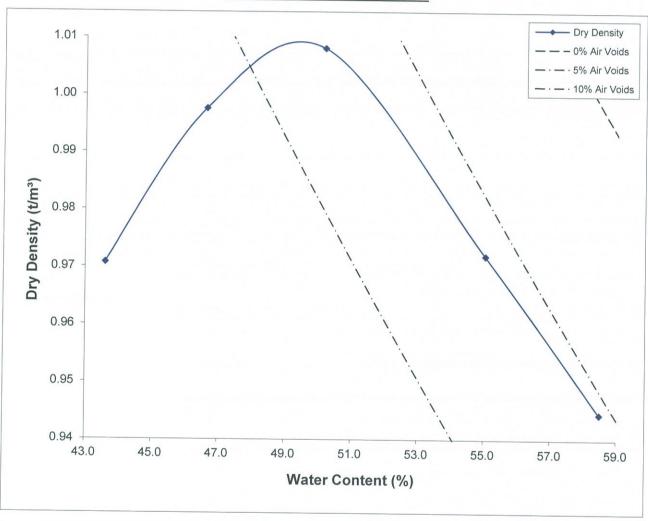
172775

Date Sampled:

7th November 2017

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

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



Private Bag 94000, Manukau City, Auckland 2241 www.stevenson.co.nz

Test Number:

172776

Report Number:

28878T

Date of Issue:

30th November 2017

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address:

PO Box 721

PUKEKOHE 2340

Attention:

Philip Kelsey

Reference:

No. 4036

Subject:

SOIL TESTING

Clients Instructions:

Conduct the tests as detailed below on the soil sample received.

Test Methods:

- 1. NZS4402: 1986:Test
 - 2.1: Determination of the Water Content
 - 2.2: Determination of Liquid Limit
 - 2.3: Determination of Plastic Limit
 - 2.4: Determination of Plasticity Index
 - 2.6: Determination of Linear Shrinkage2.7.2: 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



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

TEST METHOD	RESULT	SPECIFICATION
Liquid Limit	76	<u>-</u>
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%

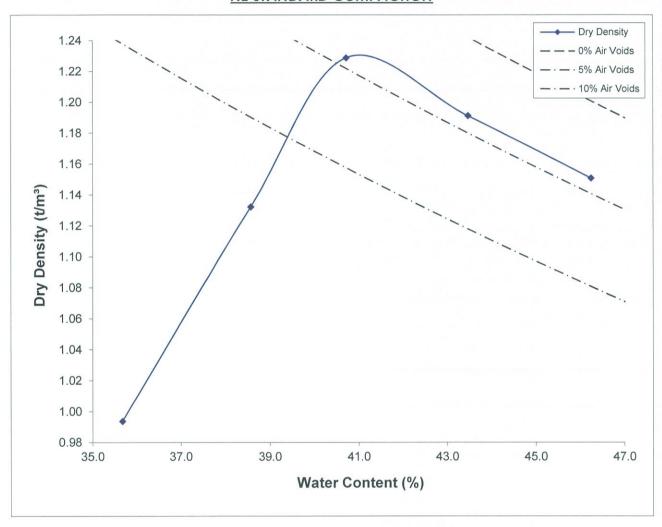
- i. Negative Swell implies shrinkage.
- ii. Test performed on material passing the 19.0mm Test Sieve (100%).

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: Reference No.: 4036

NZ STANDARD COMPACTION



Maximum Dry Density (t/m³)	Density Content		Natural Water Content	
	` '	t/m³ 2.70	15.1	
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

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



Private Bag 94000, Manukau City, Auckland 2241 www.stevenson.co.nz

Test Number:

172777

Report Number:

28861T

Date of Issue:

28th November 2017

Page 1 of 3 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address:

PO Box 721

PUKEKOHE 2340

Attention:

Philip Kelsey

Reference:

No. 4036

Subject:

SOIL TESTING

Clients Instructions:

Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test

2.1: Determination of the Water Content

2.7.2: Determination of the Solid Density of Soil Particles

4.1.1: Dry Density/Water Content Relationship

- NZ Standard Compaction

6.1.1: Determination of the California Bearing Ratio

2. NZ Geotechnical Society, Guideline

Determining the Shear Strength of a Cohesive Soil using a Hand Held

Shear Vane

Date Sampled:

7th November 2017

Date Received:

10th November 2017

Date of Test:

November 2017

Description of Sample:

TP208 (2.5 - 3.6 & 3.6 - 4.6m), Puketoka Silt/Clay

Source:

Lakeside Developments Te Kauwhata

Notes:

i. Field sample received in its natural state.

ii. Sample taken by P.Kelsley of Earthtech Consulting Ltd by an unknown method.

iii. Sampling of soil is not covered by this report.

for STEVENSON CONSTRUCTION MATERIALS LTD

T A WHITMORE

IANZ APPROVED SIGNATORY



TEST RESULTS

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

CALIFORNIAN BEARING RATIO

		Result
Compaction effort		NZ Standard Compaction
Sample condition		Soaked
Surcharge mass	(kg)	6.7
Period of Soaking	(Days)	4
Compacted dry density	(t/m³)	1.00
Compacted water content	(%)	51.8
Soaked water content	(%)	57.2
Swell	(%)	0.2
Rate of penetration	(mm/min)	7
Depth CBR recorded	(mm)	2.5 & 5.0
California Bearing Ratio	CBR	1%

Notes:

- i. ii.
- Negative Swell implies shrinkage. 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

Lakeside Developments Te Kauwhata

Lakeside Developments

Source:

Job:

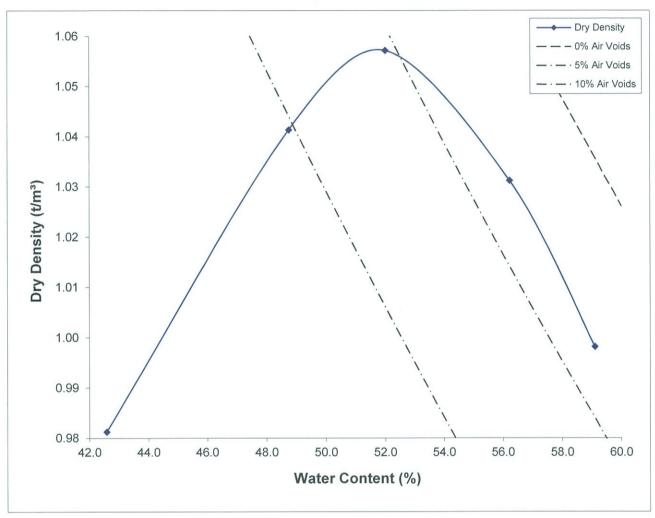
Test No.: 172777

7th November 2017

Reference No.: 4036

Date Sampled:

NZ STANDARD COMPACTION



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

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

Page 1 of 2 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address:

PO Box 721

PUKEKOHE 2340

Attention:

Philip Kelsey

Reference:

No. 4036

Subject:

SOIL TESTING

Clients Instructions:

Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test

2.1: Determination of the Water Content4.1.1: 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



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

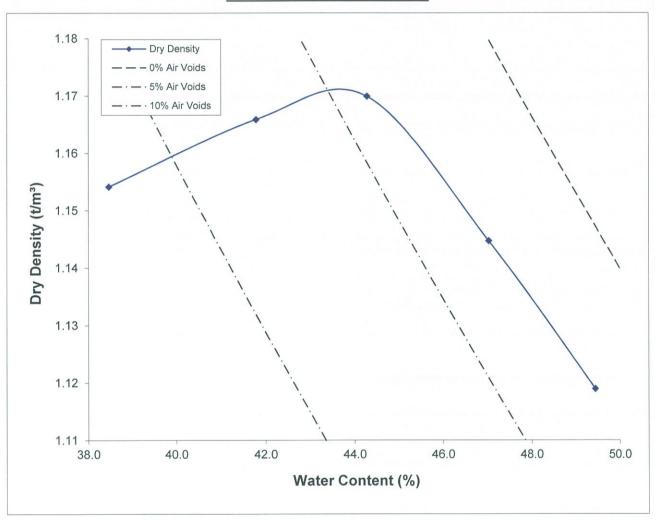
TEST RESULTS

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	Optimum Water	Solid Density	Natural
Density	Content	Assumed	Water Content
(t/m³)	(%)	t/m³	%
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 Streng	th (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 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

Page 1 of 2 Pages

FINAL REPORT FOR EARTHTECH CONSULTING LTD

Clients Address:

PO Box 721

PUKEKOHE 2340

Attention:

Philip Kelsey

Reference:

No. 4036

Subject:

SOIL TESTING

Clients Instructions:

Conduct the tests as detailed below on the soil sample received.

Test Methods:

1. NZS4402: 1986:Test

2.1: Determination of the Water Content

2.7.2: Determination of the Solid Density of Soil Particles

4.1.1: Dry Density/Water Content Relationship

- NZ Standard Compaction

2. NZ Geotechnical Society, Guideline

Determining the Shear Strength of a Cohesive Soil using a Hand Held

Shear Vane

Date Sampled:

9th November 2017

Date Received:

10th November 2017

Date of Test:

November 2017

Description of Sample:

TP212 (1.7 - 2.7 & 2.7 - 3.7m), Puketoka Sand

Source:

Lakeside Developments Te Kauwhata

Notes:

i. Field sample received in its natural state.

ii. Sample taken by P.Kelsey of Earthtech Consulting Ltd by an unknown method.

iii. Sampling of soil is not covered by this report.

for STEVENSON CONSTRUCTION MATERIALS LTD

T A WHITMORE

IANZ APPROVED SIGNATORY



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

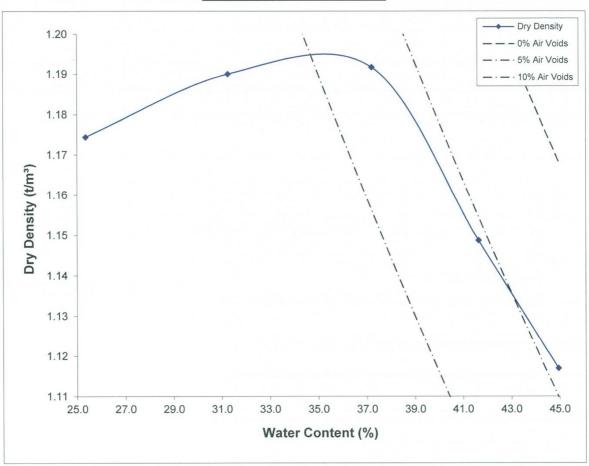
TEST RESULTS

Material: TP212 (1.7 – 2.7 & 2.7 – 3.7m), Puketoka Sand Test No.: 172780

Source: Lakeside Developments Te Kauwhata Date Sampled: 9th November 2017

Job: Lakeside Developments Reference No.: 4036

NZ STANDARD COMPACTION



Maximum Dry	Optimum Water	Solid Density	Natural
Density	Content	Measured	Water Content
(t/m³)	(%)	t/m³	%
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



Project:

Lakeside Developments

Location:

Lakeside Developments

Client:

CMW (NZ) Limited

Contractor:

-

Sampled by:
Date sampled:

Client Unknown

Sampling method:

Bulk Sample (as received)

Sampling method:
Sample description:

SILT with some clay

Sample condition:

As received

Solid density:

2.60 1

t/m³ (Tested)

Project No: 2-68014.00

Lab Ref No:

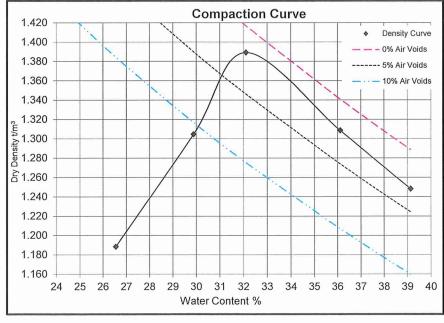
HA3889 1 MDD

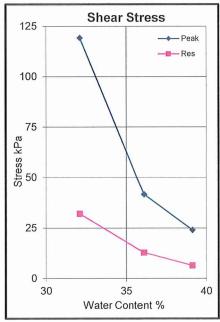
Source:

S01 (Stage 1 Bulk Fill)

Client Ref No: HAM2018-0106

Test Results								
Maximum dry den	sity	1.39	t/m³		Natural wate	r content	32.1	%
Optimum water co	ntent	32	%	Fraction tested 10		ed 100	00% 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	Stiff	Stiff	Firm	Soft	Very Soft	
•		Dry	Dry	Dry-Moist	Moist	Moist	Wet	
Peak stress	kPa	Refusal	Refusal	Refusal	119	42	24	
Remoulded stress	kPa	Refusal	Refusal	Refusal	32	13	6	





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

Date tested:

30/01/19

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date reported:

04/02/19

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IANZ Approved Signatory

Designation: Senior Civil Engineering Technician

Date:

04/02/19

ACCREDITED LABORATORY

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

PF-LAB-025 (19/03/2018)

Page 1 of 1

DRY DENSITY / WATER CONTENT RELATIONSHIP STANDARD COMPACTION



Project:

Lakeside

Location:

Lakeside

Client:

CMW (NZ) Limited

Contractor:

_

Sampled by:

Client

Date sampled:

Unknown

Sampling method:

Bulk Sample (As received)

Sample description:

CLAY (Ash mix)

Sample condition:

As received

S02 Stage 1 fill

Solid density:

Source:

2.72

t/m³ (Tested)

Project No:

2-68014.00

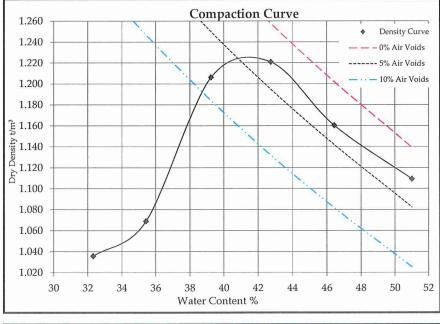
Lab Ref No:

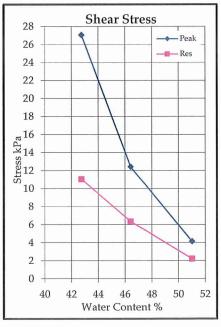
HA4413 MDD

Client Ref No:

HAM2018-0106

			T	est Results				
Maximum dry den	sity	1.22	t/m³		Natural water	content	42.7	%
Optimum water co	ontent	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	V.Stiff	Stiff	Firm	Soft	Soft	
		Dry	Dry - Moist	Moist	Moist	Moist	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 usir	g a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001		

Date tested:
Date reported:

16/05/19

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

20/05/19 • This report may only be reproduced in full

IANZ Approved Signatory

Designation:

Senior Civil Engineering Technician

Date:

20/05/19

ACCREDITED LABORATORY

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

PF-LAB-025 (19/03/2018)

Page 1 of 1

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

Lab Ref No:

HA5292

Test Results

Location ID:

Stockpile

Sample Depth (m):

Unknown

Soil Fraction Tested:

Whole

Sample History:

Natural

Solid Particle Density (t/m³):

2.72

Sample Description:

CLAY

Test Methods

Notes

Solid Density:

NZS 4402:1986 Test 2.7.2

Date tested:

22/11/19

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date reported: 25/11/19

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IANZ Approved Signatory

Designation:

Senior Civil Engineering Technician

Date:

25/11/19

ACCREDITED LABORATORY

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PF-LAB-004 (10/19)

Page 1 of 1

WSP Opus

Hamilton Laboratory

Quality Management Systems Certified to ISO 9001

Fox Street

Private Bag 3057, Waikato Mail Centre,

Hamilton 3240, New Zealand

Website

Telephone +64 7 856 2870

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

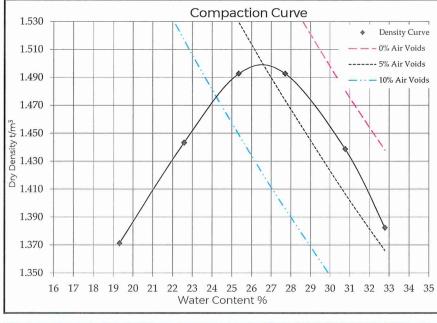
Solid density: 2.72 t/m³ (Tested) Lal

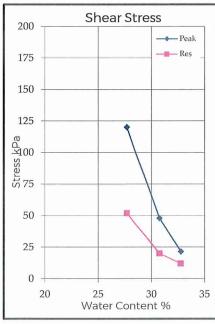
Source: Wards Quarry
Stage 1A Imported Material

Project No:	2-68014.00
Lab Ref No:	HA5292_MDD

Client Ref No: HAM2019-0062

			J	est Results				
Maximum dry der	nsity	1.50	t/m³		Natural wat	er content	25.3	%
Optimum water c	ontent	26.5	%		Fraction tes	ted All Pa	assing 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	V. Stiff	Stiff	Firm	Soft	V. Soft	
		Moist	Moist	Moist	Moist	Moist	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 usi	ng a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001	a

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



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

PF-LAB-025 (02/09/2019)

Page 1 of 1

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

Stage 1A Imported Material

Project No : 2-68014.00

Lab Ref No : HA5333_PI

Client Ref No : HAM2019-0062

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

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date reported: 09/12/19

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IANZ Approved Signatory

Designation :

Senior Civil Engineering Technician

Date:

09/12/19

ACCREDITED LABORATORY

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

LHF 2440 (10/19)

Page 1 of 1

LINEAR SHRINKAGE FOR SOILS TEST REPORT



HAM2019-0062

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

Stage 1A Imported Material

Project No : 2-68014.00 Lab Ref No : HA5333_LS

Client Ref No:

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

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date reported: 09/12/19

This report may only be reproduced in full

IANZ Approved Signatory

Designation :

Senior Civil Engineering Technician

Date:

09/12/19

ACCREDITED LABORATORY

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

LHF 2403B (10/19)

Page 1 of 1

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 CONDITION RECEIVED NZS4407:2015, Section 2.4.6.3.2 Natural SAMPLE DATE DATE RECEIVED 22/8/2019 22/8/2019

SAMPLED BY SAMPLE ID Georgia Robinson AKL19-2912 SAMPLED FROM **REPORT ID** WA Pukekawa Quarry 118114

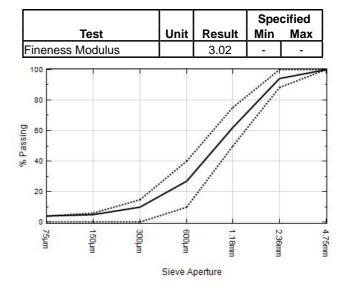
TEST METHODS

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

TEST RESULTS

Sieve Analysis NZS3111:1986 test 6

	SIEVE ANALYSI	S						
Sieve	%	Spe	cified					
Aperture	Passing	Min	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					
75um	4							



COMMENTS

This report may not be reproduced except in full.

Approved By:

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

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

Page 1 of 1

Appendix D: Subdivision Earthworks Specification



17 October 2018 Document Ref: HAM2018-0106AB Rev 1

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

1 INTRODUCTION AND SCOPE

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

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

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

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

2 RELEVANT DOCUMENTS

2.1 Standards, Guidelines and Consents

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

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

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

3 GEOTECHNICAL OBSERVATION REQUIREMENTS

3.1 Fill Materials and Conditioning

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

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

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

3.1.2 Blending of Unsuitable Material to Create Acceptable Fill

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

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

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

3.1.3 Material Conditioning

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

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

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

3.2 Fill Placement, Compaction and Testing Requirements

3.2.1 Site Won Cohesive Fill

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

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

CMW Geosciences

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 Ge	otechnical Engineer in case by case basis									

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

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 1000m³ to 1500m³ 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 1000m³ to 1500m³ 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 E	Engineer of case by ca	se 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
i iii i ype	Maximum Single Value	Minimum	Minimum
General Fill (Granular)	20%	95% MDD	5 blows per 100mm penetration

CMW Geosciences Ref. HAM2018-0106AB REV 1

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

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

Test	Frequency
Nuclear Densometer (NDM) OR Density Tube	Minimum 1 test per 1,000m³ to 1500m³ (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 1,000m³ to 1500m³ (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 1,000m³ of filling to 1500m³ (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.

CMW Geosciences Ref. HAM2018-0106AB REV 1

⁽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.

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;
- 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.

CMW Geosciences

Appendix E: Earth Fill Quality Control Data



Project:

Location:

Report No:

Client:

Report Date:

Client Address:

Project No:

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

Test Methods:

Notes:

Assumed

Page:

1 of 19

98 Scott Road, Te Kauwhata. HAM2018-0106LAA Rev.0

Lakeside Developments (2017) Limited

Lakeside Development

HAM2018-0106

15/05/2019

NZS 4402.2.1:1986 NZS 4407.4.2.2:2015

Testing Locations Selected By:

1 Blade size of 19mm used.

CMW Field Staff

NZGS:August 2001

GS:August 2001

ACCREDITED LABORATORY

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

Solid Density:

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

Client Reference:															ACCRE	DITED LABOR	RATORY labor	atory's accred	itation		
		Test Location*			Van	e ID		n-situ Va	ne Shea	r Strengt	hs				Field and	Laboratory T	esting Data				
Date Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #	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 (%)	Comments
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

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 Created By:
 JLM
 Date: 19/10/2018

 Checked By:
 JLM
 Date: 10/05/2019

Authorised Signatory: AC Date: 30/05/2019

** 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.



Lakeside Development

98 Scott Road, Te Kauwhata.

Lakeside Developments (2017) Limited

HAM2018-0106LAB Rev.0

HAM2018-0106

Project:

Project No:

Location:

Client:

Report No:

Report Date:

Client Address:

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

Test Methods: NZS 4402.2.1:1986

Notes: Solid Density:

Assumed

NZS 4407.4.2.2:2015 NZGS:August 2001

Testing Locations Selected By:

CMW Field Staff

1 Blade size of 19mm used

ACCREDITED LABORATORY

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

Measurements marked $\ensuremath{^*}$ are not accredited and are outside the scope of the laboratories accreditation

Client Reference:									AUTEUTED EADORATORT												
		Test Location*			Vane	: ID	In	ı-situ Va	ne Shear	Strength	ıs				Field and	Laboratory Te	esting Data				
Date Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #	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 Probe Depth (mm)		Solid Density (t/m³) *	Oven Dry Density (t/m³)	Calculated Air Voids (%)	Comments
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			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			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			300	55.7	2.62	1.08		
	N54	Refer to Fill Test Location Plan	20.3	CLAY	2087	2087	UTP	UTP	UTP	UTP	UTP	1.70	1.15	47.2	1	300	46.7	2.62	1.16	2	

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

12/12/2018 Created By: JLM Date: Checked By: JLM Date: 10/05/2019 Authorised Signatory: AC Date: 30/05/2019

Page: 2 of 19



Lakeside Development

98 Scott Road, Te Kauwhata.

Lakeside Developments (2017) Limited

HAM2018-0106LAC Rev.0

HAM2018-0106

15/05/2019

Project:

Project No:

Location:

Client:

Report No:

Report Date:

Client Address:

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

Test Methods:

Notes: NZS 4402.2.1:1986 Solid Density:

Testing Locations Selected By:

Assumed CMW Field Staff

NZS 4407.4.2.2:2015 NZGS:August 2001

1 Blade size of 19mm used.

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

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

Client Referen	ent Reference:																				
		Test Location*			Van	e ID		In-situ Va	ane Shea	r Strengtl	hs				Field and	Laboratory Te	sting Data				
Date Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #	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 (%) *	Comments
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	

Created By: RP Date: 04/01/2019 Checked By: JLM Date: 15/01/2019 Authorised Signatory: AC Date: 30/05/2019

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Lakeside Development

98 Scott Road, Te Kauwhata

Lakeside Developments (2017) Limited

HAM2018-0106LAD Rev.0

HAM2018-0106

15/05/2019

Project:

Project No:

Location:

Client:

Report No:

Report Date:

Client Address:

Client Reference:

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

1911

1911

1911

1911

1911

1911 UTP

1911 UTP

1911 UTP

1911 UTP

1911 108 204+

UTP

UTP

189

204+

UTP

UTP

UTP

131

145

UTP

UTP

UTP

204+

189

204+

UTP

UTP

175+

162+

1.76

1.66

1.71

1.81

1.69

1.27

1.17

1.13

1.31

1.16

38.9

42.1

51.8

38.4

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

Test Methods:

Notes:

Assumed

NZS 4402.2.1:1986 NZS 4407.4.2.2:2015

Solid Density: Testing Locations Selected By:

CMW Field Staff

NZGS:August 2001 1 Blade size of 19mm used.

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

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

		Test Location*			Van	e ID		In-situ Va	ane Shea	r Strengt	hs				Field and	Laboratory Te	sting Data				
Date Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #	Test 1 (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 (%)	Comments
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	

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Refer to Fill Test Location Plan

N98

N99

N100

N102

25/01/2019 N101

300 ** 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.

300

300

300

300

35.9

32.4

59.9

45.7

43.0

2.70

2.70

2.70

2.70

2.70

1.30

1.26

1.06

1.24

1.18

Created By: JLM Date: 17/01/2019 Checked By: JLM Date: 14/05/2019 Authorised Signatory: AC Date: 30/05/2019

5.4

13.9

14.0

5.2

4.9

CLAY

CLAY

CLAY

CLAY

CLAY

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13 See N131 for retest

-3



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

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:

Project:

Client Reference:

Test Methods:

NZS 4402.2.1:1986 Solid Density: NZS 4407.4.2.2:2015 Testing Locations Selecte Assumed CMW Field Staff

NZS 4407.4.2.2:2015 Testing Locations Selected By:
NZGS:August 2001 ① Blade size of 19mm used.

Notes:

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

Page:

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		Test Location*			Van	ne ID		In-situ V	ane Shea	r Strengt	hs				Field and	Laboratory To	esting Data				
Date Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #	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 (%) *	Comments
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	C	300	33.2	2.62	1.38	2	
	N119	Refer to Fill Test Location Plan	5.5	Clayey SILT	2349	2349	UTP	UTP	UTP	UTP	UTP	1.80	1.34	34.2	3	300	36.3	2.62	1.32	2	
	N120	Refer to Fill Test Location Plan	4.1	Clayey SILT	2349	2349	143	UTP	169	UTP	156+	1.78	1.35	31.5	6	300	34.5	2.62	1.32	4	
	N121	Refer to Fill Test Location Plan	4.7	Clayey SILT	2349	2349	UTP	UTP	UTP	UTP	UTP	1.84	1.38	33.0	1	300	30.7	2.62	1.40	3	
	N122	Refer to Fill Test Location Plan	3.6	SILT	2349	2349	UTP	UTP	UTP	UTP	UTP	1.65	1.23	34.6	11	300	36.0	2.62	1.22	10	
	N123	Refer to Fill Test Location Plan	3.7	CLAY	2349	2349	UTP	UTP	UTP	UTP	UTP	1.74	1.25	39.9	3	300	34.5	2.62	1.30	6	
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 Created By: JLM
 Date:
 1/02/2019

 Checked By: JLM
 Date:
 14/05/2019

 Authorised Signatory:
 AC
 Date:
 30/05/2019

** 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.



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

Solid Density: Assumed Testing Locations Selected By: CMW Field Staff

NZGS:August 2001 1 Blade size of 19mm used.

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

Notes:

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

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Page:

		Test Location*			Van	ie ID	ı	n-situ Va	ne Shear	Strengtl	ıs				Field and	Laboratory To	esting Data				
Date Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #	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 (%)	Comments
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	
This report sh	nould only	be reproduced in full.										** Gauge Wet I	Densities outside	of the calibrate	d range of 1.72	l 8 to 2.756 t/m³ a	re not accredite	d and are outsid	de the laboratori	es scope of accre	ditation.

Created By: JLM 12/02/2019 Date: Checked By: JLM 14/05/2019 Date: Authorised Signatory: AC Date: 30/05/2019



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: Notes:

NZS 4402.2.1:1986 Solid Density: NZS 4407.4.2.2:2015

CMW Field Staff Testing Locations Selected By:

NZGS:August 2001 1 Blade size of 19mm used.



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

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

Assumed

		Test Location*			Van	e ID	lı	n-situ Va	ne Shea	Strengt	hs				Field and	l Laboratory T	esting Data				
Date Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #	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 (%) *	Comments
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	
This report sh	nould only b	e reproduced in full.		•								** Gauge Wet D	ensities outside	of the calibrate	d range of 1.72	8 to 2.756 t/m ³	are not accredited	d and are outsid	le the laboratori	es scope of accre	ditation.

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

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Hamilton Laboratory

Test Methods:

NZS 4402.2.1:1986

NZGS:August 2001

NZS 4407.4.2.2:2015

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

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

Notes:

Solid Density:

Testing Locations Selected By:

(1) Blade size of 19mm used.

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

Assumed

CMW Field Staff

Client Referen	ce:														ACCR	EDITED LABOR	AIORI				
		Test Location*		<u> </u>	Van	ie ID		In-situ Va	ne Shea	Strength	ıs				Field an	nd Laboratory T	esting Data				1
Date Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #	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 (%)			Solid Density (t/m³) *	Oven Dry Density (t/m³)	Calculated Air Voids (%)	Comments
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	1	0 300	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

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

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

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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 Solid Density:

NZS 4407.4.2.2:2015

Testing Locations Selected By:

Assumed CMW Field Staff

NZGS:August 2001

Blade size of 19mm used.

Notes:

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

		Test Location*			Van	e ID		n-situ Va	ne Shear	Strength	ıs				Field and	d Laboratory Te	sting Data				
e Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #	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)		Solid Density (t/m³) *	Oven Dry Density (t/m³)	Calculated Air Voids (%)	Comments
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
3/03/2019	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	C	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
5/03/2019	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	
1/03/2019	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

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 JLM
 Date:
 12/03/2019

 Checked By:
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 Date:
 15/05/2019

 Authorised Signatory:
 AC
 Date:
 30/05/2019

9 of 19



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

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 Solid Density: Testing Locations Selected By:

Assumed CMW Field Staff

① Blade size of 19mm used.

ACCREDITED LABORATORY

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

Notes:

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

		Test Location*			Var	ne ID	I	n-situ Va	ne Shear	Strength	IS				Field and	Laboratory To	esting Data				
Date Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #	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 (%) *	Comments
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	
1	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	
1	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	
1	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	
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	
1	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	
1	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	
1	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	
1	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
1	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	
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	
1	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	
Th. 1	N266	Refer to Fill Test Location Plan	-	CLAY	2349	2349	149	175	UTP	UTP	162+	1.76	1.26			300	43.0	2.70	1.22	2	

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

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 JLM
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 Date:
 15/05/2019

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 Date:
 30/05/2019

Page: 10 of 19



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 Solid Density:

Assumed NZS 4407.4.2.2:2015 Testing Locations Selected By: CMW Field Staff

NZGS:August 2001 1 Blade size of 19mm used.



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

Notes:

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

		Test Location*			Van	ie ID	I	n-situ Va	ne Sheai	Strengtl	ıs				Field and	Laboratory Te	esting Data				
Date Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #	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 (%)	Probe Denth	Oven Water Content (%)	Solid Density (t/m³) *	Oven Dry Density (t/m³)	Calculated Air Voids (%) *	Comments
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	
				1																	

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

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

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Project:

Project No:

Location:

Report No:

Client:

Report Date:

Client Address:

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

Hamilton Laboratory

CMW Geosciences (NZ) Ltd Partnership

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Test Methods:

Notes:

Solid Density:

Assumed

98 Scott Road, Te Kauwhata. HAM2018-0106LAL Rev.0

Lakeside Developments (2017) Limited

Lakeside Development

HAM2018-0106

15/05/2019

NZS 4402.2.1:1986 NZS 4407.4.2.2:2015

Testing Locations Selected By:

① Blade size of 19mm used.

CMW Field Staff

NZGS:August 2001

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

Client Referer	nce:														ACCRED	ITED LABORA	TORY laborat	ory's accreditat	tion		
		Test Location*			Van	e ID	ı	n-situ Va	ne Shear	Strengt	hs				Field and	Laboratory T	esting Data			•	
Date Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #	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 (%)	Comments
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		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			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			300		2.70	1.26		Retest of N303
	N317	Refer to Fill Test Location Plan	-	CLAY	1785	1785		116	145	228	171	1.60	1.12			300		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				300	33.7	2.70	1.32	6	

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

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 JLM
 Date:
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 Date:
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 Authorised Signatory:
 AC
 Date:
 30/05/2019

Page: 12 of 19



Project:

Project No:

Location:

Client:

Report No:

Report Date:

Client Address:

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

Test Methods:

Notes:

Assumed

HAM2018-0106 98 Scott Road, Te Kauwhata. HAM2018-0106LAM Rev.0

Lakeside Developments (2017) Limited

15/05/2019

Lakeside Development

NZS 4402.2.1:1986 NZS 4407.4.2.2:2015

Testing Locations Selected By:

CMW Field Staff

NZGS:August 2001

(1) Blade size of 19mm used.

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

Solid Density:

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

Client Referer	ice:														ACCRED	ITED LABORA	TORY	org a accretina	ition .		
		Test Location*			Van	e ID	ı	n-situ Va	ne Shear	Strengtl	ıs				Field and	Laboratory Te	sting Data				
Date Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #			Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Voids (%)	Gauge Probe Depth (mm)		Solid Density (t/m³) *	Oven Dry Density (t/m³)	Calculated Air Voids (%)	Comments
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	

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

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

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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

NZS 4407.4.2.2:2015

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:

Test Methods:

NZS 4402.2.1:1986 Solid Density:

Testing Locations Selected By:

Assumed CMW Field Staff

NZGS:August 2001 (1) Blade size of 19mm used.

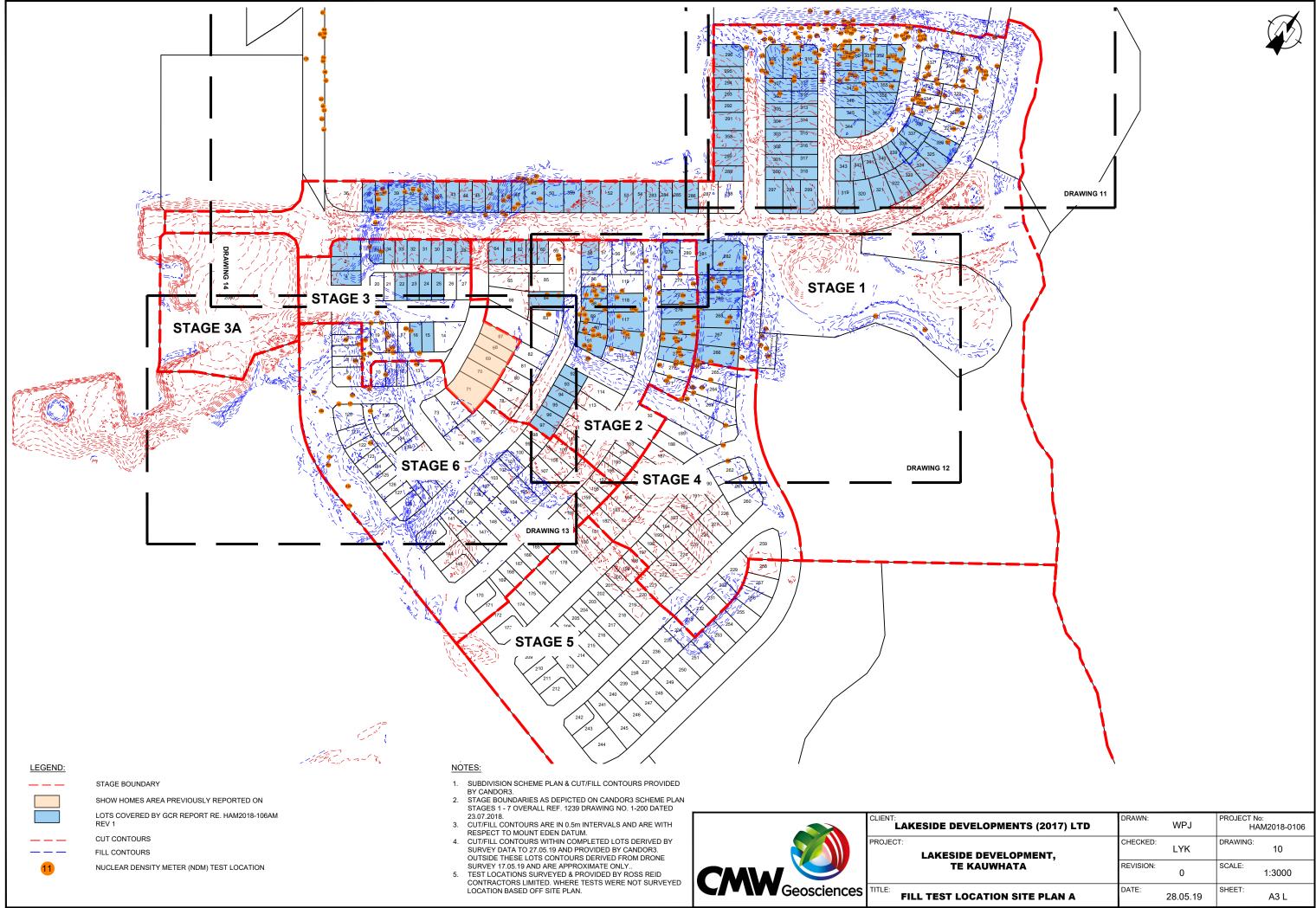
Tests indicated as not accredited are outside the scope of the laboratory's accreditation

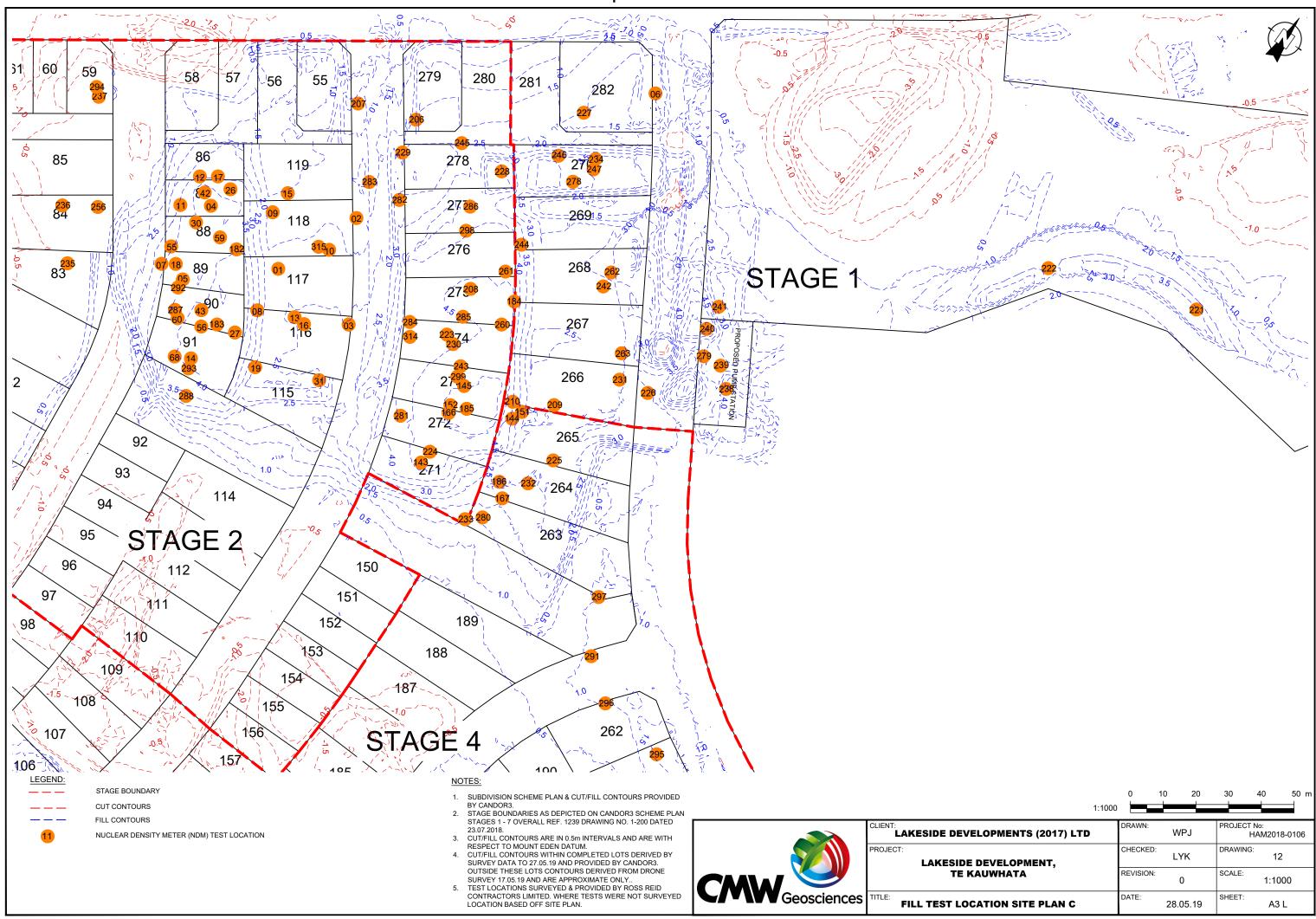
Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

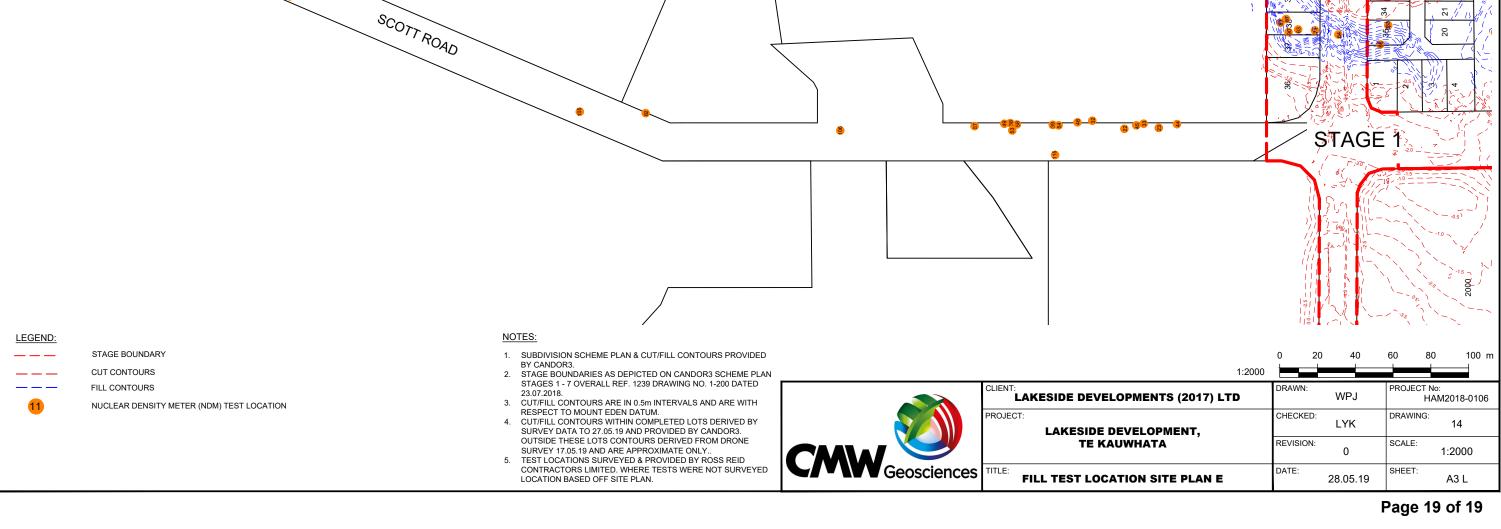
Client Refere	nce:														ACCREE	ITED LABORA	TORY INDUITE	itory's accredit	acion		
		Test Location*			Van	e ID	ı	n-situ Va	ne Shea	r Strengt	hs				Field and	Laboratory Te	esting Data				
Date Sampled	Sample No.	Location	RL	Soil Description*	Head #	Blade #		Test 2 (kPa)			Ave.	Gauge Wet Density (t/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)		Oven Water Content (%)	Solid Density (t/m³) *	Oven Dry Density (t/m³)	Calculated Air Voids (%) *	Comments
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	
This report s	hould only b	e reproduced in full.										** Gauge Wet	Densities outsid	e of the calibrat	ed range of 1.72	!8 to 2.756 t/m³	are not accredit	ed and are outs	ide the laborato	ries scope of accr	editation.

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

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Lakeside Development

98 Scott Road, Te Kauwhata

Lakeside Developments (2017) Limited

HAM2019-0062LAA Rev.0

HAM2019-0062

11/12/2019

Project:

Project No:

Location:

Client:

Report No:

Report Date:

Client Address:

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

Test Methods:

Solid Density:

Assumed

NZS 4402.2.1:1986 NZS 4407.4.2.2:2015 Solid Density Data Source: Testing Locations Selected By:

N/A CMW Field Staff

NZGS:August 2001

1 Blade size of 19mm used.

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

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

		Test Location*				Van	e ID		In-situ Va	ne Sheai	r Strength	ıs			Fic	eld and Labora	tory Testing D	Data			
Date Sampled	Sample No.	Location	RL	Soil Description*	Solid Density (t/m³) *	Head #	Blade #	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 Probe Depth (mm)		Oven Dry Density (t/m³)	Calculated Air Voids (%) *	Comments
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.
This report sl	nould only b	e reproduced in full.		•									** Gauge Wet D	ensities outside	e of the calibrat	ed range of 1.72	8 to 2.756 t/m ³	are not accredite	ed and are outsi	de the laboratorie	es scope of accreditation.

Date: Created By: JLM 14/10/2019

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

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Hamilton Laboratory

CMW Geosciences (NZ) Ltd Partnership Suite 2, 5 Hill Street, Hamilton 3204

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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:

Solid Density: Test Methods: Notes:

NZS 4402 1986 Test 2.1 NZS 4407 2015 Test 3.1

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

NZS 4407 2015 Test 4.2

NZS 4407 2015 Test 4.3 NZGS:August 2001

(1) Blade size of 19mm used.

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

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

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Page:

		Test Location*			Van	e ID	ı	n-situ Va	ne Shear	Strength	hs			Fie	eld and Labora	tory Testing D	ata				
Date Sampled	Sample No.	Location	RL	Soil Description*	Solid Density (t/m³) *	Head #	Blade #	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 (%)	Comments
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 e reproduced in full	-	CLAY	2.70	1785	1785	147	147	UTP	138	144+	1.82	1.36	33.2	4	300		1.40		s scope of accreditation.

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



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

Test Methods:

Notes:

Assumed N/A

Location: 98 Scott Road, Te Kauwhata

Lakeside Development

HAM2019-0062

NZS 4402 1986 Test 2.1 NZS 4407 2015 Test 3.1 NZS 4407 2015 Test 4.2 Solid Density Data Source: Testing Locations Selected By:

CMW Field Staff

 Report No:
 HAM2019-0062LAC Rev.0

 Report Date:
 11/12/2019

Project:

Project No:

Client Address:

NZS 4407 2015 Test 4.3 NZGS:August 2001

(1) Blade size of 19mm used.

Report Date: 11/12/2019
Client: Lakeside Dev

Lakeside Developments (2017) Limited

ACCREDITED LABORATORY

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

Solid Density:

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

		Test Location	*			Van	e ID	li	n-situ Va	ne Shear	Strength	ıs			Fi	eld and Labora	tory Testing D	ata			
Date Sampled	Sample No.	Location	RL	Soil Description*	Solid Density (t/m³) *	Head #	Blade #	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 (%)	Comments
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	

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

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 JLM
 Date:
 9/12/2019

 Checked By:
 JLM
 Date:
 11/12/2019

 Authorised Signatory:
 AWDC
 Date:
 16/12/2019

Page: 3 of 5



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

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: Notes: Solid Density:

NZS 4402 1986 Test 2.1 Solid Density Data Source: N/A
NZS 4407 2015 Test 3.1 Testing Locations Selected By: CMW Field Staff

NZS 4407 2015 Test 4.2 NZS 4407 2015 Test 4.3

NZGS:August 2001 ① Blade size of 19mm used.

** 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.

ACCREDITED LABORATORY

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Assumed

		Test Location*				Van	e ID		In-situ Va	ne Shea	r Strength	ıs			Fic	eld and Labora	tory Testing D	ata			
Date Sampled	Sample No.	Location	RL	Soil Description*	Solid Density (t/m³) *	Head #	Blade #	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 Probe Depth (mm)		Oven Dry Density (t/m³)	Oven Calculated Air Voids (%) *	Comments
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

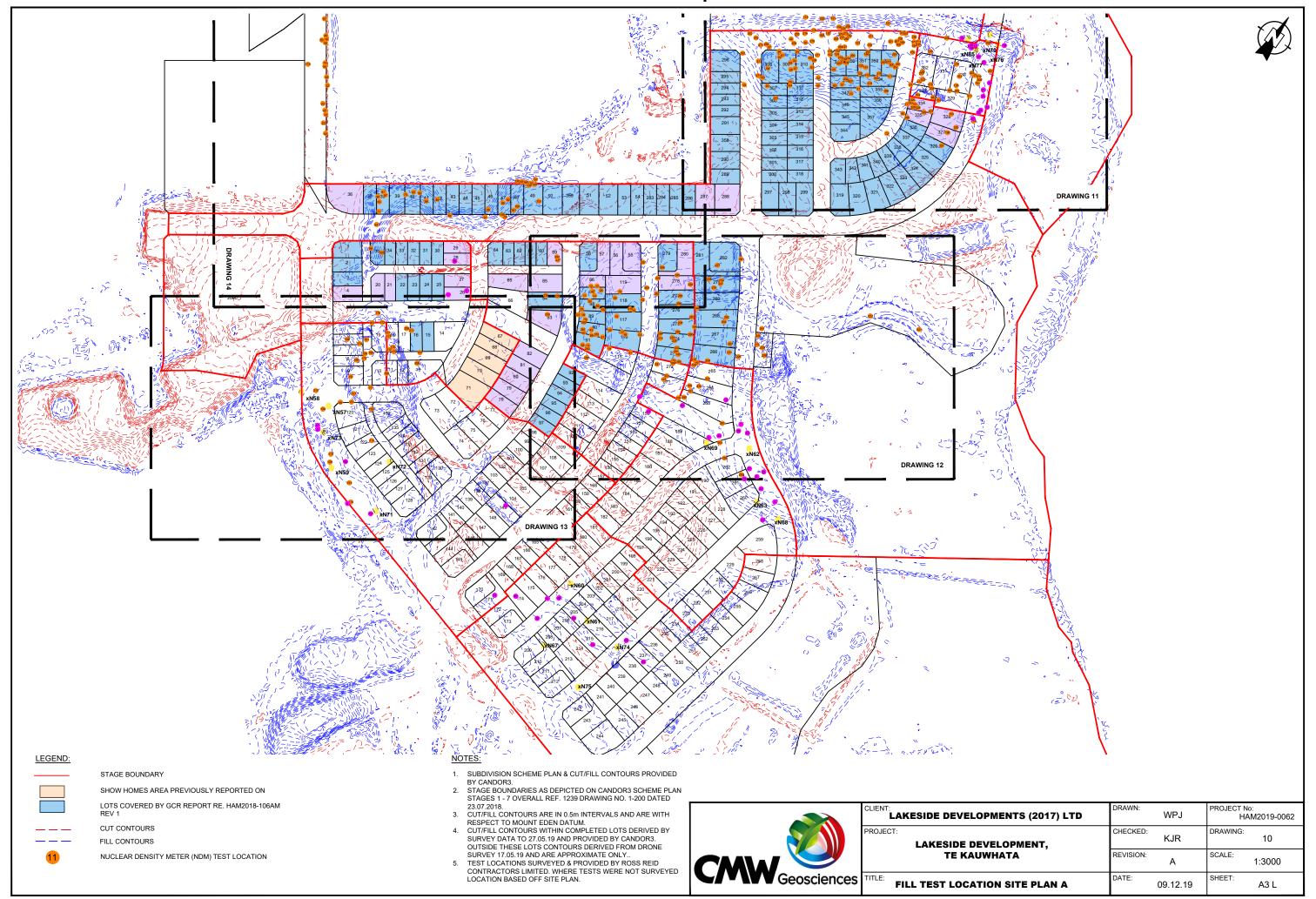
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Date: 11/12/2019 Date: 16/12/2019

Authorised Signatory: AWDC Date: 16/12/2019 Page: 4 of 5





Hamilton Laboratory

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PO Box 995, Waikato Mail Centre, Hamilton 3240

Phone: +64 (07) 2820 039

Test Methods:

Notes: Solid Density: Assumed

CMW Field Staff

HAM2019-0062

Lakeside Development 98 Scott Road, Te Kauwhata

HAM2019-0062LAE Rev.0

Lakeside Developments (2017) Limited

Report No: Report Date:

6/03/2020 Client:

Client Address:

Project:

Project No:

Location:

NZS 4402 1986 Test 2.1

Solid Density Data Source:

N/A

NZS 4407 2015 Test 3.1 NZS 4407 2015 Test 4.2

NZS 4407 2015 Test 4.3

NZGS:August 2001

1 Blade size of 19mm used.

Testing Locations Selected By:



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		Tes	t Location*			Var	ne ID	ı	n-situ Va	ne Shea	r Strength	IS			Fie	eld and Labora	tory Testing D	ata			
Date Sampled	Sample No.	Location	RL/Detail	Soil Description*	Solid Density (t/m³) *	Head #	Blade #	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 (%)	Comments
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		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		13					See N126
	N101	Stage 5	-	CLAY	2.70	1911	1911	215+	UTP	123	UTP	169+	1.77	1.27	39.5	3	250				See N107
	N102	Stage 5	8	CLAY	2.62	1911	1911	215+	UTP	UTP	UTP	215+	1.72	1.32	30.3	10			1.35		See N108
	N103	Stage 5	-	CLAY	2.62	1911	1911	113	154	179	139	146	1.77	1.33	33.0	5	200				See N109
	N104	Stage 6	15.3	CLAY	2.70	1911	1911	UTP	UTP	UTP	UTP	215+	1.65	1.31	25.5	18					See N110
	N105	Stage 6	11.1	CLAY	2.70	1911	1911	200	UTP	UTP	UTP	200+	1.77	1.42	25.2	12			1.45		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

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Hamilton Laboratory

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s: Solid Density:

Assumed N/A

Lakeside Development HAM2019-0062 98 Scott Road, Te Kauwhata

Location: 98 Scott Road, Te Kauwhat

Report No: HAM2019-0062LAF Rev.0

Report Date: 6/03/2020

Client: Lakeside Developments (2017) Limited

Client Address:

Project:

Project No:

Test Methods:NZS 4402 1986 Test 2.1
NZS 4407 2015 Test 3.1

Solid Density Data Source: Testing Locations Selected By:

CMW Field Staff

NZS 4407 2015 Test 4.2 NZS 4407 2015 Test 4.3

NZGS:August 2001

1 ① Blade size of 19mm used.



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

			Test Location*				Var	ie ID	ı	n-situ Va	ne Shea	Strengt	hs			Fie	eld and Labora	tory Testing D	ata			
Date Sampled	Sample No.		Location	RL/Details	Soil Description*	Solid Density (t/m³) *	Head #	Blade #	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 (%)	Comments
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

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

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 Date:
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 AC
 Date:
 2/04/2020

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Hamilton Laboratory

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Notes:

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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:

Project:

Test Methods: NZS 4402 1986 Test 2.1 Solid Density: Solid Density Data Source: Assumed N/A

NZS 4407 2015 Test 3.1

NZS 4407 2015 Test 4.2

Testing Locations Selected By:

CMW Field Staff

NZS 4407 2015 Test 4.

NZS 4407 2015 Test 4.3

NZGS:August 2001 ① Blade size of 19mm used.



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

Date Sampled Sample N	No. Locatio			6.11.4																
		on RL/Deta	Soil Description*	Solid Density (t/m³) *	Head #	Blade #	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 (%)			Oven Water Content (%)	Oven Dry Density (t/m³)	Oven Calculated Air Voids (%)	Comments
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		15	300		1.44	11	See N148
N141	Stage 6	15.1	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.94	1.50		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		8	300		1.29		
N144	Stage 6	15.3	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.86	1.46		6	300		1.50	9	
N145	Stage 6	13.9	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.82	1.39		6	300		1.46	10	
N146	Stage 6	12.6	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.85			2	300		1.42	-	
N147	Stage 6	12.0	CLAY	2.70	2532	2532	UTP	UTP	UTP	UTP	205+	1.94	1.51		1	300		1.58		
N148	Stage 1A	-	Imported CLAY	2.72	2532	2532	UTP	UTP	UTP	UTP	205+	1.91	1.52		5	300		1.51		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		3	300		1.43		Retest of 135, See N161
N150	Stage 5	8.0	CLAY	2.62	2532	2532	UTP	UTP	UTP	UTP	205+	1.83	1.36		1	300		1.40		
N151	Stage 5	7.9	CLAY	2.62	2532	2532	UTP	UTP	UTP	UTP	205+	1.75	1.20		-1	300		1.29		
15/01/2020 N152	Stage 6	5.9	Clayey SILT	2.62	2349	2349	UTP	204	UTP	204	204+	1.83	1.35		1	250		1.35		
N153	Stage 4	5.3	Clayey SILT	2.62	2349	2349	UTP	204	175	172	184	1.81	1.41		6	300		1.39		Retest of N137
N154	Stage 5	5.9	Clayey SILT	2.62	2349	2349	UTP	UTP	UTP	UTP	204+	1.78	1.39		8	100		1.38		Retest of N142
16/01/2020 N155	Stage 1A	-	Imported CLAY	2.72	2532	2532	175	158	175	UTP	169+	1.91	1.53		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	

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 Created By:
 WPJ
 Date:
 22/01/2020

 Checked By:
 JLM
 Date:
 9/03/2020

 Authorised Signatory:
 AC
 Date:
 2/04/2020

** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m² are not accredited and are outside the laboratories scope of accreditation.

Page: 3 of 17



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

98 Scott Road, Te Kauwhata

Report No: HAM2019-0062LAH Rev.0

Report Date:

Client: Lakeside Developments (2017) Limited

Client Address:

Location:

Test Methods: Notes: NZS 4402 1986 Test 2.1

Solid Density: Solid Density Data Source: Testing Locations Selected By:

Assumed N/A CMW Field Staff

NZS 4407 2015 Test 3.1 NZS 4407 2015 Test 4.2

NZS 4407 2015 Test 4.3

NZGS:August 2001

1) Blade size of 19mm used.



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

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

		Test	t Location*			Van	e ID	ı	n-situ Va	ne Sheai	r Strength	ıs			Fie	eld and Labora	tory Testing D	ata			
Date Sampled	Sample No.	Location	RL/Details	Soil Description*	Solid Density (t/m³) *	Head #	Blade #	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 (%)	Comments
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	
		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
		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	
		Stage 5	-	CLAY	2.70	2532	2532	61	205	105	105	119	1.75		34.3	7	300	33.0	1.31	8	Retest of N167, See N188
28/01/2020		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	

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

** 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.

4 of 17 Page:



Project:

Project No:

Location:

Client:

Client Address:

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

Test Methods:

Solid Density:

Assumed

98 Scott Road, Te Kauwhata

Lakeside Development

HAM2019-0062

NZS 4402 1986 Test 2.1 NZS 4407 2015 Test 3.1 NZS 4407 2015 Test 4.2 N/A

Report No: HAM2019-0062LAI Rev.0 Report Date:

NZS 4407 2015 Test 4.3

Testing Locations Selected By: CMW Field Staff

6/03/2020 Lakeside Developments (2017) Limited

1 Blade size of 19mm used.

Solid Density Data Source:

NZGS:August 2001

ACCREDITED LABORATORY

Notes:

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

		Test Location*				Van	e ID	ı	n-situ Va	ne Shear	Strengti	ns			Fie	eld and Labora	atory Testing D	ata			
Date Sampled	Sample No.	Location	RL/Details	Soil Description*	Solid Density (t/m³) *	Head #	Blade #	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 Probe Depth (mm)		Oven Dry Density (t/m³)	Oven Calculated Air Voids (%)	Comments
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
		on reproduced in full											** 6 W-1		- fab Pb t-	1 (1 720	27561/-3-	and the state of the state of			s scope of accreditation.

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

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

Page: 5 of 17



Hamilton Laboratory

CMW Geosciences (NZ) Ltd Partnership Suite 2, 5 Hill Street, Hamilton 3204

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Phone: +64 (07) 2820 039

Lakeside Development

HAM2019-0062

98 Scott Road, Te Kauwhata

Report No: HAM2019-0062LAJ Rev.0

Report Date: 6/03/2020

Lakeside Developments (2017) Limited Client:

Client Address:

Project No:

Location:

Test Methods:

Notes: Solid Density: Assumed

NZS 4402 1986 Test 2.1 NZS 4407 2015 Test 3.1

Solid Density Data Source: Testing Locations Selected By:

CMW Field Staff

NZS 4407 2015 Test 4.2

NZS 4407 2015 Test 4.3

NZGS:August 2001 1 Blade size of 19mm used.



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

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

		Test Location*				Var	ne ID	ı	n-situ Va	ne Shear	Strength	ıs			Fi	eld and Labora	ntory Testing D	ata		ı.	
Date Sampled Sampl	ole No.	Location	RL/Details	Soil Description*	Solid Density (t/m³) *	Head #	Blade #	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)	1	Oven Dry Density (t/m³)	Oven Calculated Air Voids (%)	Comments
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	i	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	3	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	
This report should	d only be	reproduced in full.		1			1						** Gauge Wet	Densities outsid	l e of the calibrat	L ed range of 1.72	18 to 2.756 t/m³	are not accredite	ed and are outs	l ide the laborato	ries scope of accreditation.

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

6 of 17 Page:



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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: Notes: NZS 4402 1986 Test 2.1 NZS 4407 2015 Test 3.1

Solid Density:
Solid Density Data Source:
Testing Locations Selected By:

Assumed N/A CMW Field Staff

NZS 4407 2015 Test 4.2 NZS 4407 2015 Test 4.3

NZGS:August 2001

1 Blade size of 19mm used.



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

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

		Test Location*	1			Van	e ID		n-situ Va	ne Shear	Strengt	hs			Fie	ld and Labora	tory Testing D	ata			
Date Sampled	Sample No.	Location	RL/Details	Soil Description*	Solid Density (t/m³) *	Head #	Blade #	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 (%)	Comments
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	

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 Created By:
 WPJ
 Date:
 27/02/2020

 Checked By:
 JLM
 Date:
 12/03/2020

 Authorised Signatory:
 AC
 Date:
 2/04/2020

** 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.

Page: 7 of 17



Project: Lakeside 19/20

Project No: HAM2019-0062

Location: 98 Scott Road, Te Kauwhata

Report No: HAM2019-0062LAL Rev.0

9/12/2019 Test Date:

AC.

Authorised Signatory:

Tested By:

Lakeside Developments Ltd Client:

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

CMW Field Staff Testing Locations Selected By:



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

Page 8 of 17

Test No	S	51	S	52	S2 (Cont.	S	3	S3 (Cont.
Test Location	Lot 112	Undercut	Lot 111	Undercut	Lot 111 Under	cut (1.0m-2.0m)	Lot 110	Undercut	Lot 110 Under	cut (1.0m-2.0m)
Chainage & Offset		-		-		=		-		-
Material & Layer	SA	ND	SA	ND	SA	AND	SA	ND	SA	AND
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										
							This	report should or	ly be reproduced	in full
Created by:	AS			Date:	3/03/2020) Guide to Pavement oils, and are relevant
Checked by:	JLM			Date:	9/03/2020		, 200		chesive soils only.	.,

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: HAM2019-0062LAM Rev.0

Test Date: 10/01/2020

Tested By: AS

Client: Lakeside Developments Ltd

Client Address:

Created by:

Checked by:

Authorised Signatory:

AS

JLM

AC.

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



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

*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.

Page 9 of 17

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

Test No	S4 (rete	est of S3)	S4	Cont.	S5 (rete	est of S2)				
Test Location	Lot 110	Undercut	Lot 110 Under	rcut(1.0m-2.0m)	Lot 111	Undercut				
Chainage & Offset		=		-		=				
Material & Layer	SA	ND	SA	AND	SA	ND				
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										
	<u> </u>		<u> </u>				This	report should onl	y be reproduced i	n full

3/03/2020

9/03/2020

2/04/2020

Date:

Date:



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:

AC.

Authorised Signatory:

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

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

est No S6 (retest of S5)		S6	Cont.	S7 (rete	est of S4)	S7	Cont.	S8 (rete	st of S1)					
Test Location	Lot 111	Undercut	Lot 111 Unde	rcut (1.0m-2.0m)	Lot 110	Undercut	Lot 110 Under	rcut (1.0m-2.0m)	Lot 112	Jndercut				
Chainage & Offset		-		-		-		-		-				
Material & Layer	SA	ND	S	AND	SA	ND	SA	AND	SA	ND				
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														
							Thi	s report should only	be reproduced in	full				
Created by:	AS			Date:	4/03/2020			alues calculated using						
Checked by:	JLM	Date: 9/03/2020						Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils, and are rel to fine grained cohesive soils only.						

2/04/2020



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:

Checked by:

Authorised Signatory:

JLM

AC.

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

to fine grained cohesive soils only.

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

Test No	S9 (retest of S8) Do Lot 112 Undercut		S10 (re	test of S6)	S10	Cont.	S11 (ret	est of S7)		
Test Location	Lot 112	Undercut	Lot 111	Undercut	Lot 111 Unde	rcut (Below 1m)	Lot 110	Undercut		
Chainage & Offset		-		-		-		-		
Material & Layer	SA	AND	S	AND	SA	AND	SAND (incon	nplete 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		*Equivalent CBR va	s report should only slues calculated using Figure 5.3, For Fine G	AUSTROADS (2010) Grained Cohesive Soi	Guide to Pavement

9/03/2020

2/04/2020

Date:



Lakeside 19/20 Project:

HAM2019-0062 Project No:

Location: 98 Scott Road, Te Kauwhata

Report No: HAM2019-0062LAP Rev.0

Test Date: 26/02/2020

Tested By:

Client: Lakeside Developments Ltd

Client Address:

Checked by:

Authorised Signatory:

JLM

AC

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



are relevant to fine grained cohesive soils only.

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

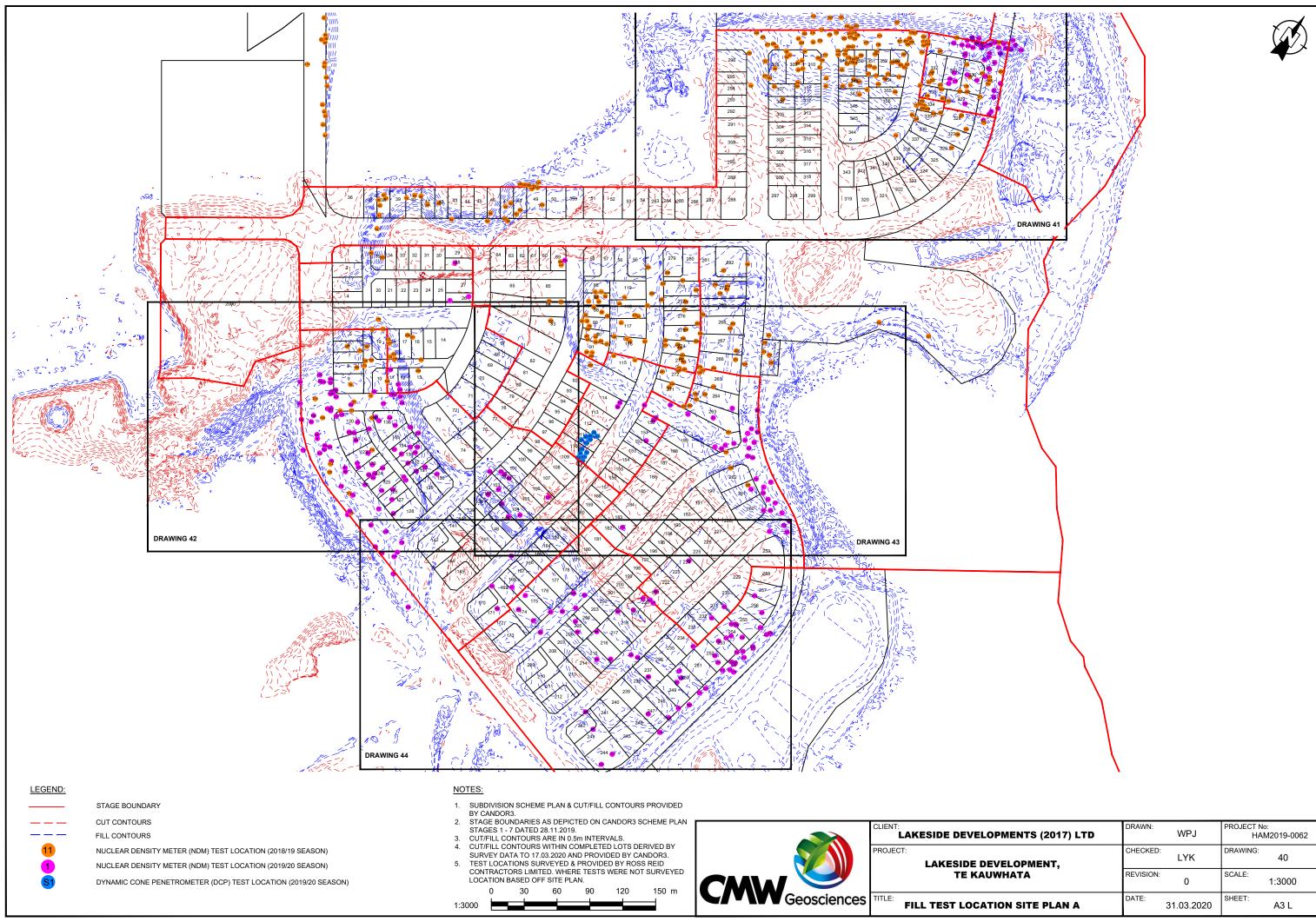
Test No	S12 (ret	test of S11)	S13 (ret	est of S12)	\$13	Cont.				
Test Location	Lot 110 Unde	rcut (incomplete)	Lot 110	Undercut	Lot 110 Under	rcut (1.0m-2.0m)				
Chainage & Offset		-		-		-				
Material & Layer	S	AND	SA	AND	Si	AND				
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	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						
est No										
est Location										
Chainage & Offset										
/laterial & 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										
600 - 700 700 - 800										

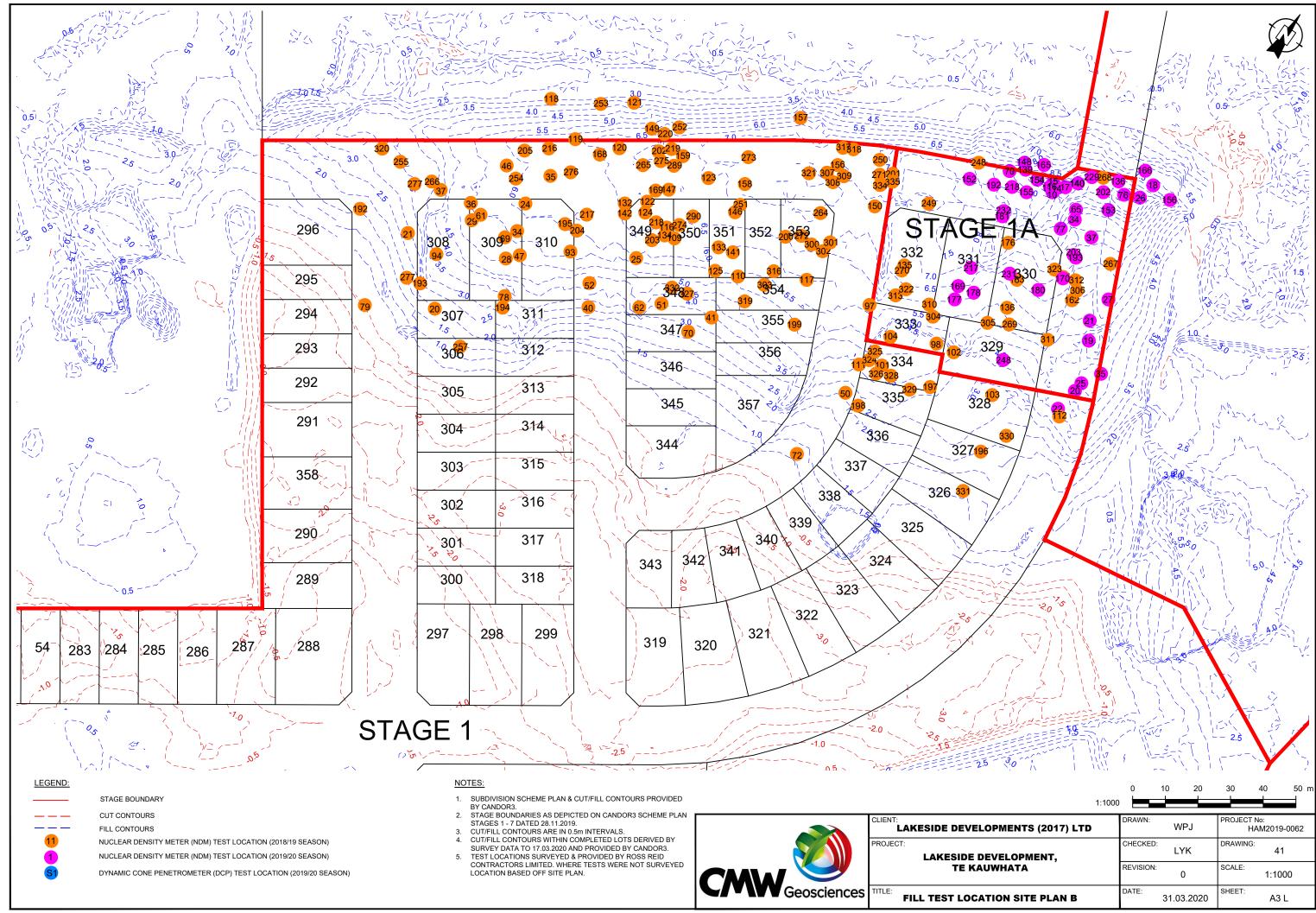
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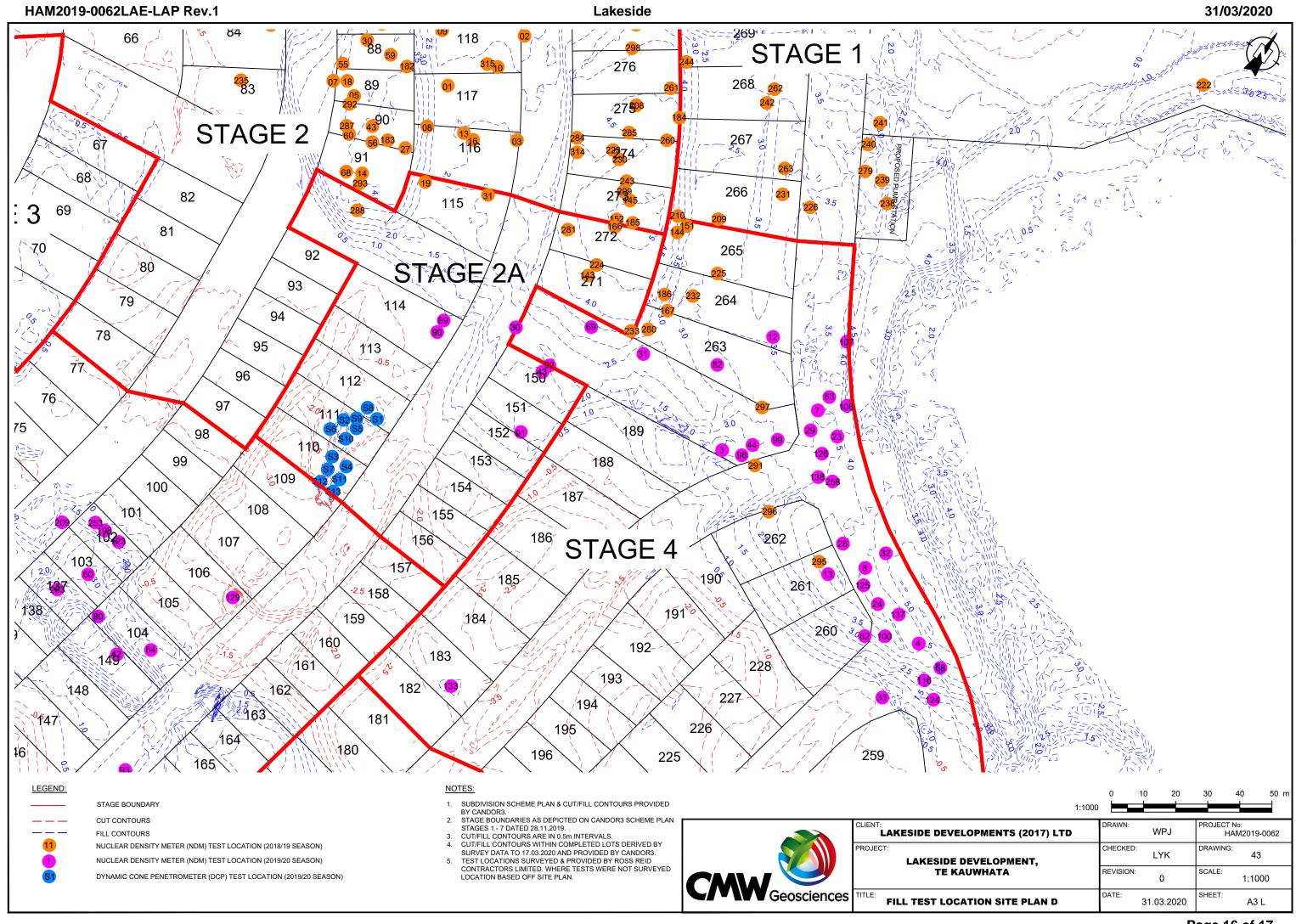
Date:

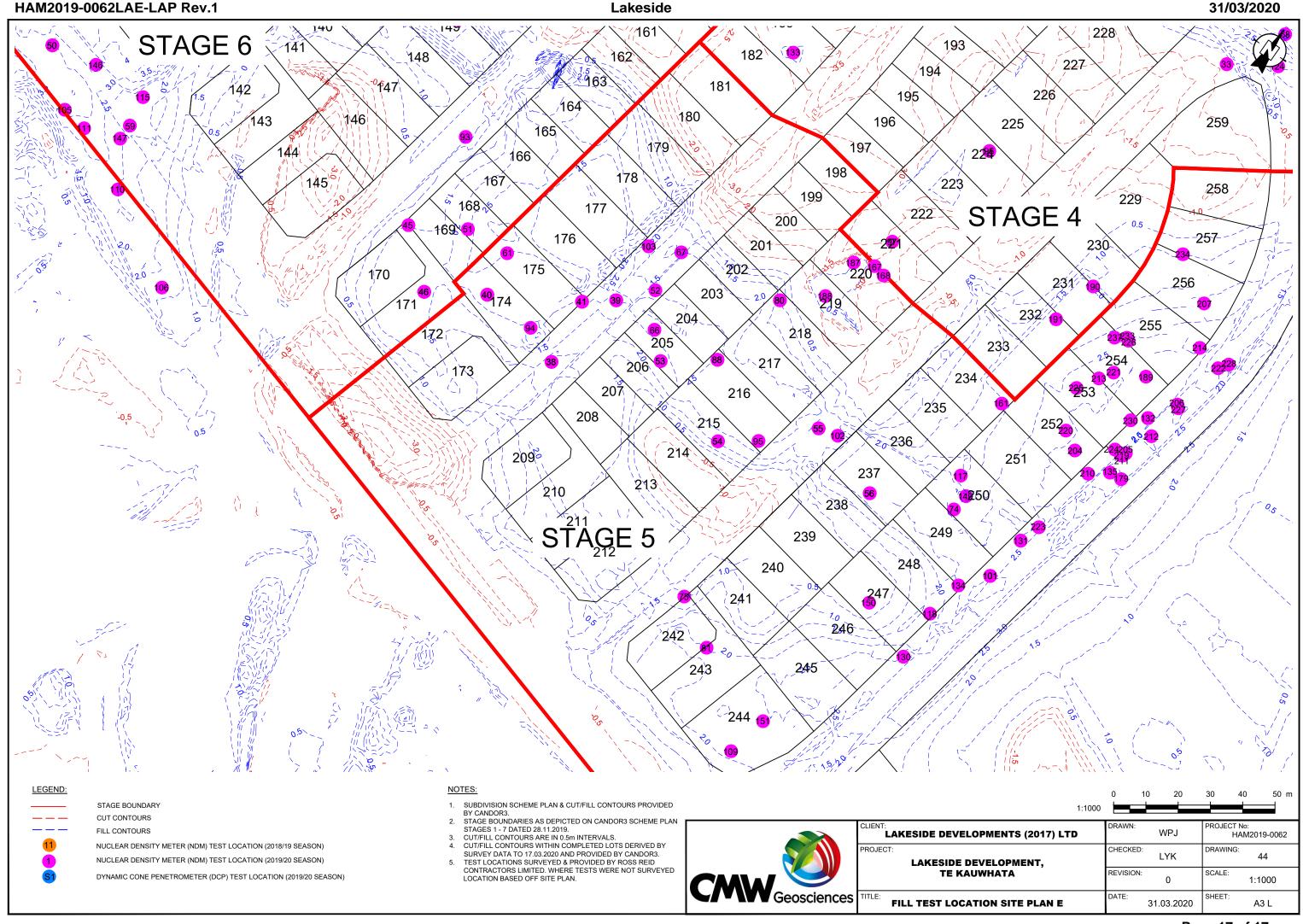
9/03/2020

2/04/2020











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: HAM2019-0062LAS Rev.0

Report Date: 29/01/2021

Client: Lakeside Developments (2017) Limited

Client Address:

Test Methods: Notes: NZS 4402 1986 Test 2.1 NZS 4407 2015 Test 3.1

Solid Density Data Source: Testing Locations Selected By:

Solid Density:

N/A CMW Field Staff

Assumed

NZS 4407 2015 Test 4.2 NZS 4407 2015 Test 4.3

NZGS:August 2001 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

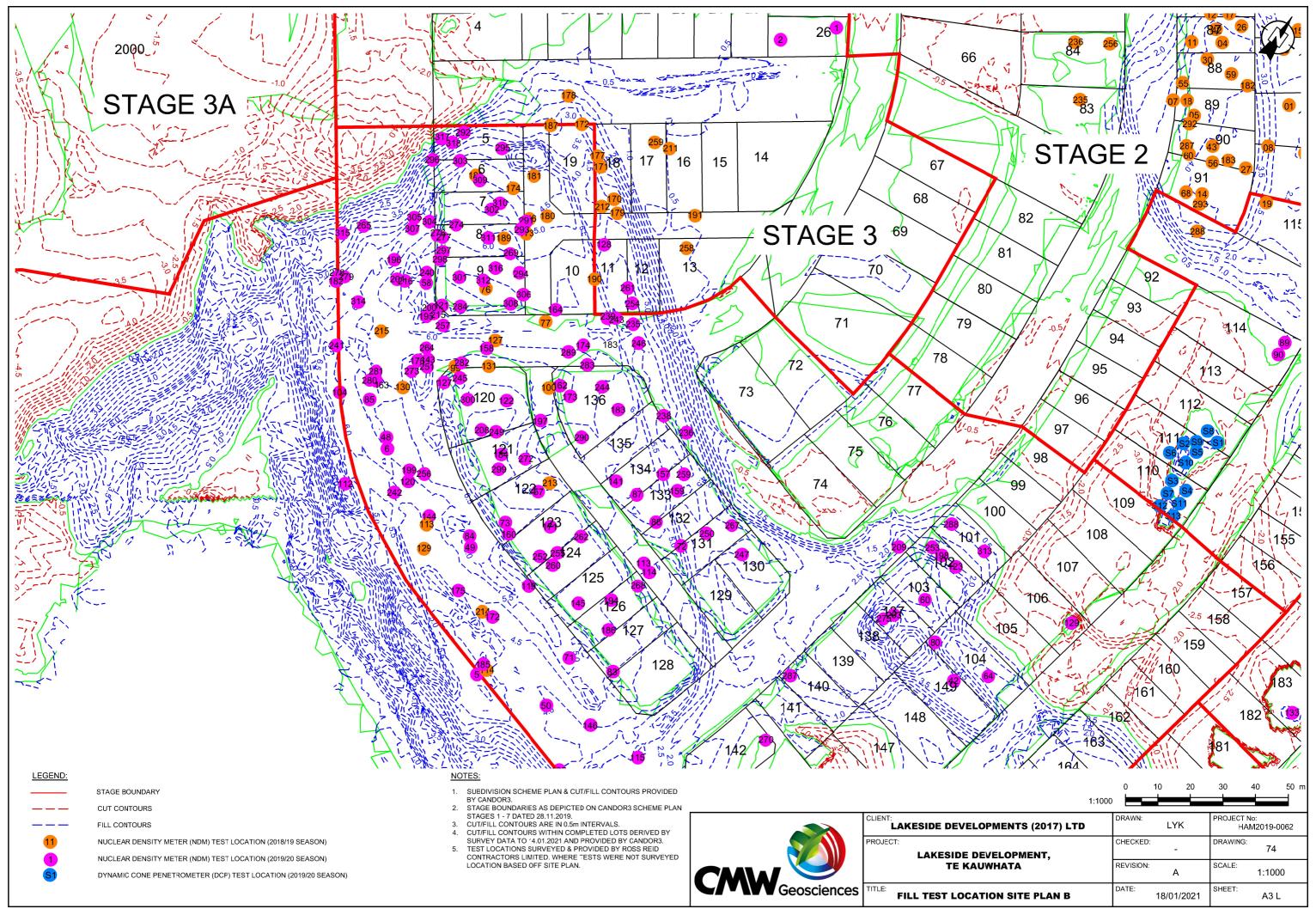
Part			Test Location*				Van	e ID		In-situ Va	ne Shea	r Strengtl	hs			Fie	eld and Labor	atory Testing D	ata			
9/03/2020 No.5 Stage 6 - CAY 2.70 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 175 17	Date Sampled	Sample No.	Location	RL/Details	Soil Description*	Density	Head #				ı		Ave.	Density	Density	Water		-		Density	Calculated	Comments
14 15 15 15 15 15 15 15	6/03/2020	N264	Stage 6	-	CLAY	2.70	1785	1785	202	196	104	147	162	1.88	1.40	34.3	(300	39.5	1.35	-3	
Mode Marco		N265	Stage 6	-	CLAY	2.70	1785	1785	202	173	147	202	181	1.83	1.33	38.0	(300	35.0	1.36	2	
No.	9/03/2020	N267	Stage 6	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	202+	1.77	1.32	34.2	6	300	27.9	1.38	10	
1/03/2020 NZ70		N268	Stage 6	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	202+	1.80	1.37	32.1	6	300	30.7	1.38	7	
Stage 6 CLAY LAY		N269	Stage 6	-	CLAY	2.70	1785	1785	187	202	170	161	180	1.70	1.22	40.2	6	300	40.6	1.21	6	
16/03/2020 N372 Stage 6 - CLAY 2.70 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785	11/03/2020	N270	Stage 6	-	CLAY	2.70	1785	1785	UTP	173	147	150	157+	1.80	1.33	35.5	3	300	33.5	1.35	5	
N273 Stage 6 - CLAY 2.70 1785 1785 147 273 141 150 153 1.80 1.25 43.8 -1 300 49.4 1.20 -4 1.20 4.8 1.20 1.20 1.20 1.20 1.20 1.20 1.20 1.20		N271	Stage 6	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	202+	1.75	1.29	35.4	6	300	27.4	1.37	12	
N274 Stage 6 - CLAY 2.70 1785 1785 UTP 202 202 UTP 202+ 1.86 1.36 34.8 2 300 31.6 1.40 4 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05	16/03/2020	N272	Stage 6	-	CLAY	2.70	1785	1785	173	187	144	176	170	1.82	1.34	36.0	2	300	38.3	1.32	1	
N275 Stage 6 - CLAY 2.70 1785 1785 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 179 1		N273	Stage 6	-	CLAY	2.70	1785	1785	147	173	141	150	153	1.80	1.25	43.8	-1	300	49.4	1.20	-4	
1/05/2020 N276 Stage 6 -1.0m Clayey SitT 2.62 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785 1785		N274	Stage 6	-	CLAY	2.70	1785	1785	UTP	202	202	UTP	202+	1.84	1.36	34.8	2	300	31.6	1.40	4	
N277 Stage 6		N275	Stage 6	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	202+	1.78	1.29	38.2	3	300	34.6	1.32	5	
N278 Stage 6 -1.0m Clayer Silt 2.62 1785 1785 202 187 1785 102 110 110 110 110 110 110 110 110 110	1/05/2020	N276	Stage 6	- 1.0m	Clayey SILT	2.62	1785	1785	190	159	159	UTP	169+	1.74	1.23	41.9	2	300	32.5	1.31	7	
N279 Stage 6 -0.5m Clayer Silt		N277	Stage 6	- 0.5m	Clayey SILT	2.62	1785	1785	179	161	159	161	165	1.67	1.13	47.5	3	300	56.4	1.07	-1	
N280 Stage 6 -1.0m Clayer SiLT 2.62 1785 1785 UTP UTP UTP UTP UTP UTP UTP 1.78 1.33 33.6 4 300 33.0 1.34 5 No Sample taken N281 Stage 6 - Clayer SiLT 2.62 1785 1785 UTP		N278	Stage 6	- 1.0m	Clayey SILT	2.62	1785	1785	202+	187	173	159	180+	1.85	1.44	28.8	4	300	25.7	1.47	6	
N281 Stage 6 - Clayey SiLT 2.62 1785 1785 1785 UTP UTP 144 159 152+ 1.81 1.34 35.4 2 300 25.1 1.45 9 17/03/2020 N283 Stage 6 - Clayey SiLT 2.62 1785 1785 UTP UTP 179 UTP UTP UTP UTP UTP UTP 1.62 1.20 35.5 12 300 25.1 1.45 9 1 1.81 11 15/05/2020 N287 Stage 6 - Clayey SiLT 2.62 1785 1785 UTP UTP UTP UTP UTP UTP UTP UTP 1.62 1.20 35.5 12 300 37.1 1.18 11 15/05/2020 N287 Stage 6 - Clayey SiLT 2.62 1785 1785 UTP UTP UTP UTP UTP UTP UTP 1.62 1.20 35.5 12 300 37.1 1.18 11 15/05/2020 N287 Stage 6 - Clayey SiLT 2.70 1785 1785 1785 1785 UTP UTP UTP UTP UTP UTP 1.62 1.20 35.5 12 300 37.1 1.18 11 15/05/2020 N287 Stage 6 - Clayey SiLT 2.70 1785 1785 1785 1785 1785 UTP UTP UTP UTP UTP UTP 1.62 1.20 35.5 12 300 37.1 1.18 11 15/05/2020 N287 Stage 6 - Clayey SiLT 2.70 1785 1785 1785 1785 1785 1785 UTP		N279	Stage 6	- 0.5m	Clayey SILT	2.62	1785	1785	187	202+	161	156	177+	1.78	1.28	39.4	1	300	33.8	1.33	4	
NZBZ Stage 6 - Clayer SiLT 2.62 1785 1785 UTP		N280	Stage 6	- 1.0m	Clayey SILT	2.62	1785	1785	UTP	UTP	UTP	UTP	UTP	1.78	1.33	33.6	4	300	33.0	1.34	5	
17/03/2020 N283 Stage 6 - Clayer Silt 2.62 1785 1785 UTP		N281	Stage 6	-	Clayey SILT	2.62	1785	1785	54	46	82	35	54									No Sample taken
N284 Stage 6 - Clayey SilT 2.62 1785 1785 UTP UTP UTP UTP UTP UTP UTP 1.62 1.20 35.5 12 300 37.1 1.18 11 15/05/2020 N287 Stage 6 - CLAY 2.70 1785 1785 1785 187 202+ 127 190 177+ 1.80 1.33 35.4 4 300 28.0 1.41 9 N288 Stage 6 - CLAY 2.70 1785 1785 181 1785 181 115 29 92 18.8 1.33 33.5 6 300 29.9 1.37 8 19/05/2020 N289 Stage 6 - Clayey SilT 2.70 1785 1785 184 72 101 58 94 1.81 1.41 28.8 7 300 31.1 1.39 6 N290 Stage 6 - Clayey SilT 2.70 1785 1785 63 58 55 58 59 1.82 1.40 29.9 6 300 31.1 1.39 6 N291 Stage 6 - Clayey SilT 2.70 1785 1785 1785 202 202 159 202 191 1.80 1.34 34.2 5 300 30.5 1.38 7 22/05/2020 N293 Stage 6 - Clayey SilT 2.70 1785 1785 1785 202 202 159 202 191 1.80 1.34 34.2 5 300 30.5 1.38 7 22/05/2020 N293 Stage 6 - CLAY 2.70 1785 1785 202 72 115 115 126 1.84 1.36 35.0 2 300 33.6 1.37 3 Retest of N284 N294 Stage 6 - CLAY 2.70 1785 1785 1785 107 UTP		N282	Stage 6	-	Clayey SILT	2.62	1785	1785	UTP	UTP	144	159	152+	1.81	1.34	35.4	2	300	25.1	1.45	9	
15/05/2020 N287 Stage 6 - CLAY 2.70 1785 1785 187 202+ 127 190 177+ 1.80 1.33 35.4 4 300 28.0 1.41 9 N288 Stage 6 - CLAY 2.70 1785 1785 187 202+ 127 190 177+ 1.80 1.33 33.5 6 300 29.9 1.37 8 N288 Stage 6 - CLAY 2.70 1785 1785 1785 144 72 101 58 94 1.81 1.41 28.8 7 300 22.8 1.48 12 Retest of N281 N290 Stage 6 - Clayer Silt 2.70 1785 1785 187 202 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202 159 202	17/03/2020	N283	Stage 6	-	Clayey SILT	2.62	1785	1785	UTP	UTP	UTP	UTP	UTP	1.76	1.30	34.8	5	300	27.9	1.37	9	
N288 Stage 6 - CLAY 2.70 1785 1785 133 115 29 92 1.78 1.33 33.5 6 300 29.9 1.37 8 1.37 8 1.39 1.39 1.39 1.39 1.39 1.39 1.39 1.39		N284	Stage 6	-	Clayey SILT	2.62	1785	1785	UTP	UTP	UTP	UTP	UTP	1.62	1.20	35.5	12	300	37.1	1.18	11	
19/05/2020 N289 Stage 6 - Clayey SiltT 2.70 1785 1785 144 72 101 58 94 1.81 1.41 28.8 7 300 22.8 1.48 12 Retest of N281 N290 Stage 6 - Clayey Sandy SiltT 2.70 1785 1785 63 58 55 58 59 1.82 1.40 29.9 6 300 31.1 1.39 6 N291 Stage 6 - Clayey SiltT 2.70 1785 1785 202 202 159 202 191 1.80 1.34 34.2 5 300 30.5 1.38 7 N292 Stage 6 - Clayey SiltT 2.70 1785 1785 112 72 81 92 89 1.85 1.41 30.7 4 300 26.9 1.45 7 22/05/2020 N293 Stage 6 - CLAY 2.70 1785 1785 202 72 115 115 126 1.84 1.36 35.0 2 300 33.6 1.37 3 Retest of N284 N294 Stage 6 - CLAY 2.70 1785 1785 187 170 UTP UTP 179+ 1.82 1.43 27.6 8 300 31.2 1.37 6 Retest of N289 N295 Stage 6 - CLAY 2.70 1785 1785 187 170 UTP 133 159+ 1.80 1.32 36.4 3 300 31.2 1.37 6 Retest of N289 N296 Stage 6 - CLAY 2.70 1785 1785 1785 202 187 127 121 159 1.78 1.25 41.8 1 300 39.4 1.28 3 N297 Stage 6 - CLAY 2.70 1785 1785 1785 1785 1785 1785 1785 1785	15/05/2020	N287	Stage 6	-	CLAY	2.70	1785	1785	187	202+	127	190	177+	1.80	1.33	35.4	4	300	28.0	1.41	9	
N290 Stage 6 - Clayey Sandy SiLT 2.70 1785 1785 63 58 55 58 59 1.82 1.40 29.9 6 300 31.1 1.39 6 N291 Stage 6 - Clayey SiLT 2.70 1785 1785 202 202 159 202 191 1.80 1.34 34.2 5 300 30.5 1.38 7 N292 Stage 6 - Clayey SiLT 2.70 1785 1785 1785 1785 1785 1785 1785 1785		N288	Stage 6	-	CLAY	2.70	1785	1785	133	115	29	92	92	1.78	1.33	33.5	6	300	29.9	1.37	8	
N291 Stage 6 - Clayer SiLT 2.70 1785 1785 202 202 159 202 191 1.80 1.34 34.2 5 300 30.5 1.38 7 N292 Stage 6 - Clayer SiLT 2.70 1785 1785 112 72 81 92 89 1.85 1.41 30.7 4 300 26.9 1.45 7 N292 N293 Stage 6 - CLAY 2.70 1785 1785 126 1.84 1.36 35.0 2 300 33.6 1.37 3 Retest of N284 N294 Stage 6 - CLAY 2.70 1785 1785 187 170 UTP UTP 179+ 1.82 1.43 27.6 8 300 28.2 1.42 7 Retest of N289 N295 Stage 6 - CLAY 2.70 1785 1785 187 170 UTP 133 159+ 1.80 1.32 36.4 3 300 31.2 1.37 6 Retest of N292 N296 Stage 6 - CLAY 2.70 1785 1785 1785 126 187 UTP 133 159+ 1.80 1.32 36.4 3 300 39.4 1.28 3 N297 Stage 6 - CLAY 2.70 1785 1785 1785 1785 1785 1785 1785 1785	19/05/2020	N289	Stage 6	-	Clayey SILT	2.70	1785	1785	144	72	101	58	94	1.81	1.41	28.8	7	300	22.8	1.48	12	Retest of N281
N292 Stage 6 - Clayer SilT 2.70 1785 1785 112 72 81 92 89 1.85 1.41 30.7 4 300 26.9 1.45 7 22/05/2020 N293 Stage 6 - CLAY 2.70 1785 1785 202 72 115 115 126 1.84 1.36 35.0 2 300 33.6 1.37 3 Retest of N284 N294 Stage 6 - CLAY 2.70 1785 1785 187 170 UTP UTP 179+ 1.82 1.43 27.6 8 300 28.2 1.42 7 Retest of N289 N295 Stage 6 - CLAY 2.70 1785 1785 187 UTP 133 159+ 1.80 1.32 36.4 3 300 31.2 1.37 6 Retest of N289 N296 Stage 6 - CLAY 2.70 1785 1785 1785 126 187 UTP 133 159+ 1.80 1.32 36.4 3 300 31.2 1.37 6 Retest of N292 N296 Stage 6 - CLAY 2.70 1785 1785 126 187 UTP 127 150+ 1.85 1.25 41.8 1 300 39.4 1.28 3 N297 Stage 6 - CLAY 2.70 1785 1785 1785 1785 1785 1785 1785 1785		N290	Stage 6	-	Clayey Sandy SILT	2.70	1785	1785	63	58	55	58	59	1.82	1.40	29.9	6	300	31.1	1.39	6	
22/05/2020 N293 Stage 6 - CLAY 2.70 1785 1785 202 72 115 115 126 1.84 1.36 35.0 2 300 33.6 1.37 3 Retest of N284 N294 Stage 6 - CLAY 2.70 1785 1785 187 170 UTP UTP 179+ 1.82 1.43 27.6 8 300 28.2 1.42 7 Retest of N289 N295 Stage 6 - CLAY 2.70 1785 1785 156 187 UTP 133 159+ 1.80 1.32 36.4 3 300 31.2 1.37 6 Retest of N289 N296 Stage 6 - CLAY 2.70 1785 1785 202 187 127 121 159 1.78 1.25 41.8 1 300 39.4 1.28 N297 Stage 6 - CLAY 2.70 1785 1785 1785 1785 1785 1785 1785 1785		N291	Stage 6	-	Clayey SILT	2.70	1785	1785	202	202	159	202	191	1.80	1.34	34.2	5	300	30.5	1.38	7	
N294 Stage 6 - CLAY 2.70 1785 1785 187 170 UTP UTP 179+ 1.82 1.43 27.6 8 300 28.2 1.42 7 Retest of N289 N295 Stage 6 - CLAY 2.70 1785 1785 156 187 UTP 133 159+ 1.80 1.32 36.4 3 300 31.2 1.37 6 Retest of N292 N296 Stage 6 - CLAY 2.70 1785 1785 202 187 127 121 159 1.78 1.25 41.8 1 300 39.4 1.28 N297 Stage 6 - CLAY 2.70 1785 1785 1785 1785 1785 1785 1785 1785		N292	Stage 6	-	Clayey SILT	2.70	1785	1785	112	72	81	92	89	1.85	1.41	30.7	4	300	26.9	1.45	7	
N295 Stage 6 - CLAY 2.70 1785 1785 156 187 UTP 133 159+ 1.80 1.32 36.4 3 300 31.2 1.37 6 Retest of N292 N296 Stage 6 - CLAY 2.70 1785 1785 202 187 127 121 159 1.78 1.25 41.8 1 300 39.4 1.28 3 N297 Stage 6 - CLAY 2.70 1785 1785 1785 147 176 UTP 127 150+ 1.85 1.39 32.9 3 300 29.2 1.43 5 Retest of N281	22/05/2020	N293	Stage 6	-	CLAY	2.70	1785	1785	202	72	115	115	126	1.84	1.36	35.0	2	300	33.6	1.37	3	Retest of N284
N296 Stage 6 - CLAY 2.70 1785 1785 202 187 127 121 159 1.78 1.25 41.8 1 300 39.4 1.28 3 N297 Stage 6 - CLAY 2.70 1785 1785 1785 147 176 UTP 127 150+ 1.85 1.39 32.9 3 300 29.2 1.43 5 Retest of N281		N294	Stage 6	-	CLAY	2.70	1785	1785	187	170	UTP	UTP	179+	1.82	1.43	27.6	8	300	28.2	1.42	7	Retest of N289
N297 Stage 6 - CLAY 2.70 1785 1785 147 176 UTP 127 150+ 1.85 1.39 32.9 3 300 29.2 1.43 5 Retest of N281		N295	Stage 6	-	CLAY	2.70	1785	1785	156	187	UTP	133	159+	1.80	1.32	36.4	3	300	31.2	1.37	6	Retest of N292
		N296	Stage 6	-	CLAY	2.70	1785	1785	202	187	127	121	159	1.78	1.25	41.8	1	300	39.4	1.28	3	
N298 Stage 6 - CLAY 2.70 1785 1785 UTP UTP UTP UTP UTP 1.85 1.35 37.5 0 300 37.2 1.35 0 Retest of N282		N297	Stage 6	-	CLAY	2.70	1785	1785	147	176	UTP	127	150+	1.85	1.39	32.9	3	300	29.2	1.43	5	Retest of N281
		N298	Stage 6	-	CLAY	2.70	1785	1785	UTP	UTP	UTP	UTP	UTP	1.85	1.35	37.5	(300	37.2	1.35	0	Retest of N282

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

Created By: WPJ 21/04/2020 Date: Checked By: JLM Date: 1/07/2020 Authorised Signatory: AS 29/01/2021 Date:

Page: 1 of 2 HAM2020-0049LAS Rev.0 29/01/2021





Hamilton Laboratory

CMW Geosciences (NZ) Ltd Partnership

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Phone: +64 (07) 2820 039

Project: Lakeside Development 19/20

Project No: HAM2019-0062

Location: 98 Scott Road, Te Kauwhata
Report No: HAM2019-0062LAT Rev.1

Report Date: 2/02/2021

Client: Lakeside Developments (2017) Limited

Client Address:

 Test Methods:
 Notes:

 NZS 4402 1986 Test 2.1
 NZS 4407 2015 Test 3.1 ◊

Solid Density Data Source: Testing Locations Selected By:

Assumed N/A CMW Field Staff

NZS 4407 2015 Test 4.2 NZS 4407 2015 Test 4.3

♦ Only samples <2.0mm will be considered for endorsed testing

NZGS:August 2001 ① Blade size of 19mm used.



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

Solid Density:

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

															CABO					
					Van	e ID	li	n-situ Va	ne Shear	Strengt	ns			Fie	eld and Labora	tory Testing D	ata			
Date Sampled	Sample No.	Test Location*	Soil Description*	Solid Density (t/m³) *	Head #	Blade #	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 (%)	Comments
18/09/2020	N299	Stage 6	SILT	2.62	2349	2349	216	216	216	216	216	1.87	1.41	33.0	0	300	31.3	1.42	1	
	N300	Stage 6	SILT	2.62	2349	2349	216	80	65	127	122									No sample taken
	N301	Stage 6	SILT	2.62	2349	2349	216	182	139	139	169	1.79	1.26	42.6	-2	300	41.9	1.26	-1	
	N302	Stage 6	SILT	2.62	2349	2349	185	213	157	185	185	1.72	1.21	41.6	3	300	36.8	1.26	6	
	N303	Stage 6	SILT	2.62	2349	2349	139	93	145	114	123									No sample taken. Retest of N290
22/09/2020	N304	Stage 6	CLAY	2.70	2349	2349	139	216+	133	170	165+	1.84	1.41	30.5	5	300	25.6	1.46	8	Retest of N300
	N305	Stage 6	CLAY	2.70	2349	2349	127	127	161	105	130	1.80	1.28	41.4	0	300				No sample taken. Retest of N303
	N306	Stage 6	CLAY	2.70	2349	2349	124	102	108	49	96									No sample taken
28/09/2020	N307	Stage 6	SILT	2.70	1785	1785	131	131	183	167	153	1.78	1.25	42.2	1	300	34.6	1.33	5	Retest of N305
	N308	Stage 6	SILT	2.70	1785	1785	216	229	160	167	193	1.70	1.21	40.0	7	300	33.9	1.27	10	Retest of N306
1/10/2020	N309	Stage 6	CLAY	2.70	1785	1785	196	223	160	138	179	1.87	1.44	29.5	4	300	31.1	1.43	3	
	N310	Stage 6	CLAY	2.70	1785	1785	229	229	128	131	179	1.86	1.45	28.0	5	300	25.0	1.49	8	
	N311	Stage 6	CLAY	2.70	1785	1785	229	UTP	UTP	177	203	1.79	1.26	42.0	0	300	39.2	1.29	2	
	N312	Stage 6	SILT	2.62	1785	1785	UTP	UTP	229	229	229	1.76	1.29	37.0	3	300	25.7	1.40	11	Retest of N288
	N313	Stage 6	SILT	2.62	1785	1785	229	229	229	UTP	229	1.92	1.49	28.8	0	300	22.0	1.58	5	Retest of N271
8/10/2020	N314	Stage 6	CLAY	2.70	2349	2349	102	124	142	151	130	1.77	1.19	48.9	-2	300	41.3	1.26	2	
	N315	Stage 6	CLAY	2.70	2349	2349	130	124	145	216	154	1.80	1.25	44.0	-1	300	38.9	1.30	2	
23/10/2020	N316	Stage 6	SILT	2.62	1785	1785	UTP	229	UTP	UTP	229	1.80	1.31	37.2	1	300	32.1	1.37	4	Retest of N312
16/12/2020	N317	Stage 6 - Lot 5	SILT	2.62	1911	1911	162	189	159	165	169	1.89	1.53	23.4	6	300	28.5	1.47	2	
18/12/2020	N318	Stage 6 - Lot 5	SILT	2.62	2532	2532	184	UTP	UTP	UTP	184	1.79	1.34	33.6	4	300	23.8	1.45	10	

This report should only be reproduced in full.

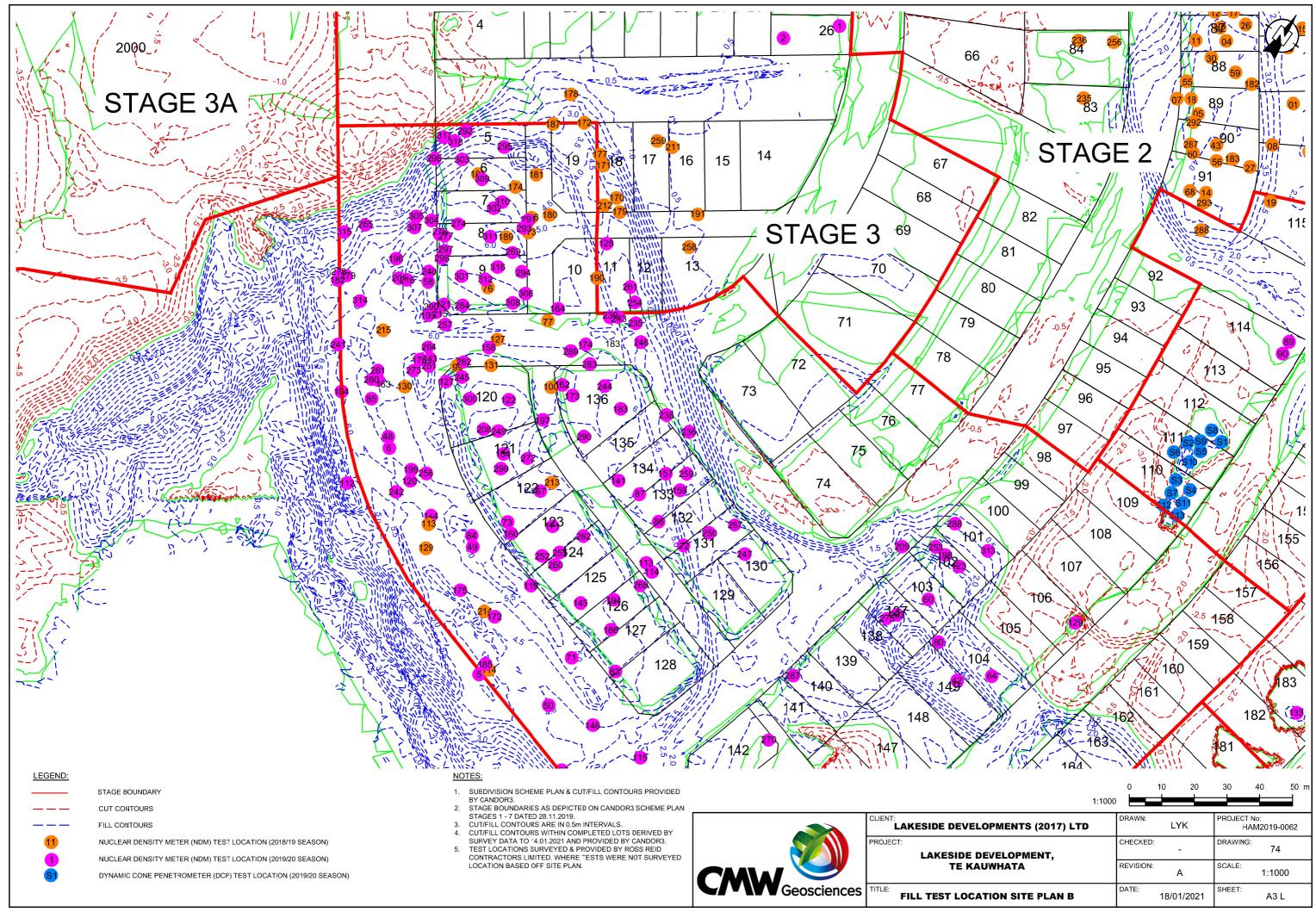
** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m³ are not accredited and are outside the laboratories scope of accreditation.

 Created By:
 AS
 Date:
 1/10/2020

 Checked By:
 AS
 Date:
 29/01/2021

 Authorised Signatory:
 AS
 Date:
 2/02/2021

Page: 1 of 2



Appendix F: Post-Construction Hand Auger Borehole Logs

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 10/12/2020

Borehole Location: Stage 6 Logged by: AS Checked by: AS Scale: 1:25 Sheet 1 of 1

Position: Projection: Mount Eden

Datum: Moturiki Survey Source: Site Plan

					Datum: Moturiki Survey Source: Site	<u>Plan</u>					
Sar Sar Depth	mples & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	F (E	Oynamio Penetro Blows/1	meter	
Depth	Type & Results	집	Dept			Con	Consi Relative		5 10) 15	5
0.3	Peak = 170kPa				ML: SILT with minor clay and trace sand: yellowish brown, mottled orange brown. Low plasticity; sand, fine. (Fill)						
0.6	Peak = 184kPa										
0.9	Peak = 116kPa		1 -			М	VSt to H			$\frac{1}{2}$	
1.2	Peak = 150kPa										
1.5	Peak = 199kPa		-								
1.8	Peak = 199kPa										
2.0	Peak = 199kPa		2 -		Borehole terminated at 2.0 m					\dashv	
			3 -								
			-								
			-								
			5 -							\perp	_
	ation Reason: Tar										_

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 01/10/2020

Borehole Location: Stage 6 Logged by: AS Checked by: AS Scale: 1:25 Sheet 1 of 1

Position: 434073.3mE; 740560.5mN Projection: Mount Eden

Datum: Moturiki Survey Source: Site Plan

					Datum: Moturiki Survey Source:	Site Plar	า				
San	nples & Insitu Tests	RL (m)	- Hung	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological u Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)			Consistency/ Relative Density	Oynami Penetr Blows/	1	
Depth	Type & Results	-	2	ž E	Nock. Colour, labric, rock harrie, additional comments. (ongringeological unity	≥∂	5	Cor	 5 1 	0 1 	15
0.3	Peak = >200kPa				CH: CLAY: with some silt; orange brown mottled greyish brown. High plasticity. (Fill)						
0.6	Peak = 164kPa										
0.9	Peak = 170kPa		1			М		VSt -			_
1.2	Peak = 180kPa				ML: SILT: with some clay; greyish brown. Low plasticity. (Fill)						
1.5	Peak = 170kPa										
1.8	Peak = 177kPa										
2.0	Peak = 174kPa		2	: - ***	Borehole terminated at 2.0 m	-	+	\dashv	 Н	_	+
			3								
			4					_			
	tion Reason: Tar		5								

Shear Vane No: 1785 DCP No:

Remarks: Groundwater not encountered.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 01/10/2020

Borehole Location: Stage 6 Logged by: AS Checked by: AS Sheet 1 of 1 Scale: 1:25 Position: 434080.4mE; 740534.0mN Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests Groundwater **3raphic** 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth ML: SILT: with some clay, with trace fine sand; greyish brown. Low plasticity. (Fill)

ML: SILT; greyish brown, with some clay; with trace fine sand.

(Fill) 0.3 Peak = >200kPa 0.6 Peak = 177kPa 0.9 Peak = 147kPa VSt 1.2 Peak = >200kPa 1.5 Peak = >200kPa Peak = >200kPa 1.8 Peak = >200kPa 2.0 2 Borehole terminated at 2.0 m

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 23/10/2020



Position: 434112.2mE; 740549.4mN Projection: Mount Eden
Datum: Moturiki Survey Source: Handheld GPS

	COILIO	11. 404112.211	,		, 10. 1	Datum: Moturiki Survey Source: Hand	dheld	GP	S			
Groundwater	Samp	ples & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	(E	Oynamio Penetro Blows/1	100mm	1)
GroL	Depth	Type & Results	<u> </u>	De	Grap	Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	కరి	Cons	Ę	5 10 I I	0 15	5
	0.3	Peak = UTP				Organic SILT: dark brown. No plasticity. (Topsoil) ML: SILT: with some clay, with minor fine sand; greyish brown. Low plasticity. (Fill)	D to M					
	0.6	Peak = UTP										
	0.9	Peak = >200kPa		1 -				н				
	1.2	Peak = >200kPa				Silty CLAY: brownish orange. High plasticity. (Fill)	М					
	1.5	Peak = UTP		-								
	1.8	Peak = >200kPa										
	2.0	Peak = UTP		2 -		Borehole terminated at 2.0 m				\vdash	\dashv	
				3 -								
				-								
				4 -								
				5 -								
	- realizat	ion Reason: Tar	got de	noth.							_	

Termination Reason: Target depth

Shear Vane No: 1785 DCP No: Remarks: Groundwater not encountered.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 09/12/2019



Position: 434087.2mE; 740570.0mN Projection: Mount Eden Datum: Moturiki Survey Source: Handheld GPS Dynamic Cone Penetrometer Samples & Insitu Tests Groundwater **3raphic** Log Moisture Condition 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth CH: CLAY: orange brown. High plasticity. (Fill) Fine to coarse GRAVEL: with some fine to coarse sand; dark grey. Well graded, angular. (Fill) 0.3 Peak = UTP CH: CLAY: orange brown. High plasticity. D to (Fill) 0.5 Peak = UTP 0.8 Peak = UTP ... at 1.00m, becoming brown. Peak = 106kPa Residual = 58kPa 1.2 M 1.5 Peak = 122kPa Residual = 56kPa Peak = 140kPa Residual = 74kPa 1.8 Borehole terminated at 1.8 m. 2

Termination Reason: Refusal on dense clay. Shear Vane No: 1911 DCP No: Remarks: Groundwater not encountered.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 12/05/2020

Borehole Location: Stage 6 Logged by: AS Checked by: LK Scale: Sheet 1 of 1 1:25 Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 Type & Results Depth OL: Organic SILT: black. Low plasticity. 0.3 Peak = UTP ML: Clayey SILT: Yellowish brown. Low plasticity. н SM: Silty fine SAND: Grey. Poorly graded. 11 (Whangamarino Formation) 20 D to VD 1.2 Peak = UTP ML: SILT: Light brown. Low plasticity, moderately sensitive. (Whangamarino Formation) Peak = >200kPa 1.5 Residual = 61kPa Н Peak = UTP 1.8 Peak = UTP 2.0 Borehole terminated at 2.0 m

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 12/05/2020



Projection: Mount Eden Position:

г	OSILIOI					Datum: Moturiki Survey Source: Site	Plan				
	Samp	oles & Insitu Tests	Ê	(m)	c Log	Material Description	tion	tency/ Density	[[ynamic Penetro Blows/1	Cone meter 00mm
	Depth	Type & Results	RL (m)	Depth (m)	Graphic Log	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) 15
				-		OL: Organic SILT: black. Low plasticity. (Topsoil)					
	0.3	Peak = UTP		-		ML: Clayey SILT: Yellowish brown mottled grey. Low plasticity. (Fill)					
	0.6	Peak = UTP		-				н			
	0.9	Peak = UTP		1 -		SM: Silty fine SAND: Grey. Poorly graded. (Fill)	м				
	1.2	Peak = UTP		-		ML: SILT: Yellowish brown mottled grey. Low plasticity. (Fill)					
	1.5	Peak = UTP		-				н			
	1.8	Peak = UTP		-							
	2.0	Peak = UTP		2 -		Borehole terminated at 2.0 m					
				-							
				-							
				-							
				-							
				-							
				3 -							
				-							
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				-							
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]						
- [5 —	1						

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 12/05/2020

Borehole Location: Stage 6 Logged by: AS Checked by: LK Scale: Sheet 1 of 1

Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 Type & Results Depth OL: Organic SILT: black. Low plasticity. (Topsoil) 9 13 0.3 Peak = UTP SM: Silty fine SAND: Grey. Poorly graded. MD 6 (Fill) 15 1.2 Peak = UTP ML: SILT: Brown. Low plasticity. Peak = UTP 1.5 Н Peak = UTP 1.8 Peak = UTP 2.0 2 Borehole terminated at 2.0 m

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 07/11/2019

Checked by: KR Scale: Borehole Location: Stage 6 Logged by: LK Sheet 1 of 1 Position: 434216.6mE; 740555.8mN Projection: Mount Eden Datum: Moturiki Survey Source: Handheld GPS Dynamic Cone Penetrometer Samples & Insitu Tests **Graphic Log** Groundwater Moisture Condition 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth OL: Organic SILT: brown. (Topsoil) D CH: Silty CLAY: with minor fine sand; grey. Low plasticity. 0.3 Peak = Utp VSt Peak = 135kPa Residual = 46kPa 0.6 M Peak = 173kPa Residual = 55kPa 0.9 1.2 Peak = Utp 1.6 Peak = >200kPa Residual = 37kPa Н W Peak = Utp 2.0 2 2.4 Peak = Utp Borehole terminated at 2.4 m

Termination Reason: Target depth

Shear Vane No: 1785 DCP No:

Remarks: Groundwater not encountered.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 07/11/2019

Borehole Location: Stage 2/6 Logged by: LK Checked by: KR Scale: 1:25 Sheet 1 of 1

Position: 434217.2mE; 740580.4mN Projection: Mount Eden

						Datum: - Survey Sou	rce: Han	<u>dhe</u> ld	<u>G</u> P	S			
	nples & Insitu Tests	RL (m)	1	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit)		Moisture Condition	Consistency/ Relative Density	(1)	Oynami Penetro Blows/1	metei 00mm	n)
Depth	Type & Results			۱ -	g			20	Rela		5 10) 1:	5
0.3	Peak = 175kPa Residual = 15kPa				× × × × × × × × × × × × × × × × × × ×	Organic SILT: black. Low plasticity. (Topsoil) ML: SILT: white. Low plasticity, extra sensitive. (Whangamarino Formation) at 0.30m, Becoming mottled brown.		M to	VSt				
				-	** *** ***	SP: Silty Fine SAND: light grey. Poorly graded. (Whangamarino Formation)		М	TP	3			
0.9	Peak = UTP		1		×× ×× ×× ××	ML: Sandy SILT: light grey. Low plasticity, Sand, fine. (Whangamarino Formation)		w	н	4			
1.2	Peak = UTP			-1	*	SP: Silty Fine SAND: light grey. Poorly graded. (Whangamarino Formation)		М			11		
					×	from 1.50m to 1.70m, Contains a lense of silty fine sand.		M to W			10 8 8		
			2	2	× × × × × × × × × × × × × × × × × × ×			М	D		10	14	
				1	^ <u>\</u> >	Borehole terminated at 2.3 m							l
			2										
	tion Reason: Tar			5 —									

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.

7

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 25/05/2019

Borehole Location: Stage 6 - Lot 98/99 Boundary Logged by: LYK Checked by: YSL Scale: Sheet 1 of 1

Position: Projection: Mount Eden

Survey Source: Site Plan Elevation: 17.50m Datum: Moturiki Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth 귐 10 Type & Results Depth 17.5 CL: CLAY: brown, mottled grey. Low plasticity. (Topsoil) 0.1 Peak = UTP 17.3 SP: Fine SAND: with some silt: light grey. Poorly graded. 16 (Whangamarino Formation) 13 ... from 0.40m to 0.60m, contains a lens of silty sand 9 12 15 10 ... from 0.80m to 1.00m, contains a lens of silty sand 12 Peak = UTP 0.9 16.4 SM: Silty fine SAND: light grey. Poorly graded. (Whangamarino Formation)
... at 1.20m, becoming mottled orange. .. from 1.30m to 1.50m, contains a lens of brown silt. 1.4 Peak = 148kPa Residual = 27kPa 16.0 SP: Fine SAND: with some silt: light grey. Poorly graded. (Whangamarino Formation) 9 15 15.7 SM: Silty fine SAND: light grey. Poorly graded. (Whangamarino Formation) 8 Peak = UTP 2.0 2 Borehole terminated at 2.0 m

Termination Reason: Target Depth Reached Shear Vane No: DCP No:

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



Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 30/04/2020

Borehole Location: Stage 6 Logged by: LK Checked by: LK Scale: Sheet 1 of 1 1:25 Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwate 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) $\widehat{\Xi}$ (Blows/100mm) Depth 귐 10 Type & Results Depth ML: Clayey SILT: brown, mottled orange grey. Low plasticity. (Fill) 0.3 Peak = UTP D 0.6 Peak = UTP CL: CLAY: brown, mottled orange and grey. Low plasticity. 0.9 Peak = UTP ... from 1.00m to 1.30m, contains minor fine to medium sand 1.2 Peak = UTP M 1.6 Peak = UTP ML: Clayey SILT: dark greyish black. Low plasticity (Whangamarino Formation) ML: Clayey SILT: with minor sand; brown, mottled brown. Low plasticity; Sand, fine. (Whangamarino Formation) Peak = UTP 2.0 Borehole terminated at 2.0 m

Termination Reason: Target Depth Reached
Shear Vane No: 2560 DCP No:
Remarks: Groundwater not encountered.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020



Position: Projection: Mount Eden

Datum: Moturiki Survey Source: Site Plan

	OSILIO					Datum: Moturiki Survey Source: Site	Plan					
Groundwater	Sam	ples & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	F (E	ynamic enetro Blows/1	c Cone ometer 00mm))
Grou	Depth	Type & Results	₩	Dep	Grap	Rock: Colour, fabric; rock name; additional comments. (origin/geological unit)	δος	Cons	ţ	5 10 I I) 15 	5
	0.3	Peak = UTP		-		ML: SILT with some sand: grey. Low plasticity; Sand, fine. (Fill)						
	0.6	Peak = UTP		-				н				
	0.9	Peak = UTP		1 -		CH: CLAY: brown. High plasticity. (Fill)	- м				\dashv	
	1.2	Peak = 173kPa Residual = 58kPa		-		ML: SILT: light brown. Low plasticity. (Fill)	_	VSt				
	1.5	Peak = >200kPa Residual = 29kPa		-	X X X X X X X X X X X X X X X X X X X	ML: SILT with some sand: grey. Low plasticity; Sensitive; Sand, fine. (Whangamarino Formation)		VSt to				
				2 -	X X X X X X X X X	Borehole terminated at 2.0 m		Н			4	
				-								
				-								
				3 -								
				-								
				-								
				4								
				-								
				-								
				5 -							\perp	
Т	erminat	ion Reason: Tar	net D	enth F	2 Paach	od	1					

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020

Borehole Location: Stage 6 Logged by: LK Checked by: LK Scale: Sheet 1 of 1 1:25 Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth ML: Clayey SILT: with minor sand; greyish brown, mottled orange, Low plasticity; Sand, fine. (Fill) 0.3 Peak = UTP M 0.6 Peak = UTP 0.9 Peak = UTP 1.2 Peak = UTP 1.6 Peak = UTP CL: CLAY: brown, mottled orange. Low plasticity. Peak = UTP 2.0 2 М 2.4 Peak = >200kPa CH: Silty CLAY: grey, mottled orange. High plasticity. (Whangamarino Formation) Borehole terminated at 2.5 m

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 30/04/2020

Borehole Location: Stage 6 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

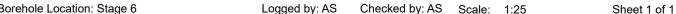
Projection: Mount Eden Position: Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater Material Description
Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit)
Rock: Colour; fabric; rock name; additional comments. (origin/geological unit) $\widehat{\Xi}$ (Blows/100mm) Depth 귐 10 15 Type & Results Depth ML: Clayey SILT: with minor sand; greyish brown, mottled orange and grey. Low plasticity; Sand, fine. (Fill) VSt 0.3 Peak = 191kPa SP: Fine SAND: white. Poorly graded. (Fill) D 14 ... from 0.80m to 0.85m, contains inclusion of clayey silt. 0.9 Peak = UTP ML: Clayey SILT: with minor sand; greyish brown, mottled orange and grey. Low plasticity; Sand, fine. 1.2 Peak = UTP Н 1.6 Peak = UTP Peak = UTP 2.0 2 Borehole terminated at 2.0 m

Termination Reason: Target Depth Reached
Shear Vane No: 2560 DCP No:
Remarks: Groundwater not encountered.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 03/02/2020



Borehole Location: Stage 6 Logged by: AS Checked by: AS Sheet 1 of 1 Scale: Position: Projection: Mount Eden Datum: Moturiki Survey Source: Hand Held GPS Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater Moisture Condition 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth OL: SILT: dark brown. Non plastic. (Topsoil) 0.3 Peak = UTP D ML: Clayey SILT: grey. Low plasticity. (Fill)
... at 0.40m, becoming brown. 0.6 Peak = >200kPa ... at 0.80m, becoming greyish brown. 0.9 Peak = 170kPa Н 1.2 Peak = >200kPa ML: SILT with minor sand: grey. Low plasticity; sand, fine. (Whangamarino Formation) 1.6 Peak = >200kPa Residual = 40kPa Peak = UTP 1.8 Borehole terminated at 1.8 m. 2

Termination Reason: Refusal on dense silt. Shear Vane No: 2349 DCP No: Remarks: Groundwater not encountered.

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 6 Logged by: AS Checked by: LK Scale: Sheet 1 of 1 1:25 Position: 434287.1mE; 740544.8mN Projection: Mount Eden Datum: Moturiki Survey Source: Handheld GPS Dynamic Cone Penetrometer Samples & Insitu Tests Graphic Log Groundwater Moisture Condition 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 Type & Results Depth SP: Silty Fine SAND: grey. Poorly graded. (Whangamarino Formation) 5 4 М MD 2 ML: SILT: light greyish brown. Low plasticity, sensitive. (Whangamarino Formation) Peak = >200kPa Residual = 28kPa 0.8 ML: SILT: dark grey. Low plasticity. (Whangamarino Formation) 1.2 Peak = UTP 1.5 Peak = UTP Borehole terminated at 1.5 m 2

Termination Reason: Refusal on dense silt

Shear Vane No: 2352 DCP No: 6

Remarks: Groundwater not encountered.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/11/2019

Borehole Location: Stage 6 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

					Datum: Moturiki Survey Source: Hai	ndheld	GP.	<u> </u>		
Sam Depth	ples & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	F (E	ynamic Penetro Blows/10	meter
Depth	Type & Results	굽	Dep		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)		Consi		5 10	15
0.3	Peak = Utp			*	MH: SILT: grey. Low plasticity. (Whangamarino Formation)	D to M	н			
0.5	Peak = 181kPa Residual = 23kPa			X X X X X X X X X X X X X X X X X X X	MH: SILT: with some clay; dark grey. High plasticity, extra sensitive. (Whangamarino Formation)	W to				
0.9	Peak = Utp Peak = 172kPa		1 -	X X X X X X X X X X X X X X X	from 0.90m to 1.30m, Contains a 300mm thick lens of light grey silt	М	VSt to H			
	Residual = 20kPa			× × × × × × × × × × × × × × × × × × ×	SP: Fine SAND: with some silt; dark grey. Poorly graded. (Whangamarino Formation)	w			9	
			2 -		from 1.90m to 2.00m, Contains 100mm lens thick fine to coarse sand Borehole terminated at 2.0 m	S	D		9	3
			-							
			3 -							
			4 -	-						
				-						
			5 -	-						

Termination Reason: Target depth

Shear Vane No: 2560 DCP No:

Remarks: Groundwater encountered at 1.80 m.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 23/10/2020

Borehole Location: Stage 6 Logged by: AS Checked by: AS Sheet 1 of 1 Scale: 1:25 Position: 434260.4mE; 740195.6mN Projection: Mount Eden Datum: Moturiki Survey Source: Handheld GPS Dynamic Cone Penetrometer Samples & Insitu Tests **Graphic Log** Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth Organic SILT: dark brown. No plasticity. (Topsoil) 0.3 Peak = UTP ML: SILT: with some clay, with trace fine sand; greyish brown. Low plasticity. (Fill) 0.6 Peak = 141kPa 0.9 Peak = >200kPa Н 1.2 Peak = UTP 1.5 Peak = UTP Peak = >200kPa 1.8 Peak = UTP 2.0 2 Borehole terminated at 2.0 m

Termination Reason: Target depth

Shear Vane No: 1785 DCP No:

Remarks: Groundwater not encountered.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 12/10/2020



Position: Projection: Mount Eden

Datum: Moturiki Survey Source: Site Plan

					Datum: Moturiki	Survey Source: Site	Plan					
Sam	nples & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Descripti Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; ser Rock: Colour; fabric; rock name; additional co	ion	Moisture Condition	Consistency/ Relative Density	F (E	Oynami Penetro Blows/1		
Depth	Type & Results	ı œ	Pe	Gra	Rock: Colour; fabric; rock name; additional col	mments. (origin/geological unit)	ဋိပိ	Con		5 10 I I	0 1	15
0.3	Peak = >200kPa				ML: SILT with minor clay and sand: yellowish brown, mottled (Fill)	d brown. Low plasticity; sand, fine.						
0.6	Peak = UTP											
0.9	Peak = >200kPa		1				М	н				+
1.2	Peak = >200kPa			3								
1.5	Peak = >200kPa											
1.8	Peak = >200kPa											
2.0	Peak = UTP		2		Borehole terminated	at 2.0 m	1		<u> </u>	\vdash		+
			3									
			4									
			5	- - - -								1

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 12/05/2020

Borehole Location: Stage 6 Logged by: AS Checked by: LK Scale: Sheet 1 of 1 Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **Graphic Log** Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth ML: Clayey SILT: Brown. Low plasticity. (Fill) 0.3 Peak = >200kPa 0.6 Peak = UTP 0.9 Peak = >200kPa ... from 1.00m to 1.30m, with minor fine gravel. 1.2 Peak = >200kPa 1.5 Peak = UTP Peak = UTP 1.8 2 2.1 Peak = UTP 2.4 Peak = UTP Borehole terminated at 2.5 m

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 12/05/2020

Borehole Location: Stage 6 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **Graphic Log** Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth OL: Organic SILT: black. Low plasticity. (Topsoil) 0.3 Peak = 173kPa ML: Clayey SILT: Yellowish brown. Low plasticity. 0.6 Peak = >200kPa 0.9 Peak = UTP 1.2 Peak = UTP VSt to H 1.5 Peak = 150kPa ... at 1.50m, becoming grey. Peak = 133kPa 1.8 ... at 1.80m, becoming light brown. 2 2.1 Peak = UTP 2.4 Peak = UTP Borehole terminated at 2.5 m

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 10/03/2020

Borehole Location: Stage 6 Logged by: AS Checked by: AS Scale: 1:25 Sheet 1 of 1

Position: Projection: Mount Eden

Datum: Moturiki Survey Source: Site Plan

					Datum: Moturiki Survey Source: S	Site Plar	1				
Sam	nples & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological un Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)			e Density	Dynar Pene (Blows	nic Co tromet 3/100n	one ter nm)
Depth	Type & Results	≅	Dec	Grap	Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	M C	Cons	Kelativ	5	10 	15
0.3	Peak = >200kPa				ML: Clayey SILT with trace fine sand: brown, mottled orange and grey. Low plasticity. (Fill)						
0.6	Peak = UTP										
0.9	Peak = 150kPa		1			М	VSt H	to		_	
1.2	Peak = >200kPa										
1.5	Peak = UTP										
1.8	Peak = UTP										
2.0	Peak = UTP		2	1	Borehole terminated at 2.0 m			+	+	+	+
			3								
			4								

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 10/03/2020



Position: Projection: Mount Eden

'	OSILIO					Datum: Moturiki Survey Source: Site	Plan					
Groundwater	Sam	ples & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	F (E	ynamio Penetro Blows/1	c Cone meter 00mm	e r n)
Grou	Depth	Type & Results	₩.	Dep	Grap	Rock: Colour, fabric; rock name; additional comments. (origin/geological unit)	N O	Cons	Ę	5 10 I I	0 15 I	5
	0.3	Peak = >200kPa		-		ML: Clayey SILT: brown, mottled grey. Low plasticity. (Fill)						
	0.6	Peak = >200kPa		-								
	0.9	Peak = UTP		1 -			М	VSt to H				
	1.2	Peak = UTP		-								
	1.5	Peak = 130kPa		-								
	1.8	Peak = >200kPa		-		at 1.90m, becoming dark brown, with trace black mottling.						
	2.0	Peak = >200kPa		2 -	10000	Borehole terminated at 2.0 m					\dashv	
				3 -								
				-								
				4 —								
1				5 —							_	
	in at	ion Reason: Tar	got D	-	2000							

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 10/03/2020

Borehole Location: Stage 6 Logged by: AS Checked by: AS Scale: 1:25 Sheet 1 of 1

Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **Graphic Log** Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth 귐 10 15 Type & Results Depth ML: Clayey SILT: brown, mottled grey. Low plasticity. (Fill) 0.3 Peak = 190kPa 0.6 Peak = UTP ... from 0.80m to 1.00m, some fine sand. 0.9 Peak = >200kPa 1.2 Peak = UTP Peak = >200kPa 1.5 Peak = >200kPa 1.8 ... at 1.90m, trace coarse gravel; angular. Peak = UTP 2.0 2 Borehole terminated at 2.0 m

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020

Borehole Location: Stage 6 Logged by: LK Checked by: LK Sheet 1 of 1 Scale: Position: Projection: Mount Eden Survey Source: Site Plan Datum: Moturiki Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwate 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth OL: Organic SILT: brown. Low plasticity. (Topsoil)

ML: Clayey SILT: with minor sand; grey , mottled orange. Low plasticity; Sand, fine to course. (Fill) 0.3 Peak = 172kPa 0.4 Peak = >200kPa VSt W 0.6 Peak = 188kPa Peak = UTP 0.9 ... from 1.10m to 1.30m, contains a lens of fine to course sand, tightly packed. М 1.4 Peak = UTP w ... from 1.50m to 1.60m, contains a lens of fine to course sand, tightly packed 1.6 Peak = UTP ML: Clayey SILT: brown, mottled orange grey. Low plasticity. (Fill) н Peak = UTP 2.0 2 ... at 2.10m, becoming grey, mottled orange grey. М 2.4 Peak = UTP 2.6 Peak = UTP Borehole terminated at 2.6 m

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062 Date: 12/05/2020 Borehole Location: Stage 6 Logged by: AS Checked by: LK Scale: Sheet 1 of 1 Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 Type & Results Depth OL: Organic SILT: black. Low plasticity. (Topsoil) 0.3 Peak = UTP ML: Clayey SILT: Brown. Low plasticity. 0.6 Peak = 199kPa 0.9 Peak = >200kPa ... at 0.90m, becoming mottled orange. 1.2 Peak = 144kPa VSt to H 1.5 Peak = 153kPa Peak = UTP 1.8 Peak = UTP 2.0 2 2.3 Peak = UTP ML: Sandy SILT: Grey. Low plasticity; Sand, fine. (Whangamarino Formation) 2.5 Peak = UTP Borehole terminated at 2.5 m

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020



Position: Projection: Mount Eden Survey Source: Site Plan

						Datum: Moturiki Survey Source: Site	Plan					
Groundwater	Samp	ples & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	E (E	Oynamio Penetro Blows/1	: Cone meter 00mm	e n)
Grou	Depth	Type & Results	Œ	De	Gra		≥ိပိ	Con		5 10 I I) 15 I	5
	0.3	Peak = >200kPa		-		MH: Clayey SILT: Light brown. High plasticity (Fill)						
	0.6	Peak = UTP		-								
	0.9	Peak = >200kPa		1 —			М	Н				
	1.2	Peak = >200kPa		-								
	1.5	Peak = UTP		- - - -								
	1.8	Peak = UTP		-								
	2.0	Peak = UTP		2 —	*****	Borehole terminated at 2.0 m	+			Н	+	\dashv
				3								
				5 —								

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

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



Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth ML: SILT with some sand: grey. Low plasticity. (Fill) 0.3 Peak = 161kPa 0.6 Peak = >200kPa CH: CLAY: brown. High plasticity. (Fill) 0.9 Peak = >200kPa 1.2 Peak = 176kPa 1.5 Peak = >200kPa Peak = UTP 1.8 Peak = UTP 2.0 2 Borehole terminated at 2.0 m

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 12/05/2020



Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater Moisture Condition 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth ML: Clayey SILT: Brown. Low plasticity. (Fill) M Н 0.3 Peak = >200kPa ML: Clayey SILT: Grey. Low plasticity. 0.6 Peak = 107kPa Peak = 121kPa Residual = 43kPa 0.9 ... at 0.90m, becoming brown. Peak = 135kPa Residual = 43kPa 1.2 VSt to H 1.5 Peak = 179kPa Residual = 55kPa Peak = >200kPa Residual = 58kPa 1.8 2 2.1 Peak = >200kPa ... at 2.10m, becoming yellow mottled brown. Residual = 75kPa М 2.4 Peak = UTP Borehole terminated at 2.5 m

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

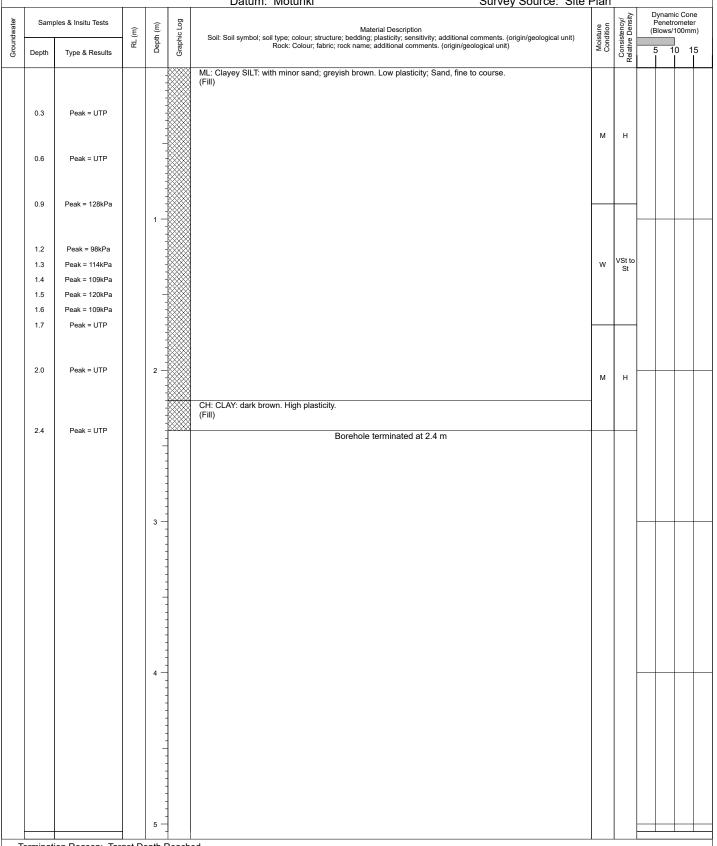
Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 30/04/2020

Borehole Location: Stage 6 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: Mount Eden
Datum: Moturiki Survey Source: Site Plan



Termination Reason: Target Depth Reached
Shear Vane No: 2560 DCP No:
Remarks: Groundwater not encountered.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020

Borehole Location: Stage 6 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: Mount Eden

Datum: Moturiki Survey Source: Site Plan

						Datum: Moturiki Survey Source: S	te Plar	1				
	Samp	oles & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)			re Density	Dyna Pen (Blov	amic C netromo ws/100	Cone eter Omm
[Depth	Type & Results	<u>«</u>	Deg			ĕÖ	Cons	Relativ	5	10	15
	0.3	Peak = UTP			X X X X X X X X X X X X X X X X X X X	ML: Clayey SILT: with minor fine to course sand; greyish brown, mottled orange. Low plasticity. (Fill)		 -				
	0.6	Peak = UTP			- X X - X X							
	0.9	Peak = 166kPa		1	1 X X X X X X X X X X X X X X X X X X X	at 1.10m, contains some sand.	M		_	+	+	
	1.3	Peak = >200kPa				from 1.20m to 1.30m, contains a lens of sand.		VSI F				
	1.6	Peak = UTP			(X X X X X X X X X X X X X X X X X X X							
	2.0	Peak = UTP		2		Borehole terminated at 2.0 m			_	+	+	_
					-							
				3	-							
					-							
				4	-							
					-							
					-							
					-							
				5	_					\pm	\pm	\exists

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020



Position: Projection: Mount Eden

Datum: Moturiki Survey Source: Site Plan

						Datum: Moturiki Survey Source: Site	Plan				
Groundwater	Samp	oles & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	F	ynamic Penetro Blows/10	Cone meter 00mm)
Grou	Depth	Type & Results	교	Dep	Grap	Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	S o	Cons Relativ		5 10	15
	0.3	Peak = 154kPa		-		ML: Clayey SILT: with minor fine to course sand; greyish brown, mottled orange. Low plasticity. (Fill)		St			
	0.6	Peak = 154kPa									
	8.0	Peak = 86kPa					w	St			
	1.1	Peak = 120kPa		1 -			l vv	51			
	1.2	Peak = 185kPa			****						
	1.4	Peak = 129kPa		-							
	1.6	Peak = 139kPa						VSt to H			
	2.0	Peak = UTP		2 -							
				-	-	Borehole terminated at 2.0 m					
				3 -	-						
				-							
				-	-						
				5 -]					_	_

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020

Borehole Location: Stage 6 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: Mount Eden
Datum: Moturiki Survey Source: Site Plan

					Datum: Moturiki Survey Source: Site	Plan					
Samples Samples	s & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	E (E	ynamic Penetro Blows/1	c Cone ometer (00mm))
Depth	Type & Results	₩ ₩	Dep	Grap	Rock: Colour, fabric; rock name; additional comments. (origin/geological unit)	§ S	Cons	Ę	5 10 I I	0 15 I	,
0.3 F	Peak = >200kPa				ML: Clayey SILT: brown. Low plasticity. (Fill)						
0.6	Peak = UTP										
0.9	Peak = UTP		1 -			М	VSt to H			_	
1.2	Peak = 173kPa										
1.6	Peak = UTP		-								
2.0	Peak = UTP		2 -		Borehole terminated at 2.0 m					_	
			-								
			3 -								
			-								
			4 -								
			_								
			5 -							\perp	
Termination	n Reason: Tare	net D	enth I	Zeach		Ь—					_

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020



Position: Projection: Mount Eden

						Datum: Moturiki Survey Source: Site	Plan					
Groundwater	Sam	ples & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	F (E	Oynamio Penetro Blows/1	Cone meter	e r n)
Groun	Depth	Type & Results	占	Dep	Graph		Moi	Consi	į	5 10) 1!	5
	0.3	Peak = UTP		-		ML: Clayey SILT: brown. Low plasticity. (Fill)						
	0.6	Peak = 130kPa Residual = 29kPa		-								
	0.9	Peak = 144kPa Residual = 29kPa		1 -			М	VSt to H				
	1.2	Peak = UTP		-								
	1.5	Peak = UTP		-								
	1.8	Peak = UTP		-		ML: Clayey SILT with some gravel: brown. Low plasticity; gravel, coarse. (Whangamarino Formation)	-					
				2 -	77	Borehole terminated at 2.0 m	+					
				-								
				-								
				-								
				-								
				3 -								
				-								
				-								
				-								
				4 -								
				-								
				-								
				-								
				5 —								
<u>_</u>	<u> </u>	ion Reason: Ref			<u>ل</u> با						_	

Termination Reason: Refusal on gravels.

Shear Vane No: 1785 DCP No:

Remarks: Groundwater not encountered.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020



Position: Projection: Mount Eden

Datum: Moturiki Survey Source: Site Plan

						Datum: Moturiki Survey Source: Site	Plan					
De	Sampl	les & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	E (E)ynami Penetro Blows/1	100mn	m)
De	epth	Type & Results		ă	Ga	Nock. Colour, rabite, rock frame, additional comments. (origin/geological unit)	≥٥	Cor	5	5 10 	0 1	5
).3	Peak = UTP				ML: Clayey SILT: brown. Low plasticity. (Fill)						
	0.6	Peak = UTP						н				
	0.9	Peak = UTP		1 -			М					
	1.2	Peak = UTP			X X X X X X X X X X X X	ML: Gravelly SILT: grey. Low plasticity; gravel, coarse. (Whangamarino Formation) ML: SILT: greyish brown. Low plasticity; Extra sensitive. (Whangamarino Formation)						
1	1.5	Peak = >200kPa Residual = 17kPa			(VSt				
				2 -	X X X X X X X X X X X X X X X X X X X	SM: Silty fine SAND: grey. Poorly graded. (Whangamarino Formation) Borehole terminated at 2.0 m						
				-								
				3 -								
				-								
				4 -								
					- - - - - - -							
				-	† - - - - -							
	\dashv			5 -]							Ι

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

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 6 Logged by: AS Checked by: LK Sheet 1 of 1 Scale: 1:25 Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 Type & Results Depth ML: Clayey SILT: brown. Low plasticity. (Fill) 0.3 Peak = 173kPa 0.5 Peak = >200kPa VSt to GM: Gravelly SILT: grey. Low plasticity; gravel, coarse. (Whangamarino Formation) 0.9 Peak = UTP 1.2 Peak = UTP SP: Fine SAND: grey. Poorly graded. (Whangamarino Formation) Peak = >200kPa 1.5 ML: SILT with minor sand: grey. Low plasticity. Residual = 29kPa (Whangamarino Formation) Peak = >200kPa Residual = 26kPa 1.8 VSt to 2.1 Peak = UTP 2.4 Peak = UTP Borehole terminated at 2.5 m

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

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 03/07/2020

Borehole Location: Stage 6 Logged by: AS Checked by: LK Sheet 1 of 1 Scale: 1:25 Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 Depth Type & Results OL: Organic SILT: black. Low plasticity. 4 8 0.3 Peak = UTP GP: Silty Medium to coarse GRAVEL: greyish white. Poorly graded. 5 M to W (Whangamarino Formation) 10 MD to 10 0.6 Peak = UTP 11 ML: Gravelly SILT: light yellowish brown. Low plasticity. (Whangamarino Formation) 0.9 Peak = UTP 5 3 4 Peak = 144kPa Residual = 26kPa 1.2 5 SP: Fine to medium SAND: with minor silt; grey. Poorly graded. 9 (Whangamarino Formation) W 9 MD to 4 ML: SILT: with trace fine sand; grey. Low plasticity. (Whangamarino Formation) 8 Peak = UTP 1.8 12 VSt Peak = UTP 2.0 Borehole terminated at 2.0 m

Termination Reason: Target depth.

Shear Vane No: 1785 DCP No: 13

Remarks: Groundwater not encountered.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020

Borehole Location: Stage 6 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: Mount Eden Survey Source: Site Plan Datum: Moturiki Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwate 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 Type & Results Depth ML: Organic SILT: with minor sand; light grey. Low plasticity; Sand, fine. (Topsoil) 8 SM: Silty fine SAND: grey. Poorly graded; Pumiceous. 9 0.3 Peak = UTP (Whangamarino Formation) 9 MD 6 0.5 Peak = 102kPa ... from 0.50m to 0.60m, lens of sandy silt. 0.6 Peak = 151kPa W L SW: Fine to course SAND: brown, mottled orange. Well graded. 3 (Whangamarino Formation) 3 ML: SILT: with minor fine sand; light grey. Low plasticity. 6 (Whangamarino Formation)
SP: Fine to medium SAND: with some silt; light grey. Poorly graded. 6 (Whangamarino Formation) MD 5 MH: SILT: with some clay; brown, mottled orange. High plasticity. 5 (Whangamarino Formation)
... at 1.40m, iron stained. LIGNITE: black. No plasticity. 10 (Whangamarino Formation) 12 D Н 18 Peak = UTP 1.9 Borehole terminated at 1.9 m 2 -

Termination Reason: Refusal

Shear Vane No: 1911 DCP No: Remarks: Groundwater not encountered.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 13/05/2020

Borehole Location: Stage 6 Logged by: LK Checked by: LK Scale: Sheet 1 of 1 1:25 Position: Projection: Mount Eden Survey Source: Site Plan Datum: Moturiki Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwate 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 Type & Results Depth OL: Organic SILT: brown. Low plasticity. (Topsoil) ML: Sandy SILT: grey, mottled orange. Low plasticity; Sand, fine. (Whangamarino Formation)
SP: Fine SAND: with some silt; light grey. Poorly graded.
(Whangamarino Formation)
... from 0.40m to 0.45m, contains lens of silt 4 6 8 11 10 9 MD to 10 8 6 SW: Fine to course SAND: with trace silt; grey, mottled yellow. Well graded. (Whangamarino Formation) 4 4 ... from 1.50m to 1.60m, contains lens of light grey silt. SM: Silty fine SAND: grey. Poorly graded. 11 (Whangamarino Formation)
... from 1.70m to 1.80m, contains a lens of brown clayey silt. D 12 LIGNITE: black. No plasticity. М Н 15 (Whangamarino Formation) Borehole terminated at 1.9 m 2

Termination Reason: Refusal

Shear Vane No: DCP No:

Remarks: Groundwater not encountered.

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 13/05/2020

Borehole Location: Stage 6 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: Mount Eden Survey Source: Site Plan Datum: Moturiki Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwate 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) $\widehat{\Xi}$ (Blows/100mm) Depth 귐 10 Depth Type & Results OL: Organic SILT: brown. Low plasticity. (Topsoil) D 3 MH: Clayey SILT: light brownish grey. High plasticity; Halloysite. (Whangamarino Formation)
ML: SILT: light grey. Low plasticity. 0.3 Peak = >200kPa 4 (Whangamarino Formation)
SP: Fine SAND : with some silt; light grey. Poorly graded. (Whangamarino Formation) M 10 14 10 SM: Silty fine SAND: light grey. Poorly graded. 6 (Whangamarino Formation) ... from 1.20m to 1.30m, contains a lens of brown silt, halloysite W D ML: Sandy SILT: brown. Low plasticity. (Whangamarino Formation)
SP: Fine SAND: with some silt; brown. (Whangamarino Formation) Peak = 51kPa 1.6 ML: Sandy SILT: brown. Low plasticity; Sand, fine. (Whangamarino Formation) W to Peak = Fell through 2.0 2 vs s LIGNITE: black. No plasticity. М 2.5 Peak = UTP (Whangamarino Formation) Borehole terminated at 2.5 m

Termination Reason: Refusal Shear Vane No: 2087

Shear Vane No: 2087 DCP No: Remarks: Groundwater encountered at 2.2 m

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 13/05/2020

Borehole Location: Stage 6 Logged by: LK Checked by: LK Scale: Sheet 1 of 1 1:25 Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwate 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 Type & Results Depth OL: Organic SILT: brown. Low plasticity. (Topsoil)
ML: SILT: light grey. Low plasticity. н 8 (Whangamarino Formation) 8 0.3 Peak = UTP SP: Fine SAND: with some silt; light grey. Poorly graded. 8 (Whangamarino Formation)
SM: Silty fine SAND: light grey. Poorly graded. M 9 (Whangamarino Formation) 8 10 11 11 0.9 Peak = UTP VD 9 8 13 SP: Fine to medium SAND: with minor silt; grey. Poorly graded. 14 (Whangamarino Formation) 8 13 ... from 1.50m to 1.10m, contains a lens of sandy silt. 6 LIGNITE: black. Low plasticity. 8 (Whangamarino Formation) 6 М 10 Peak = UTP 1.9 Borehole terminated at 1.9 m 2 -

Termination Reason: Refusal

Shear Vane No: 2087 DCP No: Remarks: Groundwater not encountered.

HAND AUGER BOREHOLE LOG - PCHA 145

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020

Borehole Location: Stage 6 Logged by: LK Checked by: LK Scale: Sheet 1 of 1 1:25

Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 Type & Results Depth SP: Fine to medium SAND: with minor silt; brown, mottled orange. Poorly graded (Whangamarino Formation) 5 5 MD to D 4 М 6 8 0.6 Peak = UTP 9 MH: SILT: with some clay; brown, mottled orange. High plasticity. 6 (Whangamarino Formation)
LIGNITE: black Н М 0.9 Peak = UTP (Whangamarino Formation) Borehole terminated at 0.9 m 2

Termination Reason: Refusal

Shear Vane No: 1911 DCP No: Remarks: Groundwater not encountered.

HAND AUGER BOREHOLE LOG - PCHA 145 A

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 17/05/2020



Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater Moisture Condition 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 Type & Results Depth OL: Organic SILT: brown. Low plasticity. 7 MD to SP: Silty fine SAND: grey. Poorly graded. 8 (Whangamarino Formation) 10 8 4 4 4 MD 5 SM: Silty fine to medium SAND: brown. Poorly graded. 6 (Whangamarino Formation) 6 6 ML: SILT: with minor clay; yellowish brown, mottled brown. Low plasticity. (Whangamarino Formation) 10 Peak = 159kPa 1.5 16 Residual = 17kPa 20 VSt to М LIGNITE: black. No plasticity. (Whangamarino Formation) Peak = UTP 1.8 Peak = UTP 2.0 Borehole terminated at 2.0 m

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

HAND AUGER BOREHOLE LOG - PCHA 146

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020



Position: Projection: Mount Eden

						Datum: Moturiki Sur	rvey Source: Site F	Plan					
Groundwater	Samp	ples & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional commen Rock: Colour; fabric; rock name; additional comments. (origin/geological			Consistency/ Relative Density	(E	ynamic Penetro Blows/10	meter 00mm)	1
Gro	Depth	Type & Results		De	Gra	Rock. Colour, labric, rock name, additional comments. (origin/geological	unit)	Σŏ	Con Relati	5	5 10 I I	15	
	0.3	Peak = UTP		-		ML: Clayey SILT: brown, mottled white and pink. Low plasticity. (Fill) CL: Sandy CLAY: with minor gravel; brownish grey. Low plasticity. Sand, fine to coumedium. (Whangamarino Formation)							
	0.6	Peak = 188kPa Residual = 22kPa		-	(ML: SILT: with some clay; light greyish brown, mottled black. Low plasticity, extra se (Whangamarino Formation)	ensitive; Halloysite.		VSt				
	0.9	Peak = 114kPa Residual = 15kPa		1 -	(ML: SILT: with minor clay; white. Low plasticity, sensitive; halloysite. (Whangamarino Formation)		w				+	
	1.2	Peak = 89kPa Residual = 22kPa			X X X X X X X X X X X X X X X X X X X	ML: SILT: with some sand and minor clay; brown. Low plasticity, extra sensitive; Sa (Whangamarino Formation)	nd, fine.		St				
	1.6	Peak = 126kPa Residual = 15kPa Peak = UTP		-	(ML: SILT: with minor clay; white. Low plasticity, extra sensitive; halloysite. (Whangamarino Formation) LIGNITE: black. No plasticity.			VSt to H				
				2 -		(Whangamarino Formation) Borehole terminated at 1.9 m		М				_	
				-									
				3 -									
				-									
				4									
				5 —									
		ion Resson: Ref	1										-

Termination Reason: Refusal

Shear Vane No: 1911 DCP No:

Remarks: Groundwater not encountered.

HAND AUGER BOREHOLE LOG - PCHA 146 A

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 14/05/2020



Projection: Mount Eden Position: Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 Type & Results Depth OL: Organic SILT: brown. Low plasticity. 10 9 0.3 Peak = UTP ML: Gravelly SILT: brown. Low plasticity. Gravel, fine to course. 2 M Peak = 199kPa Residual = 6kPa 0.4 ML: SILT: with trace fine sand; brown and yellow. Low plasticity. 2 Н 1 Peak = >200kPa Residual = 17kPa 0.7 ML: SILT: grey. Low plasticity, dilatant. 6 W 6 1.0 Peak = UTP SW: Fine to course SAND: with trace silt; grey. Well graded. 6 6 M L ... at 1.70m, becoming brown W 2 Borehole terminated at 2.0 m

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

HAND AUGER BOREHOLE LOG - PCHA 147/148

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020

Borehole Location: Stage 6 Logged by: LK Checked by: LK Sheet 1 of 1 Scale: Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwate $\widehat{\Xi}$ Material Description (Blows/100mm) 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) Depth 귐 10 Type & Results Depth ML: Clayey SILT: with minor sand; greyish brown, mottled white and orange. Low plasticity. (Fill) 0.3 Peak = UTP Μ 0.6 Peak = UTP ... at 0.60m, contains some fine sand D to M Peak = UTP 0.9 CH: Silty CLAY: bluish grey. High plasticity. (Whangamarino Formation)
... at 1.20m, becoming brown, mottled orange. Peak = UTP 1.2 D ... at 1.40m, becoming grey, mottled orange. contains minor fine to course sand. 1.6 Peak = UTP .. from 1.60m to 1.70m. contains a lens of fine to course sand. CL: Silty CLAY: grey. Low plasticity. (Whangamarino Formation) М ... at 1.90m, contains minor fine sand. Peak = UTP 2.0 Borehole terminated at 2.0 m

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

HAND AUGER BOREHOLE LOG - PCHA 149

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 06/05/2020

Borehole Location: Stage 6 Logged by: LK Checked by: LK Scale: 1:25 Sheet 1 of 1 Position: Projection: Mount Eden Datum: Moturiki Survey Source: Site Plan Dynamic Cone Penetrometer Samples & Insitu Tests **Graphic Log** Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth 귐 10 15 Type & Results Depth ML: Clayey SILT: with minor sand; brown, mottled grey and orange. Low plasticity; Sand, fine to course. (Fill) 0.3 Peak = UTP D to M 0.6 Peak = UTP Н Peak = UTP ... from 0.90m to 1.10m, contains a lens of brown clay. 1.2 Peak = UTP 1.6 Peak = 139kPa Peak = UTP 1.7 CL: CLAY: brown, mottled orange. Low plasticity; contains trace 20-70mm inclusions of sand. (Fill) √St to М Peak = UTP 2.0 Borehole terminated at 2.0 m

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

HAND AUGER BOREHOLE LOG - PCHA 156/157

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 15/11/2019



Position: Projection: Mount Eden
Datum: - Survey Source: Handheld GPS

					Datum: - Survey Source: Har	<u>idh</u> elc					
Samp	ples & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit)	Moisture Condition	- ₹)ynami Penetro Blows/1	omete	er
Depth	Type & Results	<u>«</u>	De	Grap	Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	ĕS	Cons		5 10 I I) 1	5
0.3	Peak = >200kPa Residual = 53kPa			- X X X X X X X X X X X X X X X X X X X	ML: Sandy SILT: grey. Low plasticity, moderately sensitive to sensitive; sand, fine. (Whangamarino Formation)	М	н				
0.5	Peak = 160kPa Residual = 15kPa		-	X X X X X X	ML: SILT: grey. Low plasticity, sensitive to extra sensitive. (Whangamarino Formation)			-			
0.8	Peak = 99kPa Residual = 23kPa		1 -	*		M to W	St to VSt				
1.2 1.3	Peak = 190kPa Residual = 18kPa Peak = >200kPa Residual = 29kPa			(ML: SILT: dark brown. Low plasticity, sensitive.						
1.5	Peak = UTP		-	*	(Whangamarino Formation) ML: SILT: with some fine sand; dark grey. Low plasticity. (Whangamarino Formation)	М	н				
1.8	Peak = UTP			× × × × > × × ×	from 1.90m to 2.00m, becoming fine sandy silt.	-					
2.0	Peak = UTP		2 -	-× × >	Borehole terminated at 2.0 m						1
			3 -								
			4 -								
			5 -	1							

Termination Reason: Target depth

Shear Vane No: 2349 DCP No:

Remarks: Groundwater not encountered.

HAND AUGER BOREHOLE LOG - PCHA 158/159

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 15/11/2019

Checked by: LK Scale: 1:25 Borehole Location: Stage 6 Logged by: AS Sheet 1 of 1

Position: 434332.4mE; 740568.0mN Projection: Mount Eden

Sometimes is feature from the control of the contro			Datum: Moturiki Survey Source:						I GP	S			
Dos Proba = 100/Pg (Whosparamirino Formation) Dos Proba = 100/Pg (Whosp	oundwater			RL (m)	(m) undec	aphic 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	onsistency/ ative Density	(F	Penetr Blows/	omete 100mn	r n)
0.5 Paux - 19Pu Beaks at - 90Pu Beaks at - 90P	ō	Depth	Type & Results			Ō		-0	Re C	Ι `	ĺ		5
Restart - 6479		0.3	Peak = 102kPa		-	(MH: SILT: light brown. High plasticity, extra sensitive. (Whangamarino Formation)						
0.7 Prais = 178 Prais Recidad = 2019 Pa SW SNy Fine SAND prey Well graded. (Whangamatino Formation) Solution of the state of the sta			Residual = 9kPa		-	(M to	St to				
Readous 238.7s SW. Silly Pine SAND: grey. Well graded. (Whangamen o Formation) M MD 7 5 8 7 Borehole terminated at 2.0 m		0.7			-	(**	VOI				
(Whangamarino Fermalien) Borehole terminated at 2.0 m		0.8	Peak = >200kPa Residual = 23kPa		-	(
Borehole terminated at 2.0 m					1		SW: Silty Fine SAND: grey. Well graded. (Whangamarino Formation)			6			
Borehole terminated at 2.0 m					-			М	MD	5	7		
3 - 4 - 4					-						_		
					-		Borehole terminated at 2.0 m						
					- - - -	-							
					-								
					3 -								
					-								
					-								
					4 -								
					-								
					-								
										二	<u> </u>		

Termination Reason: Target depth

DCP No: Shear Vane No: 2349 7

Remarks: Groundwater not encountered

HAND AUGER BOREHOLE LOG - PCHA 160/161

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 10/12/2019



Position: Projection: Mount Eden

Datum: Moturiki Survey Source: Site Plan

					Datum: Moturiki Survey Source: Site	Plan					_
San	nples & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	(E	Penetro Blows/1	00mm))
Depth	Type & Results		ă	Š	room cood, as no, roomano, adamona commone. (origing coods ann)	20	Cor Relat	۱ '	5 10 	0 15 	
0.3	Peak = 61kPa Residual = 17kPa		-	X X X X X X X X X X X X X X X	ML: SILT: grey. Low plasticity, moderately sensitive. (Whangamarino Formation) at 0.40m, becoming mottled orange, contains minor fine sand.		St				
0.6	Peak = UTP			X X X X X X X X X		м					
0.8	Peak = UTP		1 -	(X X) (X X) (X X) (X X) (X X)	(Margananie i Smalor)		н			+	
1.3	Peak = 43kPa Residual = 12kPa		-	(ML: SILT: grey. Low plasticity, moderately sensitive. (Whangamarino Formation)	w	F				
1.5	Peak = 101kPa Residual = 29kPa		-	X X X X X X X X X	ML: Sandy SILT: grey. Low plasticity, moderately sensitive; sand, fine. (Whangamarino Formation)		St				
1.8	Peak = UTP			(ML: SILT: grey. Low plasticity. (Whangamarino Formation)	- M	н				
2.0	Peak = UTP		2 -	-X X >	Borehole terminated at 2.0 m	1				+	_
			3 -								_
			-								
			4 -								
			5 —	-							

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

HAND AUGER BOREHOLE LOG - PCHA 163/162

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 6 Logged by: IP Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: 434323.3mE; 740517.2mN Projection: Mount Eden

_	on: 434323.3r				Datum: Moturiki Survey Source: Hand	dheld	GP:				
San	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	(E	Oynami Penetro Blows/1	c Con omete 100mr	er m)
0.3	Peak = UTP Peak = 102kPa Residual = 38kPa		-		CL: CLAY: with minor gravel; brown mottled orange. Low plasticity. Gravel, fine to medium. (Fill)	D	VSt to				
0.9	Peak = 131kPa Residual = 47kPa Peak = UTP		1 -		CH: Silty CLAY: with minor gravel; brown. High plasticity. Gravel, fine to medium. (Fill)	w	Н				
1.6	Peak = 163kPa		-		CL: Sandy CLAY: brown mottled light orange. Low plasticity. Sand, fine. (Fill) from 1.30m to 1.35m, Lens of light grey fine sand CL: CLAY: light brown mottled dark brown. Low plasticity.	М	VSt				
2.0	Peak = UTP		2 —		(Fill) Borehole terminated at 2.0 m		н				
			-								
			3								
			4 —								
			-								
			5 -								

Termination Reason: Target depth

Shear Vane No: 2349 DCP No:

Remarks: Groundwater not encountered.

HAND AUGER BOREHOLE LOG - PCHA 164/165

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 6 Logged by: IP Checked by: LK

Scale: Sheet 1 of 1 1:25 Position: 434323.8mE; 740504.2mN Projection: Mount Eden Datum: Moturiki Survey Source: Handheld GPS Dynamic Cone Penetrometer Samples & Insitu Tests Groundwater **3raphic** Log Moisture Condition 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth CL: CLAY: with trace gravel; brown mottled orange. Low plasticity. (Fill) D

0.3 Peak = 146kPa VSt CL: Sandy CLAY: with minor gravel; dark brownish grey. Low plasticity. Sand, fine. 0.6 Peak = UTP 0.9 Peak = UTP CL: CLAY: brown mottled orange. Low plasticity. 1.2 Peak = UTP Н CL: Sandy CLAY: with minor gravel; dark brownish grey. Low plasticity. Gravel, fine to medium. 1.6 Peak = UTP M to W Peak = UTP 2.0 2 Borehole terminated at 2.0 m

Termination Reason: Target depth

Shear Vane No: 2349 DCP No:

Remarks: Groundwater not encountered.

HAND AUGER BOREHOLE LOG - PCHA 166/167

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 6 Logged by: IP Checked by: LK Scale: Sheet 1 of 1 1:25 Position: 445282.8mE; 698770.3mN Projection: Mount Eden Datum: Moturiki Survey Source: Handheld GPS Dynamic Cone Penetrometer Samples & Insitu Tests **Graphic Log** Groundwater Moisture Condition 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth CL: CLAY: with trace gravel; brown mottled orange. Low plasticity. (Fill) D Peak = 175kPa Residual = 29kPa 0.3 VSt ... from 0.50m to 0.60m, Contains a lens of light grey, very fine sand. 0.6 Peak = UTP 0.9 Peak = UTP 1.2 Peak = UTP Н 1.6 Peak = UTP Peak = 102kPa Residual = 35kPa 2.0 2 Borehole terminated at 2.0 m

Termination Reason: Target depth

Shear Vane No: 2349 DCP No: Remarks: Groundwater not encountered.

HAND AUGER BOREHOLE LOG - PCHA 168/169

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 6 Logged by: AS Checked by: LK Scale: 1:25 Sheet 1 of 1

Position: Projection: Mount Eden
Datum: Moturiki Survey Source: Site Plan

					Datum: Moturiki Survey Source: Site						
Sample Sample Depth	es & Insitu Tests	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	(E	Oynami Penetro Blows/1	c Cone ometer 00mm	e r n)
Depth	Type & Results	≅	Dep	Grap	Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	S o	Cons Relativ		5 10	0 15 	5
0.3	Peak = >200kPa		- - - - -		ML: Clayey SILT: with minor fine sand; light brown mottled light grey. Low plasticity. (Fill)						
0.6	Peak = >200kPa		-								
0.9	Peak = UTP		1 —			М	н				
1.2	Peak = >200kPa		-								
1.5	Peak = >200kPa		- - - -								
1.8	Peak = UTP		-								
2.0	Peak = >200kPa		2 —		Borehole terminated at 2.0 m	_		┝		\dashv	
			3 —								
			4 —								
			5 —					_	\sqcup	\dashv	
	on Reason: Tar	L		1							

Termination Reason: Target depth

Shear Vane No: 2532 DCP No:

Remarks: Groundwater not encountered.

HAND AUGER BOREHOLE LOG - PCHA 170/171

Client: Lakeside Developments 2017 Ltd Project: Lakeside Earthworks 2019/20 Site Location: 95 Scott Road Te Kauwhata

Project No.: HAM2019-0062

Date: 28/02/2020

Borehole Location: Stage 6 Logged by: AS Checked by: LK Scale: Sheet 1 of 1 1:25 Projection: Mount Eden Position: Datum: Moturiki Survey Source: Site Pan Dynamic Cone Penetrometer Samples & Insitu Tests **3raphic** Log Groundwater 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) $\widehat{\Xi}$ (Blows/100mm) Depth (귐 10 15 Type & Results Depth ML: Organic SILT: brown. No plasticity. (Topsoil) CL: CLAY: with some fine sand; light orange brown mottled dark brown. Low plasticity. 0.3 Peak = UTP 0.6 Peak = >200kPa 0.9 Peak = >200kPa 1.2 Peak = >200kPa 1.5 Peak = UTP Peak = UTP 1.8 Peak = UTP 2.0 2 Borehole terminated at 2.0 m

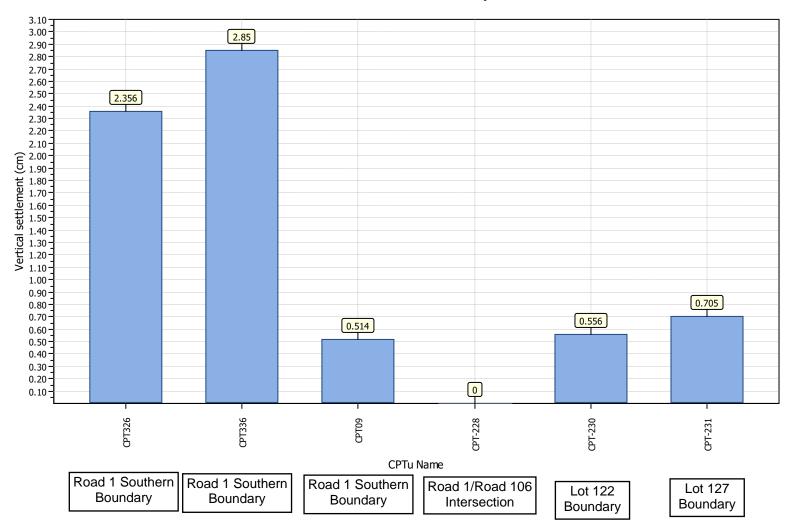
Termination Reason: Target Depth Reached
Shear Vane No: 1911 DCP No:
Remarks: Groundwater not encountered.

Appendix G: Stage 6 Liquefaction Results



Project title : Location :

Overall vertical settlements report



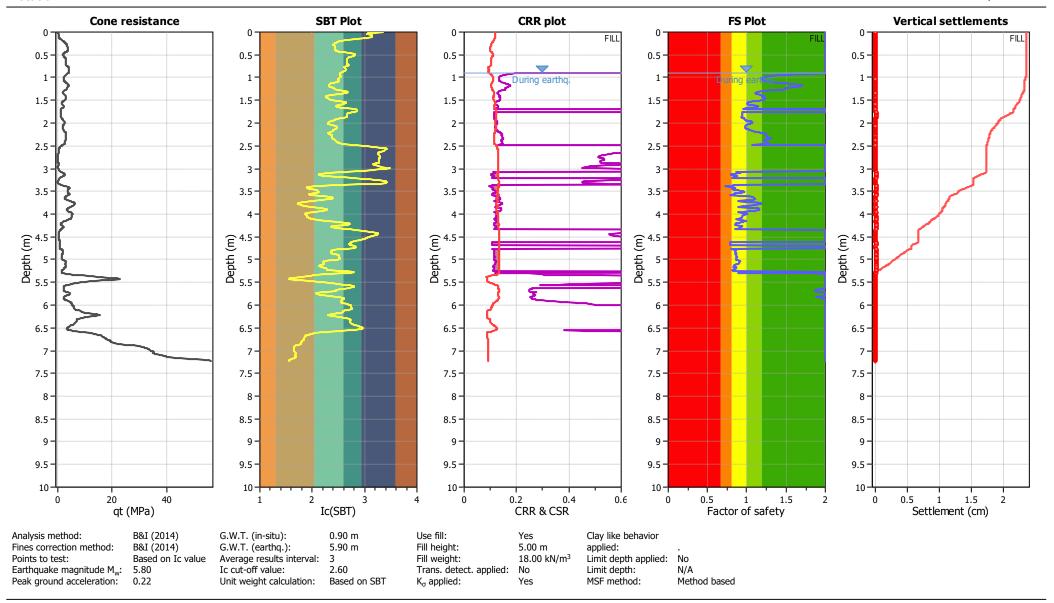


Project: Location:

Total double, 7.32 mg

CPT: CPT326

Total depth: 7.22 m

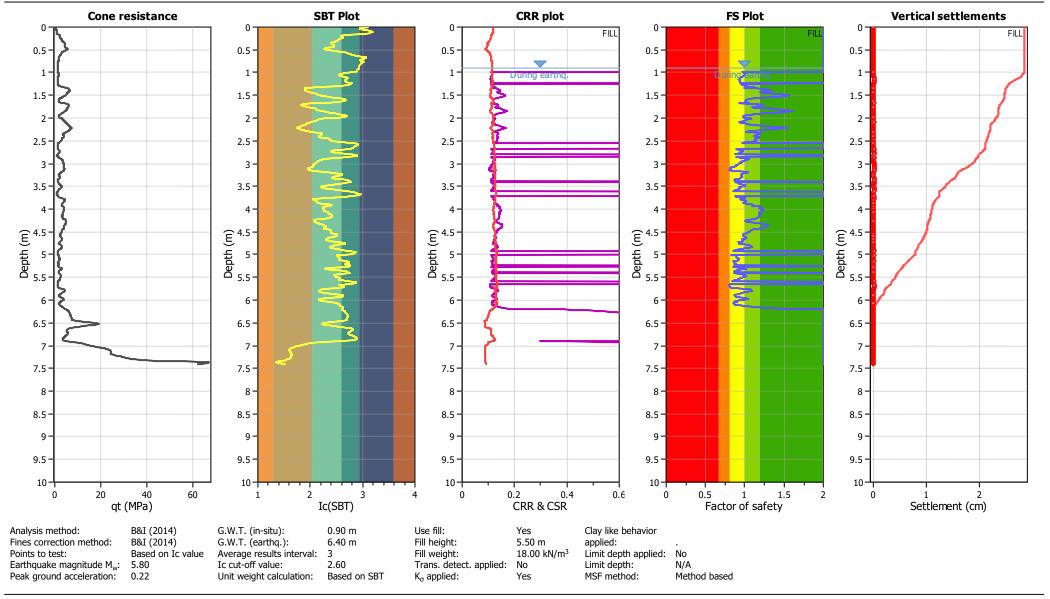




Project: Location:

Total depth: 7.41 m

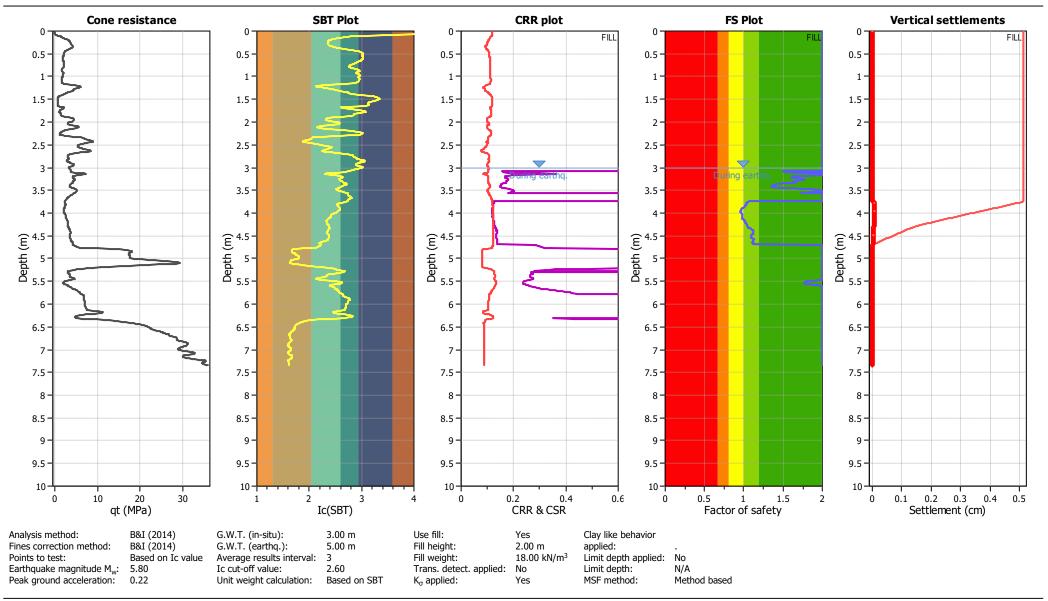
CPT: CPT336





Project:

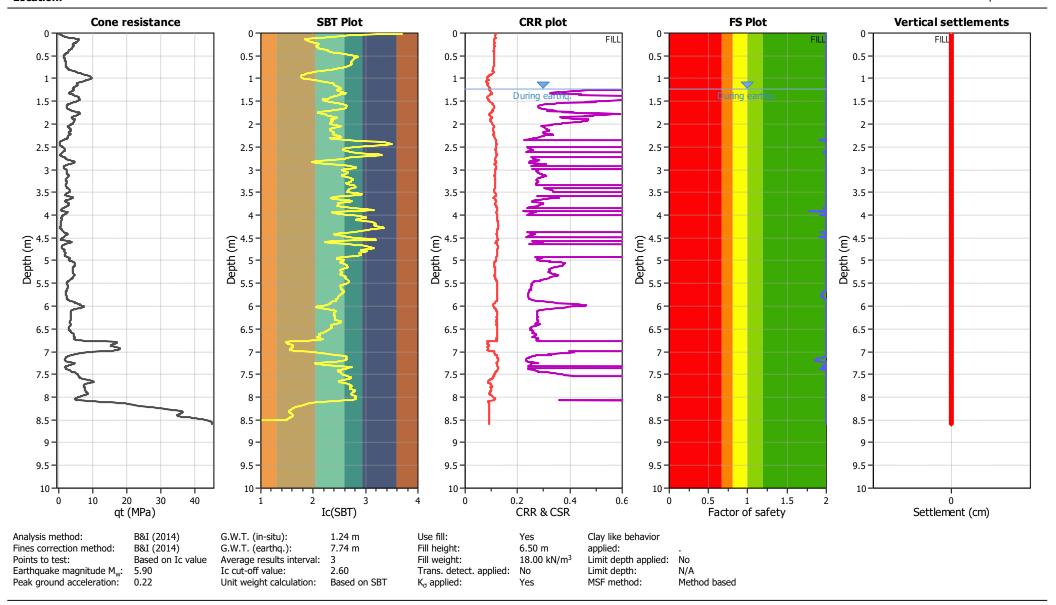
Total depth: 7.34 m Location:



CPT: CPT09



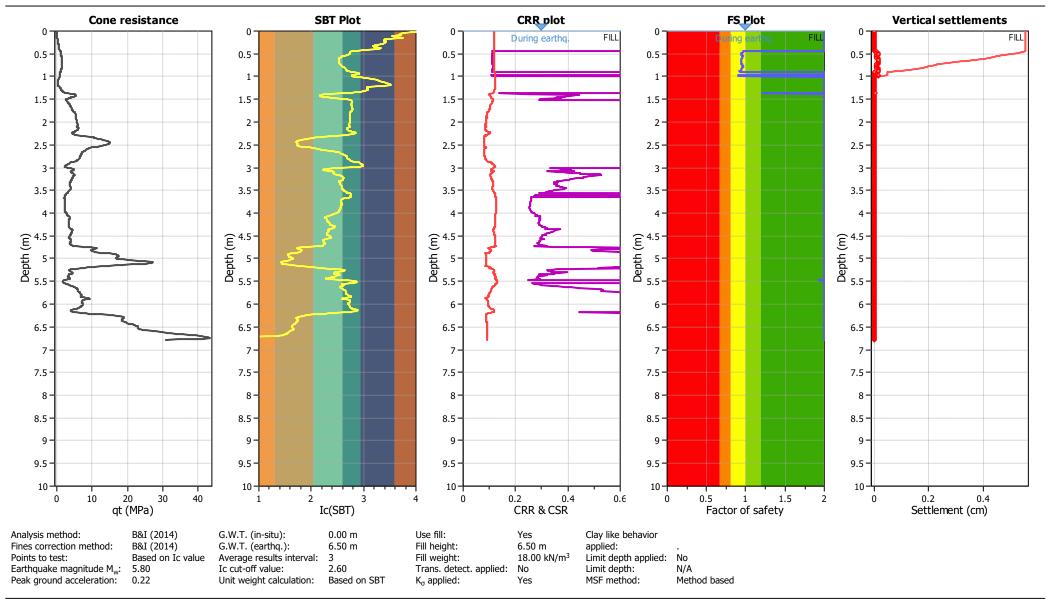
Project: Location: CPT: CPT-228
Total depth: 8.59 m





Project: Location: CPT: CPT-230

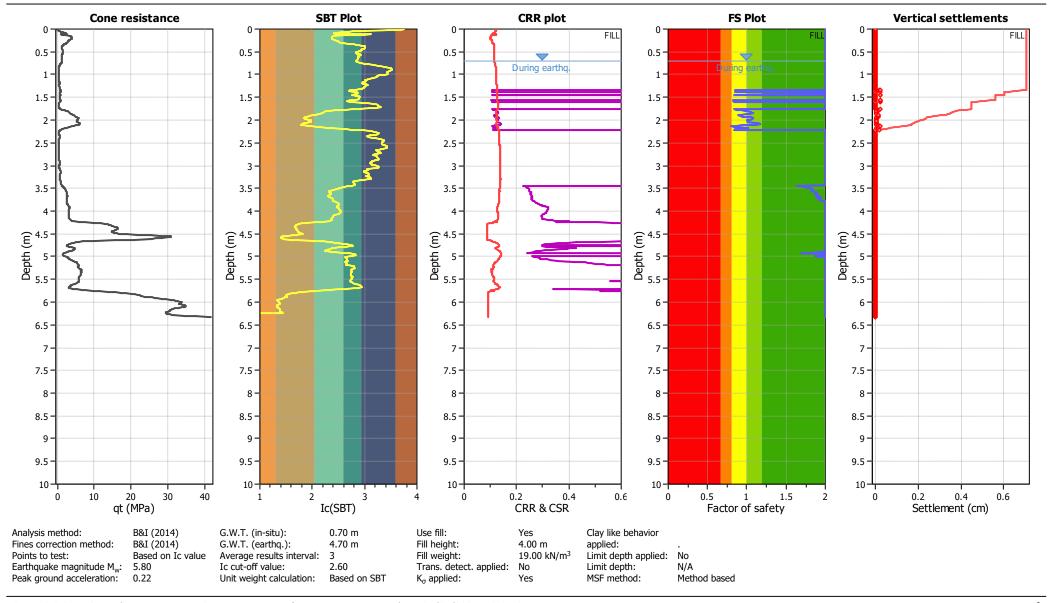
Total depth: 6.79 m





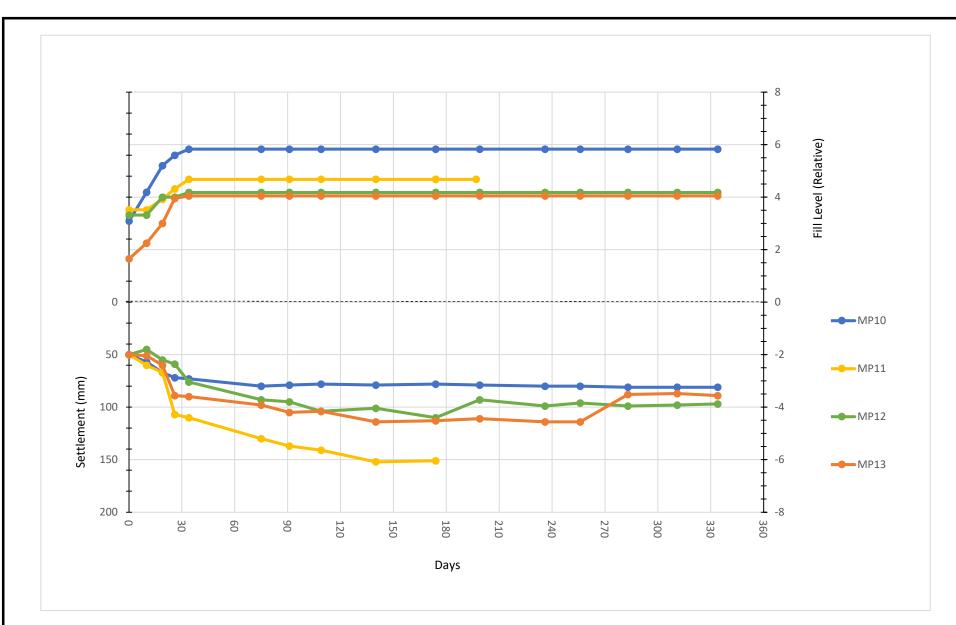
Project: Location:

Total depth: 6.33 m



CPT: CPT-231

Appendix H: Stage 6 Settlement Data





CLIENT: Lakeside Development (2017) Ltd	DRAWN: LK	PROJECT NO: HAM2019-0062
PROJECT: Lakeside Development	CHECKED: KJR	DRAWING REF: 1
Stage 6	REVISION: 0	SCALE: NTS
Settlement Monitoring Data	DATE: 18/01/2021	SIZE/SHEET: A4L

CLIENT:	Lakeside Developments Ltd 2017	DESIGN
PROJECT:	Stern C. Laksaida Davidanment. Ta Kawakata	\Box
	Stage 6, Lakeside Development, Te Kauwhata	Г
	me:	
Geosciences	Primary and Secondary Consolidation of Soil Layers	F
<u>'</u>		

1. Consolidation Settlement (Terzaghi)

Exist Fill Density: Soft Soil Density (Saturated): 16 kN/m3 16 kN/m3 18 kN/m3 0 kN/m2 Surcharge Density: Additional surcharge load

	Original	Water Table	Surcharge Top (m)	Exist Fill	Soft Soil			Mid-Point Soft	Surcharge		Applied		Recomp. Index I				Consol	tactual	Cons Coeffi Cv	Drainage path	consol (year)	Days
Layer	Ground	(mbgl)		Thickness (m)	Thickness	Base Fill mbgl	Soil mbgl	Soil mbgl	Height	Initial Eff Stress	Surcharge	Comp Index C _C	C _R	e ₀	Exist Over Consol.	Δe	Settlement	Consol	(m2/year)	(1 or 2 way)	()/	
	(mAHD)	(mAHD)	(mAHD)	(m)	(m)	(mAHD)	(mAHD)	(mAHD)	(m)) (kPa)	(kPa	1)			(kPa)		(m)	(m)	(m2/year)			
MP10	0	-0.1	5.8	0.5	1.5	-0.5	-2	-1.25	5.8	3 9	104.	4 0.102	0.018	1.125	0	-0.1135	0.080	0.080	10	2	0.048	17.411
MP11	0	-0.3	4.7	0.5	2	-0.5	-2.5	-1.5	4.7	7 12	84.	6 0.179	0.018	1.125	0	-0.1609	0.151	0.151	15	2	0.057	20.635
MP12	0	-0.7	4.1	0.8	1.5	-0.8	-2.3	-1.55	4.1	l 16	73.	8 0.22	0.018	1.125	0	-0.1626	0.115	0.110	6	2	0.080	29.018
MP13	0	-1.7	4	2	2	-2	-4	-3	4	35	7.	2 0.252	0.018	1.125	0	-0.1218	0.115	0.114	10	2	0.085	30.952

LYK KR 2 18/01/2021 HAM2019-0062

Total

2. Mesri Creep Settlement - (Mesri et al (1994) and Mesri & Ajlouni (2007))

0.04 50 yr 0 kPa Assumed C_{α}/C_{c} = Design Period, t = Future Load, $\Delta \sigma$ =

	н	Ca	Creep (m)	Remaining Consolidation (m)	Total (m)
MP10	1.420	4.1E-03	0.004	0.000	0.004
MP11	1.849	7.2E-03	0.010	0.000	0.010
MP12	1.385	8.8E-03	0.009	0.005	0.014
MP13	1.885	1 0F-02	0.014	0.001	0.015

$$\Delta \varepsilon_{S} = \frac{C_{\alpha}}{1 + e_{p}} \log \frac{t_{2}}{t_{1}}$$

- $\begin{array}{ll} \bullet & \mathcal{C}_{\alpha} \text{ is the material dependent coefficient of secondary consolidation.} \\ \bullet & \text{eo} \text{ is the void ration at the end of primary consolidation.} \end{array}$
- t₂ is the design life (50 years).
- $\bullet \quad \ \ t_1 \text{ is the time at end of primary consolidation (t_{90})}.$