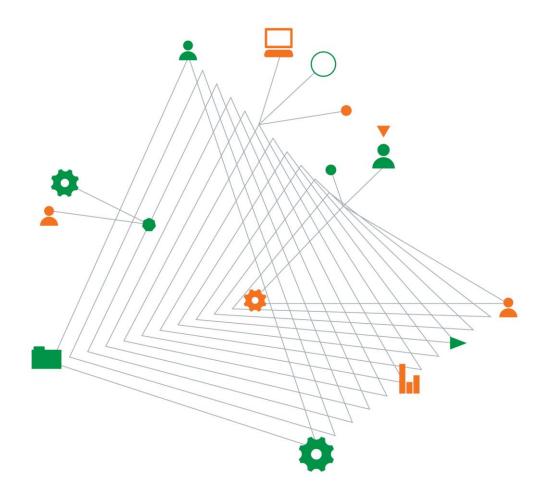


The Lakes (2012) Ltd

The Lakes - Stage 3CD

Geotechnical Completion Report

11 April 2016



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The Lakes - Stage 3CD

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11 April 2016

Document authorisation

Our ref: GENZTAUC13086AP-AG

For and on behalf of Coffey

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Quality information

Revision history

Revision	Description	Date	Author	Reviewer	Signatory
Draft	Draft for review	1/4/2016	R Telford	D Sullivan	R Telford
Final	Final for issue	11/4/2016	R Telford	D Sullivan	R Telford

Distribution

Report Status	No. of copies	Format	Distributed to	Date
Final	1	Hardcopy + PDF	The Lakes (2012) Ltd	11/4/2016
Final	1	PDF	Harrison Grierson Consultants Ltd	11/4/2016
Final	1	Hardcopy + PDF	Tauranga City Council	11/4/2016

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1. Introduction and Scope

This Geotechnical Completion Report (GCR) has been prepared by Coffey Geotechnics (NZ) Ltd (Coffey) for the Lakes (2012) Limited following completion of earthworks for Stages 3C and 3D of the Lakes subdivision and in general accordance with the conditions of Council resource consent number RC21332. These stages are collectively known as Stage 3CD.

This report also covers Lots 104 to 106 in Stage 3A which were excluded from the previous GCR due to on-going settlement monitoring at the time that report was issued.

This GCR contains the results of site investigations and relevant control test data, together with asbuilt plans derived from Harrison Grierson Consultants Ltd (HGCL) topographical data. It describes bulk earthworks completed during the 2007-2008, 2013-2014 and 2014-2015 earthworks seasons.

The extent of earthworks supervised by Coffey is shown on the appended plans (Figures 1 to 6, Appendix A). A Statement of Professional Opinion (Form G2) and Summary of Technical Data (Form G3) for the works described herein are also appended.

2. Excluded Lots

Lots 236 to 239 in Stage 3D have been excluded from this GCR due to ongoing settlement of the filling below this area. These lots will need to be assessed in a subsequent GCR report.

3. Description of Subdivision

Stages 3CD of the Lakes subdivision are located near the intersection of Takitimu Drive (SH36) and Pyes Pa Road in Pyes Pa, Tauranga. The site location and original ground contours are shown on Figure 1.

Before work began, the majority of the site consisted of an elevated, flat or gently rolling north-south oriented plateau at approximately RL 60m (Moturiki Datum, 1953). Three steeply sided gullies were located along the south-western boundary of this plateau. The Northern Gully (shown on the attached plans) is largely located outside the subject area although it does include Lots 104 to 106 in Stage 3A. The Central Gully extends from the southern end of Stage 3C and into 3D near the middle of the site. The Southern Gully is located at the southern corner of the site above Takitimu Drive.

The eastern margin of the site was defined by an approximately 30m high, steep to very steep natural slope.

During the 2007 to 2008 earthworks season, major works were undertaken within the Lakes area and to form the Takitimu Drive road alignment (State Highway SH36) which runs along the site's south-western and southern boundaries. These earthworks included excavation on the elevated plateau and filling within each of the three gullies mentioned above. Contours of the works completed are shown on Figure 2. The finished ground surface (surveyed in 2012) is shown on Figure 3.

In 2012 ownership of the Lakes subdivision passed from Grasshopper Farms Ltd to The Lakes (2012) Ltd. Further earthworks were completed including additional excavation on the plateau and filling within the northern and central gullies during the 2013-2014 work season and filling of the southern gully in the 2014-2015 season. Excavations were also undertaken at the south-eastern corner of the site to form a two-lane collector road to service later stages of the subdivision. Cut/fill contours for the 2013-2014 and 2014-2015 earthworks are shown on Figure 4 Appendix A.

Civil infrastructure for these stages of the subdivision was installed in 2015 and 2016. The finished (March 2016) ground surface is shown on Figure 5.

4. Related Reports

The following documents were prepared prior to or during the design and development of Stages 3CD:

- 1. 'Pyes Pa West Urbanisation Development, Tauranga Geotechnical Assessment Report', report prepared by S&L Consultants Ltd (Ref: 16944, dated October 2003).
- 2. 'Detailed Site Investigation for the Lakes Subdivision Stage 3, Takitimu Drive, Tauranga', report prepared by Coffey Environments (Ref: ENNZAUCK51132AA, dated 21 March 2013).
- 3. 'Geotechnical Investigation Report for the Lakes Subdivision Stage 3 (Phase 1) at Pyes Pa, Tauranga', report prepared by Coffey (Ref: GENZTAUC13086AF-AA, dated 29 April 2013).
- 4. *Summary of Works Report, The Lakes, Stage 3, Tauranga'* report prepared by Coffey Environments (Ref: ENNZAUCK51132AB, dated 7 April 2014).
- 5. 'The Lakes Subdivision Stage 3 Zone 1 Earthworks Completion Report', report prepared by Coffey (Ref: GENZTAUC13086AF-AE, dated 15 August 2014).

Key conclusions of the main documents are summarised below.

4.1. Geotechnical Assessments

The original geotechnical assessment for the Lakes subdivision was completed by S&L Consultants Ltd and contained an overview of geotechnical conditions for the entire Lakes project. The report concluded that the site was generally suitable for subdivision and residential development, subject to appropriate design and construction.

With regard to the Stage 3CD area, S&L determined that the slopes to the south-west of the site had been affected by previous instability. The report recommended that future buildings be set back from the crest of these slopes or that the slope profiles should be modified by earthworks to improve their stability. Within Stage 3CD these slopes have been re-graded as part of the earthworks described in this GCR and in accordance with the previous recommendations.

The subsequent geotechnical investigation report by Coffey in April 2013 summarised additional and more detailed investigations that were completed to specifically assess the Stage 3 area. These investigations generally confirmed the S&L conclusion that the site was adequate for subdivision. In addition to the western and south-western slopes, Coffey concluded that the slope to the east of Stage 3 had also been affected by past instability. Coffey recommended that buildings adjacent to this slope also be set back from the crest (see Section 9.3 below).

4.2. Contaminated Soils Reports

Due to the presence of farm buildings and facilities on the original site, Coffey was also engaged to complete an environmental assessment of the proposed development area. The results of this assessment were described in the Coffey Environments report of March 2013 (Section 4, reference 2). This report identified isolated areas of possibly contaminated soil at the sites of a (suspected) pre-existing sheep dip, an above-ground fuel storage tank and a diary effluent pond.

Further investigation at the suspected sheep dip site did not find any evidence of significant soil contamination in this area. Soils beneath the fuel storage tank and the effluent pond were sub-excavated during the early stage of earthworks in 2013 and were buried beneath road areas within the development area as required by the Environmental Management Plan. This work was supervised and certified by Coffey Environments in the Summary of Works Report of April 2014 (Section 4, reference 4).

4.3. Earthworks Completion Report

The August 2014 Earthworks Completion Report (ECR) concluded that the bulk earthworks undertaken in 2007-2008 and 2013-2014 were generally completed in accordance with the relevant standards and guidelines including NZS 4431 (Code of Practice for Earth Fill for Residential Development) and the Tauranga City Council Infrastructure Development Code (TCC IDC). The report did however identify several areas that needed to be re-visited in this GCR. These were:

- 1. Some of the fill materials placed towards the end of the 2013-2014 season did not pass the required Nuclear Density Meter (NDM) tests. The failed tests were attributed to the highly variable source materials being used (silts, sands and clays) which resulted in fills that could not be easily assessed with a NDM. It was therefore decided that the affected fill would be retested using hand-auger boreholes with undrained shear strength measurements and/or Dynamic Cone Penetrometer (DCP) testing as appropriate for the individual soils.
- The ECR recommended that static settlements below filled areas should continue to be monitored post-earthworks and the data should be reviewed and assessed prior to issuing the GCR.
- 3. The ECR also commented on the presence of undocumented filling that was encountered during excavations in 2013 within the central and southern gullies in Stage 3C and 3D. This filling is understood to have been placed between 2010 and 2012, when works on site were not closely managed by either Grasshopper Farms Ltd or The Lakes (2012) Ltd.
- 4. Finally, the ECR recommended that the stability of the eastern slope should be reassessed in the GCR and an appropriate Building Restriction Line (BRL) be defined for lots along the crest of this slope.

These issues are addressed in the following sections of this report.

5. Investigations Completed

Geotechnical investigations have been undertaken on this and adjacent sites during each stage of the Lakes subdivision's design and construction. The investigations used for this report are listed below. Logs of each investigation are included in Appendix C.

- Five machine boreholes drilled to depths of up to 20m near the Western Batter in 2007 (S&L Consultants, MB34 to MB38 on Figure 1);
- Seven test pits excavated in 2012 within or near the subject stages to maximum depths of up to 5m to assess shallow ground conditions before the 2013-2014 work season (Coffey, TP01 –TP05 and TP09 TP10 on Figure 3);
- Ten Cone Penetration Tests (CPTs) in 2013 to 20m depth to assess ground conditions beneath the 2007-2008 filling within Stages 3C and 3D (Coffey, CPT01 to CPT10 on Figure 3);

- Four hand-auger boreholes drilled in November 2013 to assess the undocumented filling identified within the central gully in Stage 3C (Coffey, HA01 to HA04 on Figure 2);
- Eight hand-auger boreholes completed in October 2014 to assess the compaction of the variable filling placed within Stage 3C towards the end of the 2013-2014 work season (Coffey, HA301 to HA308 on Figure 4).

On completion of the bulk and minor earthworks, Coffey drilled a total of 132 hand-auger boreholes to a target depth of 1.5m to 2m on lots underlain by natural (cut) soils and approximately every third lot underlain by engineered fill. The location of each borehole is shown on Figure 6. Although not shown on the plan, the boreholes are numbered according to the relevant stage and lot number. For example, the borehole on Lot 209 in Stage 3D is referred to as HA3D-209. Logs of these boreholes are included in Appendix D.

6. Overview of Geological Conditions

The majority of the subject area is located on an elevated, gently sloping plateau. Below the topsoil layer, the pre-development soil profile across this plateau comprised approximately 10m of volcanic ashes including the Hamilton Ash and Rotoehu Ash. This ash sequence is common throughout the Tauranga area. At this location the volcanic ashes overlie ancient alluvial deposits of the Matua Sub-Group and weakly cemented pumice sands of the Te Ranga Ignimbrite.

Excavations in 2007-2008 and 2013-2014 reduced the thickness of the volcanic ashes across most of the plateau by up to 10m. The subsoils below many of the finished lots therefore comprise volcanic ash silts but in some areas excavations have penetrated through the ash layers and the finished lots are underlain by variable Matua Sub-Group soils. These include silts, sands and clays which can be highly sensitive to reworking. Soils with relatively low undrained shear strengths (i.e. < 50kPa) have also been observed in these materials.

7. Earthworks Operations

7.1. Plant

Earthworks during the 2007-2008 season were completed by Bob Hicks Earthmovers Ltd. The contractor for the 2013-2014 and 2014-2015 seasons was JMC Civil Construction Ltd.

The main items of plant used during each of the bulk earthworks phase comprised Terex motorscrapers and bulldozer or tractor towed 'scoops', hydraulic excavators, bulldozers, articulated allterrain dump trucks (ADT's) and sheeps-foot rollers.

7.2. Construction Programme

7.2.1. 2007 – 2008 Earthworks Season

Earthworks in 2007 and 2008 summer included excavations of up to 9m depth on the main plateau as shown on Figure 2. Excavated material was used for filling up to approximately 11m deep within the three gullies and up to 17m deep below the highway embankment along the site's south-western boundary.

The filling of the northern gully was observed and tested by Coffey. It is understood the filling within the central and southern gullies was overseen and tested by Beca as part of the highway construction works.

As shown on Figure 2, subsoil drains were installed beneath the filling where shallow groundwater or seepages were encountered.

7.2.2. 2010 – 2012

In 2010, work on the Lakes subdivision site ceased under the original developer, Grasshopper Farms Ltd, when that company went into receivership. Records from this time are incomplete until work started again on site under The Lakes (2012) Ltd.

As mentioned in Section 4.3, excavations during 2013 encountered apparently non-engineered fill in the central gully. Comparison of survey data from 2008 and 2012 indicated this filling is approximately 4m deep and overlies the engineered fill placed in the gully in 2007-2008.

During late 2014, excavations in the southern gully also encountered fill materials that did not appear to have been placed under engineer supervision. These soils consisted of highly sensitive silts and clays with a relatively high moisture content and low undrained shear strength.

Based on investigations completed by Coffey including HA01 to HA04 within the central gully (Figure 2) and a series of unlogged test pits within the southern gully it was considered that the nonengineered filling could remain in place provided the later fill in these areas was placed appropriately and that static settlements were monitored and reviewed prior to issue of the GCR. This later filling is discussed in more detail below.

7.2.3. 2013 – 2014 & 2014 – 2015 Earthworks Seasons

During this period the remaining earthworks were completed to form the current ground surface, including placement of up to 11m of additional engineered filling within the central and southern gully areas and excavation of up to 8m depth on the rest of the plateau. Cut and fill contours for this period are shown on Figure 4 and the finished ground surface is shown on Figure 6.

Several pre-existing farm buildings and facilities were removed from site at this time. This included the sub-excavation and disposal of contaminated soils from areas around the buildings in accordance with the 2014 Summary of Works Report.

Other works completed during this earthworks phase included the excavation and infilling of an approximately 4m deep sub-surface erosion feature ('tomo') that was identified on site in late 2014. The tomo was undercut by JMC and backfilled with compacted earthfill under Coffey supervision. The extent of the tomo excavation and back filling is shown on Figure 4.

8. Quality Control

8.1. Site Preparation Observations

Prior to filling within the gullies in 2007-2008, gully cleaning, topsoil stripping and partial removal of soft or unsuitable soils was periodically observed by Coffey and Beca. Subsoil drains were installed where wet ground was encountered.

During 2013-2014 and 2014-2015, Coffey undertook regular observations of fill areas to ensure topsoil, vegetation or unsuitable materials had been removed before filling.

8.2. Fill Control

The filling placed in the northern gully in 2007-2008 was tested by Coffey using in-situ density (NDM), undrained shear strength and water content measurements. The locations of all tests are shown on Figure 2. It is understood the filling in the central and southern gullies was observed by Beca as part of the SH36 highway construction. The results of their testing were unavailable at the time this GCR was issued.

In the 2013-2014 and 2014-2015 seasons, Nuclear Density Meter (NDM), laboratory moisture content and undrained shear strength tests were carried out by Geotechnics Ltd. The locations of the tests completed are shown on Figure 4.

As previously discussed, Coffey also drilled a series of hand-auger boreholes with field shear vane readings and DCP testing to assess variable sandy and silty fill placed in 2014 which could not be practically testing with a NDM. These boreholes are also shown on Figure 4.

8.2.1. Compaction Control Criteria

The compaction control criteria for this project were specified using the minimum allowable shear strength and maximum allowable air voids method as defined below:

- Air voids percentage (defined in NZS 4402:1986 and as measured by NDM) targeting an average value less than 10% over any 10 consecutive tests and maximum single value no greater than 12%.
- Undrained shear strength measured by hand held shear vane calibrated using the NZGS 2001 method. A single undrained shear strength 'test' was defined as the average of four individual shear vane readings at each NDM location. The target test values were an average value greater than 150kPa and minimum single value no less than 140kPa.

The hand-auger boreholes drilled to test filling in the central gully in 2014 used field shear vane measurements and/or DCP testing, depending on the type of fill encountered. In cohesive fills the target results for the shear vane tests were as above. In granular fills the target test value was five blows or more per 100mm DCP penetration.

8.2.2. Test Results

Summary tables showing the results of the laboratory fill tests for the two stages of bulk earthworks are included in Appendix E and the locations of the tests are shown on Figures 2 and 4. The majority of tests met or exceeded the compaction control criteria given above. Failed tests are shown in red on the relevant figures.

Two tests during the 2007-2008 season in the vicinity of the subject lots did not meet the required values, with test numbers 826 and 827 being deemed to have failed due to high % air voids values. However, the hand-auger boreholes drilled on these lots in 2016 indicate the fill at this location contained layers of pumiceous sand with DCP results of 5 to 11 blows per 100mm penetration. It is considered that the high % air voids values are likely the result of the pumiceous sands and do not accurately represent the compaction the fill at this location. Based on the DCP results the, sand fills were assessed as meeting or exceeding the required compaction standard.

A total of ten tests failed to meet the required specification during the 2013-2014 season. Tests 06, 12, 22 and 84 failed due to low undrained shear strength readings. The fill in near tests 06, 12 and 22 was re-worked and re-tested with the later results passing specification. The fill near 84 was re-tested in-situ (test 84R) and passed, indicating the failed result was either due to an incorrect test value or

an isolated pocket of filling. As these tests were superseded by later testing, the failed results are not shown on the site plan.

Tests 41, 65, 86, 121, 130 and 157 all failed due to low undrained shear strength measurements. The fill around test 86 was observed on site and the low result was attributed to a significant portion of sand within the fill at this location. The remaining failed results were investigated with hand-auger boreholes in October 2014. The logs of these boreholes (HA301 to HA308) indicate the finished fill comprised layered silts and sands. The low shear strength readings are therefore attributed to sandy soils. DCP testing undertaken with each borehole indicates the sand layers had generally been adequately compacted with DCP results of 5 blows of more per 100mm penetration being recorded.

Fill tests met specifications in the subject area during the 2014-2015 season.

9. Engineering Evaluation and Recommendations

9.1. Fill Quality

Based on the appended earth fill quality control test data and reliance on the diligence of the bulk earthworks contractor at times when engineering staff were not present on site, results indicate that the compaction control criteria were generally met during the bulk earthworks periods in 2007-2008, 2013-2014 and 2014-2015. As noted above however, the completion data from Beca for the central and southern gully filling in 2007-2008 were not available at the time of writing.

It is noted that the post-development investigations on lots 175 and 176 encountered organic soils that are not considered adequate for certified fill or 'good ground' per NZS 3604. Specific recommendations for development on these lots are given in Section 9.5 below.

9.2. Static Settlement

9.2.1. Northern and Central Gullies

Static settlements below the 2013-2014 filling within the northern and central gullies were monitored at 11 locations shown as SM1 to SM6 and PZ1 to PZ5 on Figure 5. The monitoring pins consisted of steel rods attached to plates installed at the base of the filling. The data from these pins are presented graphically in Appendix F. Measured settlements ranged from less than 100mm to over 1100mm, depending on the thickness of fill and underlying soils at each location.

The data show the majority of consolidation settlement below the main areas of 2013-2014 filling occurred within 2 to 4 months of earthworks being completed. Within the central gully however, monitoring points SM1 to SM5 and PZ1 showed that after consolidation was effectively complete, settlement entered a long term 'creep' phase. Extrapolating the data out for a period of 50 years indicated that lots in this area may be affected by up to 200mm of future creep settlement over the assumed life of the proposed dwellings, with a high risk of differential settlement due to the significant differences in fill depth below many lots.

To reduce the risk of differential settlements, parts of the central gully filling were pre-loaded with 2.0m of topsoil. The extent of the pre-loaded area is shown on Figure 5 and the points at which preload was added to the respective settlement monitoring points are marked on the plots in Appendix F. Three additional monitoring points referred to as 'SM-Lot 169', 'SM-Lot 189' and 'SM-Lot 278' were also installed at the locations shown on Figure 5.

The pre-load was added in two stages, with lots within Stage 3C being surcharged from February to March 2015 and lots within Stage 3D from July to August 2015. On-going monitoring of the points

within the pre-loaded area indicated that the surcharge induced an additional 100mm to 150mm of consolidation settlement over the monitoring period.

Settlement monitoring of most of the points within the central gully ended in August 2015 when calculations indicated that consolidation settlements below the original filling and pre-load were at least 90% complete (i.e. 'T90'). Monitoring continued at SM1 and SM-Lot 278 within Stage 3D until December 2015 when calculations indicated this area had also reached T90.

9.2.2. Southern Gully

Data for monitoring points SM15 and SM28 within the southern gully are plotted separately in Appendix F. The graphs show that settlement is continuing at this location, particularly at SM28 where calculations using the Asaoka method indicate that consolidation is approximately 65% complete after 10 months of monitoring.

Given the on-going consolidation and potential for future long-term creep settlement in the southern gully, it has been recommended that the lots above this feature be excluded from this GCR. Settlement will need to be continually monitored at SM15 and SM28 until calculations confirm it has reached an acceptable level and a later GCR for these lots can be issued.

9.3. Slope Stability

While the proposed lots within Stages 3CD are generally gently or moderately sloping, the lots around the southern and eastern perimeter of the development are located above steeper slopes.

Lots 148 to 162 in Stage 3C, 240 to 254 in 3D and also 105 to 106 in 3A are located above a 1V:3H batter that falls down to Takitimu Drive. This batter is formed from natural soils and engineered fill. The 1V:3H gradient is considered to be an adequately stable slope angle for these materials and a specific Building Restriction Line (BRL) has therefore not been proposed for these lots. It is considered that the 1.5m yard setback from the property's rear boundaries as required by the TCC city plan will provide sufficient protection for new development on these sites.

Along the eastern boundary of the development, Lots 217, 221 to 224 and 229 are located above a 1V:2.5H batter which has been cut from natural soils. The relic landslide study conducted for the Tauranga area in 2000¹ indicates that this gradient should be adequately stable for residential development. However, given the height of this batter (up to 25m) it is recommended that a BRL be defined along the crest of this slope to reduce the risk posed to the development by shallow slumping or erosion. The BRL is shown on Figure 6, and is set back 3m to 5m from the crest of the batter.

At the northern end of Stage 3D, Lots 342 to 349 and 351 are located above an approximately 30m high natural slope with a gradient of up to 1V:1.6H. Slope angles steeper than 1V:2H are commonly considered to be marginally stable in the Tauranga area and are not adequate for residential development. A BRL is therefore also recommended on these lots as shown on Figure 6. The BRL has been defined by either projecting a 1V:2.5H line from the toe of the steepest adjacent slope, or by measuring 15m back from the slope crest, whichever is smaller. The proposed setback distance is considered adequate for the residential development in this area.

Further recommendations for lots affected by a BRL are discussed in Section 9.4 below.

¹ D H Bell et-al, "Relic Slip Verification Study – Tauranga District", 2000.

9.4. Development on Lots with a BRL

It should be understood that the inclusion of a BRL on a lot does not specifically preclude development beyond the restriction line. However, any development between the BRL and slope will require specific geotechnical input and may need additional slope protection works such as retaining walls, deepened foundations, etc. The following restrictions are recommended for these lots:

- Any part of a dwelling or structure which extends beyond the BRL must be reviewed and approved by a TCC Category 1 Geo-Professional prior to the building consent application. A geotechnical report must be provided including the specific design of any mitigation works proposed.
- Any filling between the BRL and slope must be reviewed and approved by a TCC Category 1 Geo-Professional with a report to be provided to Council before work begins.
- Any filling of more than 1.5m depth within the lot <u>irrespective of its relation to the BRL</u> must be reviewed and approved by a TCC Category 1 Geo-Professional to assess its effect on slope stability.
- Stormwater from any paved or impermeable surfaces including roofs and driveways on these lots must be collected and piped to the site's stormwater system. Stormwater must not be disposed via ground soakage on these lots and any concentration of runoff over the slope must be avoided.

9.5. Lots 175 & 176

As shown on the log for HA3C-176, the post-subdivision borehole drilled on Lot 176 encountered a layer of buried topsoil or highly organic material between 1.1m and 1.4m depth. Subsequent test pits (logs not presented) confirmed the presence of up to three layers organic soils below Lot 176 and extending across the boundary to Lot 175. HAC-175 however did not encounter these soils near the middle of Lot 175.

The soils observed do not meet the requirements of 'good ground' as defined by NZS 3604. The depth and extent of the organic layers will therefore need to be assessed prior to construction on these lots and remedial actions taken to remove or replace unsuitable soils. These works will need to be completed under the observation and to the satisfaction of a chartered engineer (CPEng) or TCC Category 2 Geo-Professional. A note has been added for these lots on the Geotechnical Data Summary table (Form G3) in Appendix B.

9.6. Lots 253 & 254

These lots are adjacent to a stormwater main that collects water from Stage 3D. The main has been designed to accept flows from a 1 in 50 year rainfall event or smaller, with flows from larger storms being directed over-land via the road to the north-west of the lots to Lakes Boulevard.

The finished ground surface within Lots 253 and 254 has been formed to provide approximately 200mm freeboard above overland flow levels within the road reserve. It is important that the ground at the front of these lots is maintained at this level so that storm flows are not directed through the lots.

The ground level within the 3m front yard of these sites must therefore be maintained so that a continuous barrier at at least RL55.20m (Moturiki Datum) is formed across the full width of these properties. This will include gardens, driveways, paths or other paved areas.

A note has been added to the Geotechnical Data Summary table (Form G3) in Appendix B.

9.7. Foundation Design & Bearing Capacity

Most of sites discussed in this GCR are underlain by natural volcanic soils which have been exposed by excavation. While the large majority of tests and investigations in these soils indicate they are adequate for standard shallow foundations, areas of relatively weak or sensitive materials have also been encountered in either the post-development hand-auger boreholes or in the trenches excavated for buried services.

It is therefore recommended that dwellings on sites underlain by natural soils be supported on podraft type foundations (e.g. 'rib-raft') which have been specifically designed for a geotechnical ultimate bearing capacity of 200kPa. The ground conditions under many of these lots should also be adequate for standard foundations designed in accordance with NZS 3604, however this would need to be confirmed by specific site investigation at the building consent stage.

The ground conditions beneath building platforms underlain by at least 2m of engineered fill should be adequate for standard foundations designed per NZS 3604 using a geotechnical ultimate bearing capacity of 300kPa. It should be understood that excavations on sites underlain by filling will reduce the depth of fill below the building platform. Ground conditions beneath building platforms that are to be excavated more than 1m below current ground level should therefore be confirmed before the foundation type is selected.

The subsoil conditions beneath specific lots are summarised in Table 1below.

Table 1: Site Subsoil Conditions

Subsoil Condition	Lot Numbers
Natural Soils or <2m Engineered Filling	105, 106, 155, 156, 163 – 166, 170 – 184, 187, 189 – 280, 282 - 351
>2m Engineered Filling	104, 148 – 154, 157 – 162, 167 – 169, 185 – 186, 188, 281,

9.8. Variable Ground Conditions

It should be understood that due to the volcanic nature of the natural soils on this site, it is possible that local soil conditions may vary from those discussed above. It is therefore important that any potentially soft or unsuitable soils encountered in the foundation excavations are brought to the attention of a geotechnical professional.

10. Conclusion

Based on the test data and observations presented in this report it is concluded that the earthworks and subdivision of Stages 3C and 3D (and Lots 104 to 106 within 3A) have been completed in general accordance with the our previous recommendations, Tauranga City Council Infrastructure Development Code and New Zealand standards.

This report presents site-specific recommendations including Building Restriction Lines (BRLs) on some lots located above steeper slopes. Provided these recommendations are followed and prudent development practices are adopted, it is considered that the finished lots are at low risk of erosion, falling debris, subsidence, inundation or liquefaction and these sites should therefore be adequate for residential development without the need for Section 72 restrictions under the New Zealand Building Act.

Development outside the BRL (i.e. between the restriction line and the slope) is subject to further geotechnical input per Section 9.4 of this report and the need for a Section 72 restriction on affected lots will need to be re-assessed at the building consent stage.

11. Limitations

This report has been prepared solely for the use of the client, The Lakes (2012) Limited, their professional advisers and the relevant Territorial Authorities in relation to the specific project described herein. No liability is accepted in respect of its use for any other purpose or by any other person or entity. All future owners of this property should seek professional geotechnical advice to satisfy themselves as to its ongoing suitability for their intended use.

The opinions, recommendations and comments given in this report result from the application of normal methods of site investigation. As the post construction factual evidence has been obtained solely from laboratory testing, boreholes, CPTs and test pits, which by their nature only provide information about a relatively small volume of subsoils, 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.

For and on behalf of Coffey

Report Prepared By:

ROB TELFORD TCC Category 2 Engineering Geologist

Report Reviewed By:

DAVID SULLIVAN Principal Geotechnical Engineer

Geotechnical Suitability Statement Signed By:

G. Marchaut

P MARCHANT TCC Category 1 Geotechnical Engineer

Coffey Geotechnics (NZ) Ltd GENZTAUC13086AP-AG 11 April 2016



Important information about your Coffey Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give

preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.



Important information about your Coffey Report

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

Data should not be separated from the report*

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment.

Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

Rely on Coffey for additional assistance

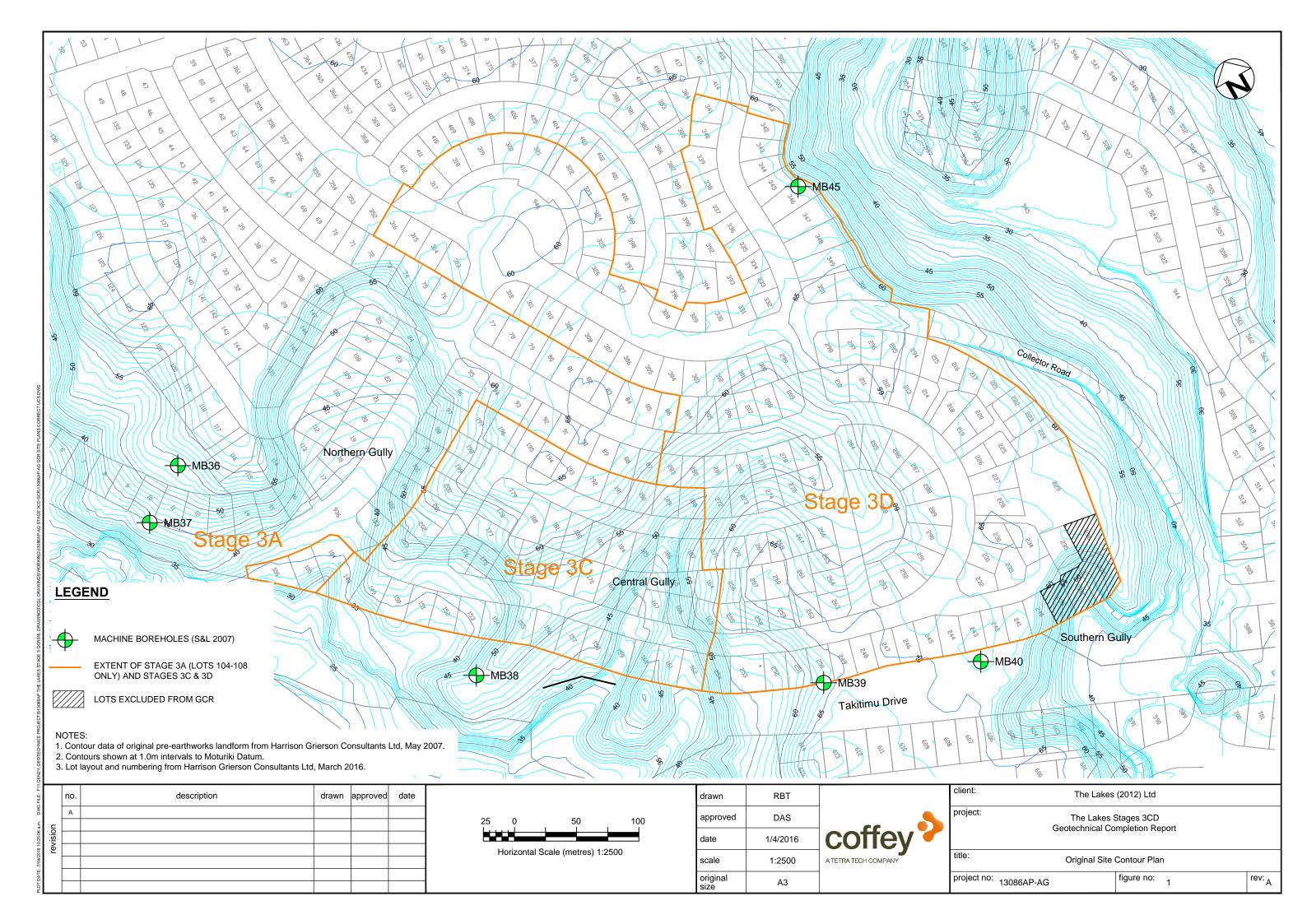
Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

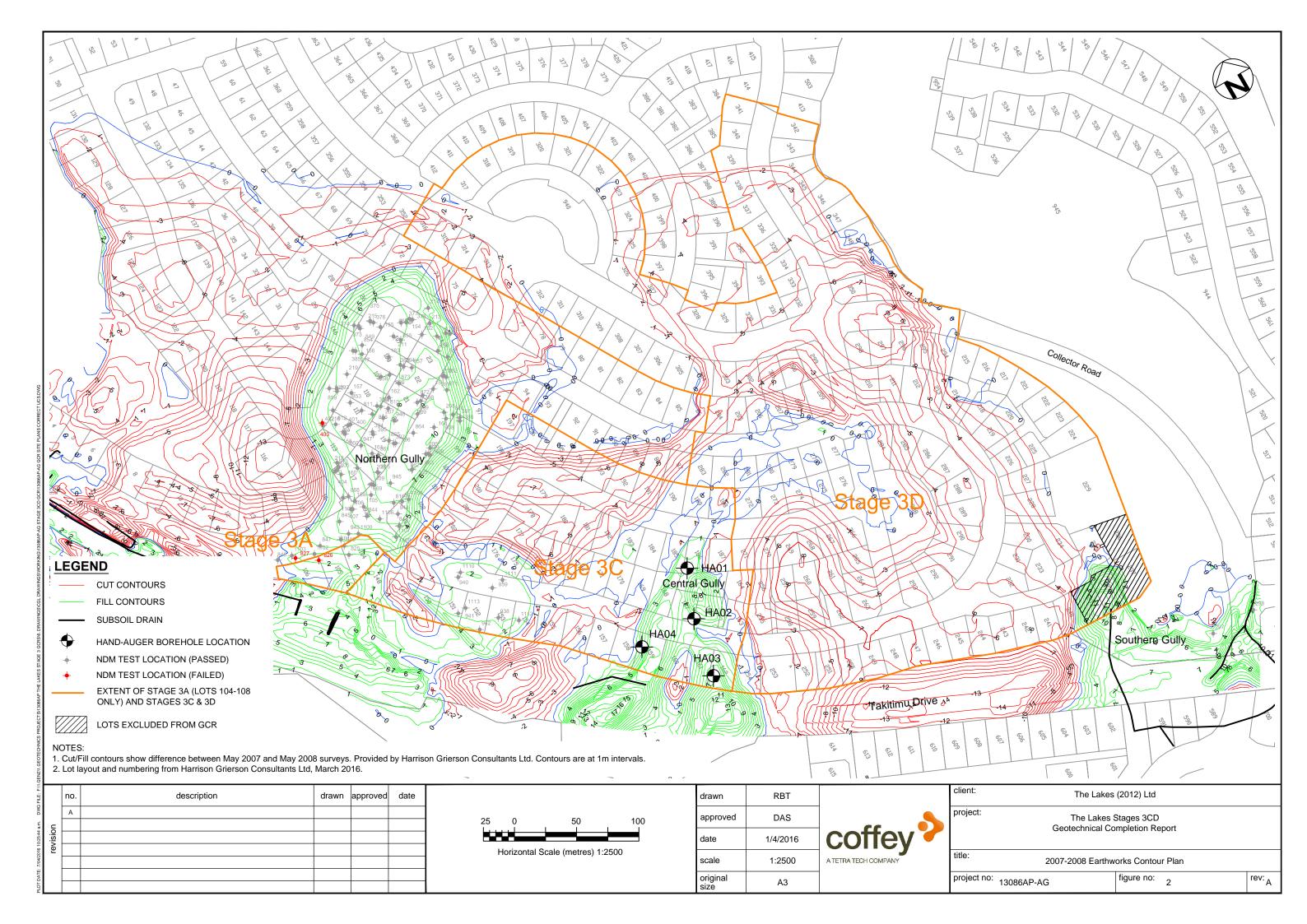
Responsibility

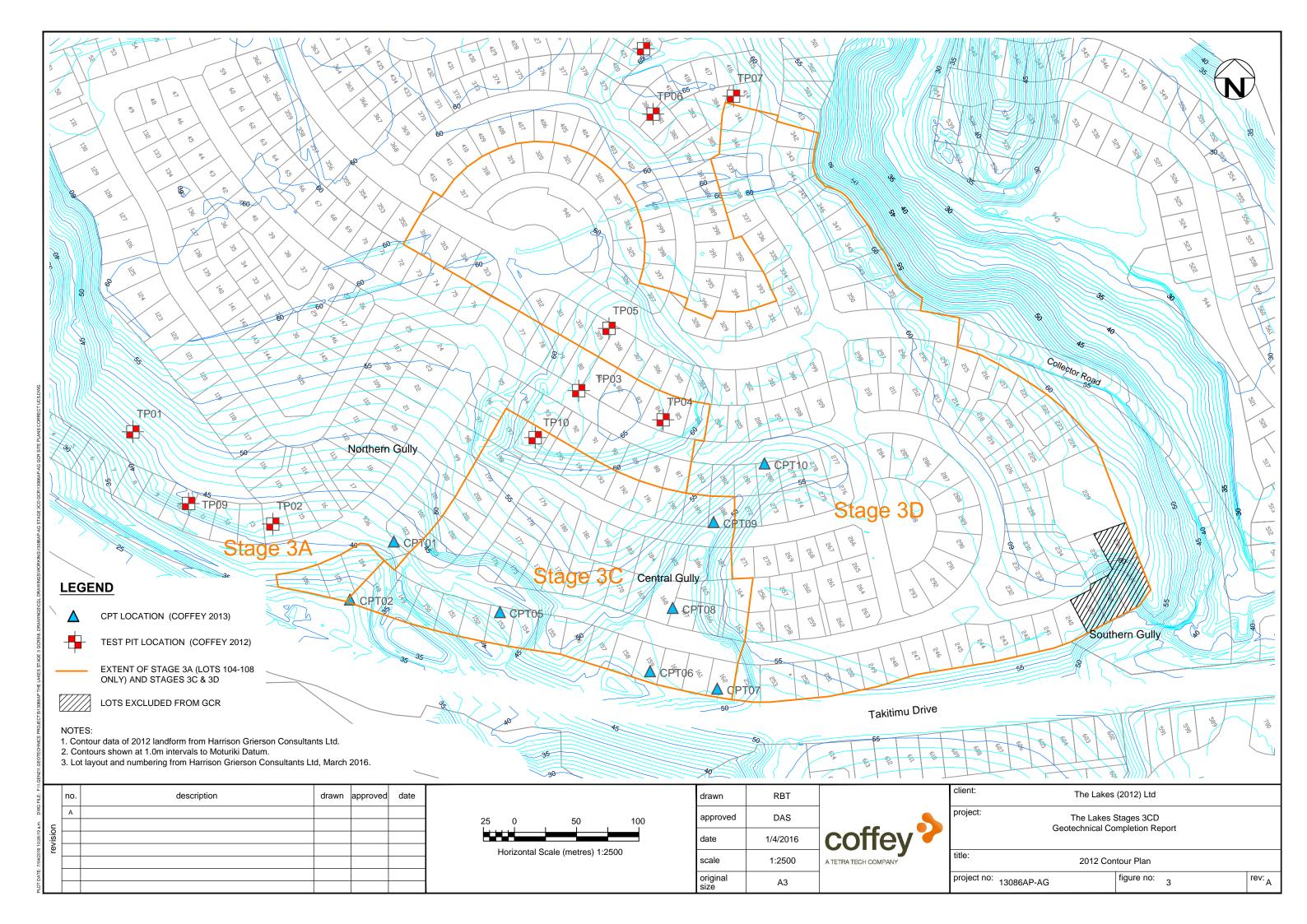
Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

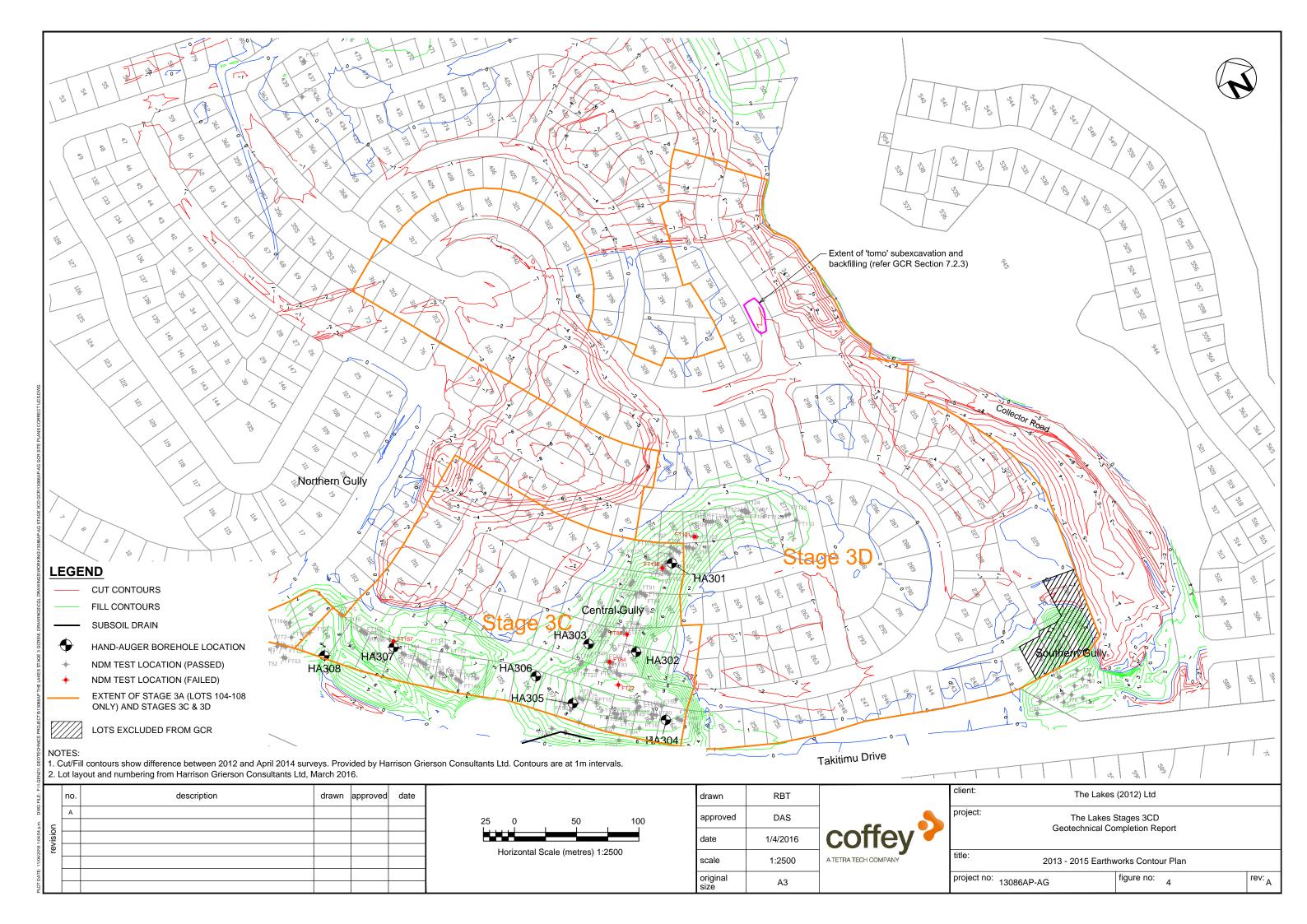
* For further information on this aspect reference should be made to "Guidelines for the Provision of Geotechnical information in Construction Contracts" published by the Institution of Engineers Australia, National headquarters, Canberra, 1987.

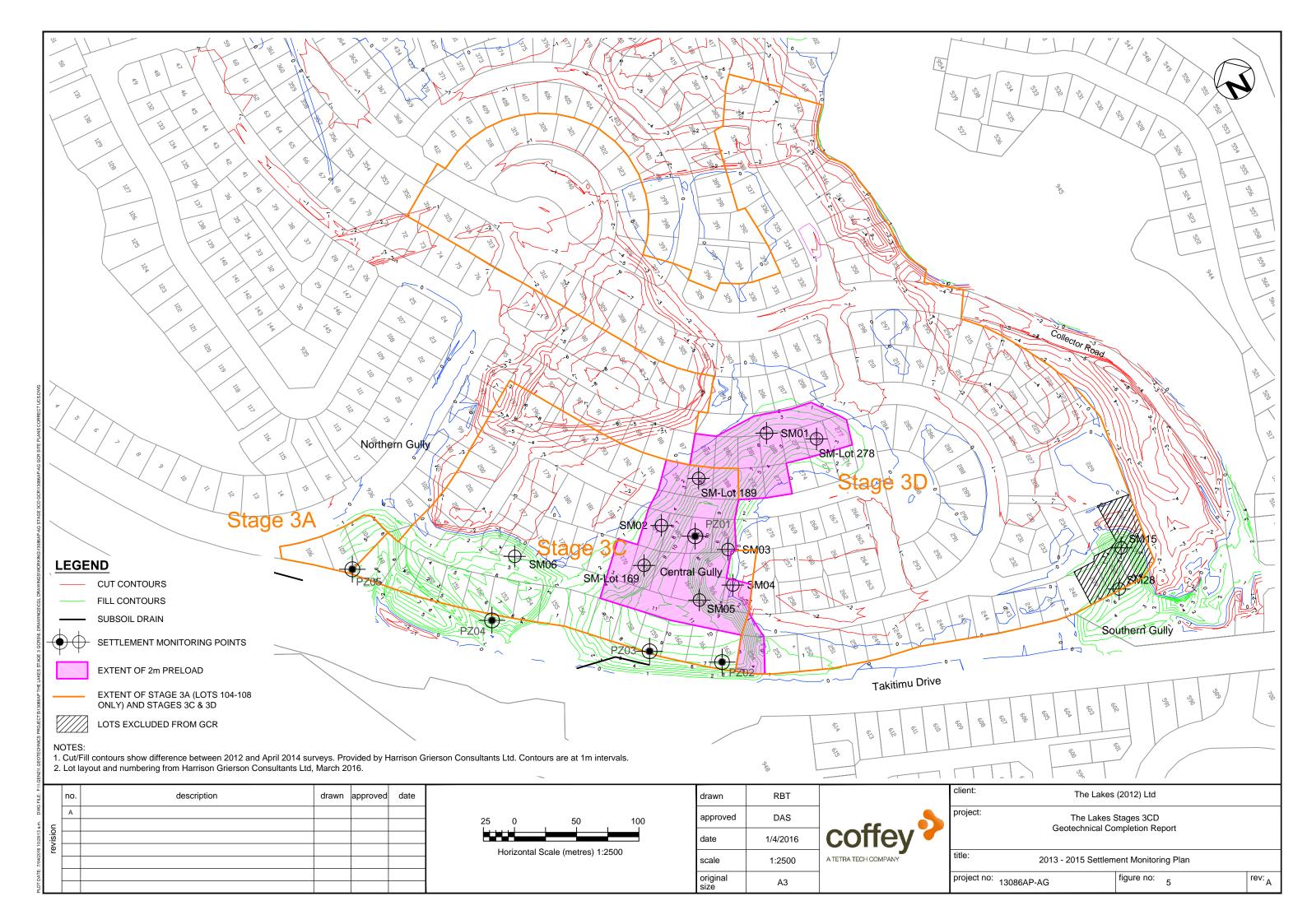
Appendix A - Figures

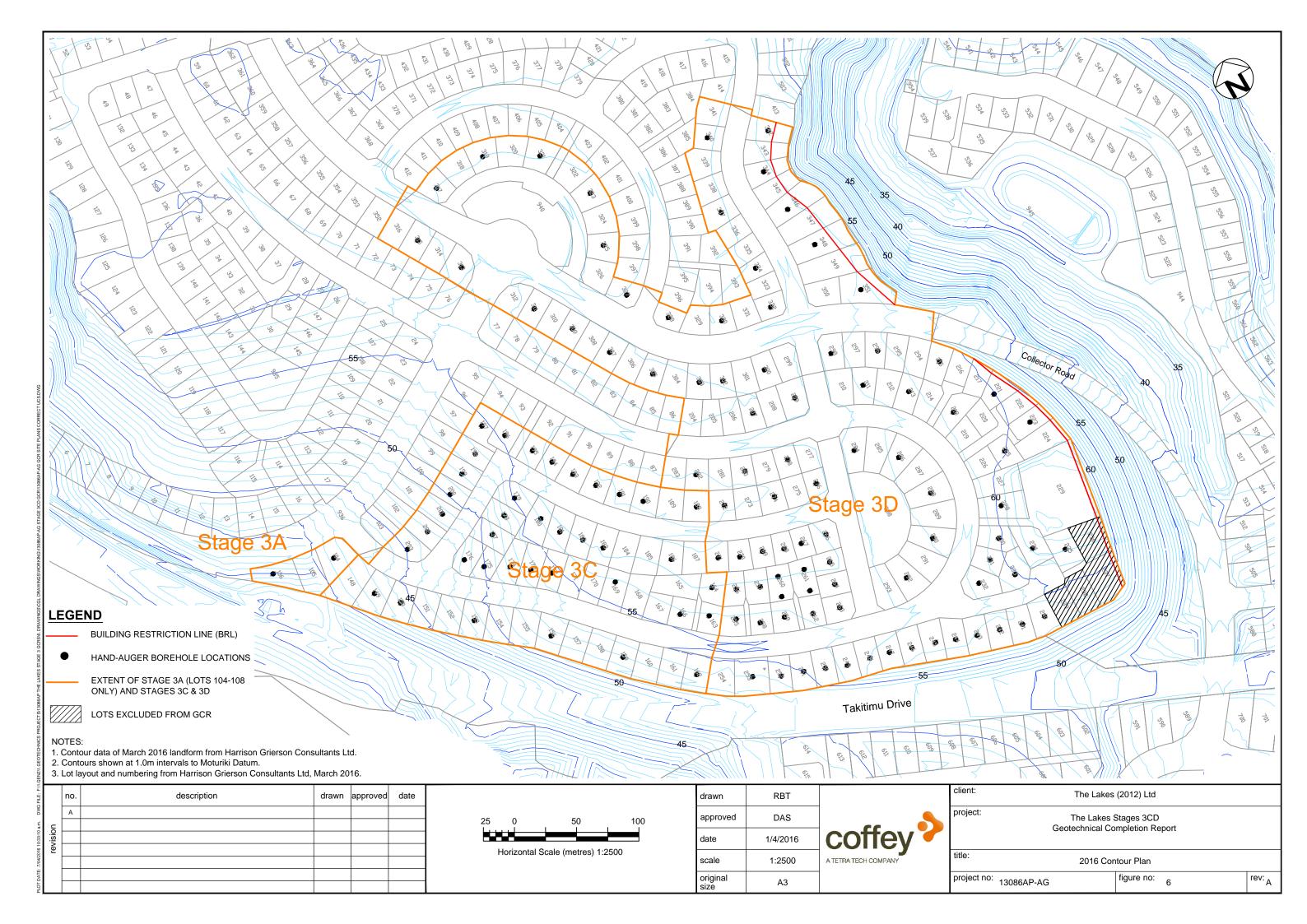












Appendix B - Geotechnical Suitability Statement & Geotechnical Data Summary Table

STATEMENT OF PROFESSIONAL OPINION AS TO THE GEOTECHNICAL SUITABILITY OF LAND FOR BUILDING

NAME OF SUBDIVISION	The Lakes Subdivision – Stages 3C & 3D + Stage
	3A Lots 104-106
COUNCIL FILE NUMBER RC No:	RC21332
ENGINEER RESPONSIBLE FOR	Peter Marchant
DEVELOPMENT	
QUALIFICATIONS:	MIPENZ, CPEng (Reg. No. 69408), TCC Category 1
	Geotechnical Engineer

I, Peter Marchant of Coffey Geotechnics Ltd, 96 Cameron Road, Tauranga, hereby confirm that:

- 1) I am a professional person, appropriately qualified with experience in geomechanics to ascertain the suitability of the land for building development and was retained as the Soils Engineer to the above development.
- 2) An appropriate level of site investigation and construction supervision has been carried out under my direction and is described in our development evaluation report dated 29 April 2013.
- 3) In my professional opinion, not to be construed as a guarantee, I consider that;
 - a) The areas shown in my report dated 11 April 2016 of each new allotment are suitable for the erection thereon of the building types appropriate to the zoning of the land, provided that reference is made to my Geotechnical Completion Report Ref. GENZTAUC13086AP-AG, dated 11 April 2016.
 - b) The earth fills shown on the attached Plans ref Figure 02 & Figure 04 have been placed in general accordance with the requirements of the Infrastructure Development Code.
 - c) The completed works give due regard to all land slope and foundation stability considerations.
 - d) The filled ground is suitable for the erection thereon of residential buildings not requiring specific design subject to the recommendations presented in my Geotechnical Completion Report Ref. GENZTAUC13086AP-AG, dated 11 April 2016.
 - e) The original ground not affected by filling is suitable for the erection thereon of residential buildings requiring specific design subject to the recommendations presented in my Geotechnical Completion Report Ref. GENZTAUC13086AP-AG, dated 11 April 2016.
- 4) This professional opinion is furnished to the Council and the owner 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 for any dwelling.

Signed

P. G. Marchaut

Date: 11 April 2016



PRODUCER STATEMENT SUITABILITY OF LAND FOR BUILDING DEVELOPMENT

	G2							
7	VERSION 1	1						
	July 2011	1						

DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

_	A			Subsu	rface data			Foundations Building Restriction Conventional Specific Shallow Design Foundation to		S/W Specific E	S/W Soakage	S/W Reticulate	Designated Bu	Minimum Building	Compressible	On-Site Efflue	Consent Notice			
Lot No:	Area (m²)	Shear Strength (kPa)		livision Iling	Natural Topography Unworked	Торо	tural graphy worked	Conventional Shallow Foundation to NZS	Specific Design	iction Line	Design triction Line		æ	I Building Platform		Soils	Effluent Disposal	ë		
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	NZS 3604:2011 Y/N/NA	Y/N/NA					form	orm	rm			Comments	
104	721	>240	Y	10	Ν	Ν	-	Y	Ν	N	N	N	Y	N	N	N	N	N	Suitable for standard foundations designed in accordance with NZS 3604, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.	
105	664	NT	Y	11	Ν	Ν	-	Ν	Y	N	N	Ν	Y	Ν	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity	
106	669	>183	Y	7	Ν	Ν	-	Ν	Y	N	N	N	Y	N	N	Ν	Ν	Y	200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.	
148	869	NT	Y	11	Ν	Ν	-	Y	Ν	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Ν		
149	714	133	Y	11	Ν	Ν	-	Y	Ν	N	Ν	Ν	Υ	Ν	Ν	Ν	Ν	Ν		
150	653	>240	Y	4	Ν	Ν	-	Y	Ν	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Ν		
151	608	NT	Y	7	Ν	Ν	-	Y	Ν	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Ν	Suitable for standard foundations designed in accordance with NZS 3604, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.	
152	613	NT	Y	8	Ν	Ν	-	Y	Ν	N	Ν	Ν	Υ	Ν	Ν	Ν	Ν	Ν	UI COTTEY GUN TEL. GENZIAULISU00AP-AG.	
153	600	>183	Y	8	Ν	Ν	-	Y	Ν	Ν	Ν	Ν	Υ	Ν	Ν	Ν	Ν	Ν		
154	608	NT	Y	8	Ν	Ν	-	Y	Ν	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Ν		

Taunanaa (itu	SUMMARY OF GOTECHNICAL DATA FOR INDIVIDUAL LOTS	G3	
Tauranga City		VERSION 1	
	INFRASTRUCTURE DEVELOPMENT CODE	Julv 2011	

DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

_	A			Subsu	rface data			Foundati	dations al Specific Design to		S/W Specific Design	S/W Soakage	S/W Reticulate	Designated Building	Minimum Building Platform	Compressible Soils	On-Site Efflue	Consent Notice		
Lot No:	Area (m²)	Shear Strength		livision Iling	Natural Topography	Торс	atural ography	Conventional Shallow	Specific Design	iction L)esign		ſD	iilding Platform	ding Pl	Soils	Effluent Disposal	ē		
	C	(kPa) at 0.5m depth	Y/N	Depth (m)	Unworked Y/N	Earth Y/N	Depth (m)	Foundation to NZS 3604:2011 Y/N/NA	Y/N/NA	ine	; ;				atform		osal			Comments
				1			1	1 .					1				1	1	1	
155	657	NT	Y	6	N	Y	2	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y		pe foundations specifically designed echnical ultimate bearing capacity
156	644	>240	Y	4	N	Ν	-	N	Y	Ν	Ν	Ν	Y	N	Ν	Ν	Ν	Y	200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.	
157	600	NT	Y	7	N	Ν	-	Y	N	N	Ν	Ν	Y	N	Ν	Ν	Ν	N		
158	600	NT	Y	11	N	Ν	-	Y	N	N	N	Ν	Y	N	N	N	Ν	N		
159	611	>183	Y	16	N	Ν	-	Y	N	N	N	Ν	Y	N	Ν	Ν	Ν	N		or standard foundations designed in
160	612	NT	Y	16	N	Ν	-	Y	N	N	N	N	Y	N	N	N	N	N		with NZS 3604, subject to Section 9.7 GCR ref: GENZTAUC13086AP-AG.
161	613	NT	Y	12	N	Ν	-	Y	N	N	N	N	Y	N	N	N	N	N		
162	610	>240	Y	12	N	Ν	-	Y	N	N	N	Ν	Y	N	N	N	Ν	N		
163	429	>240	Y	4	Ν	Ν	-	N	Y	N	N	Ν	Y	N	Ν	Ν	Ν	Y	De dureft te	
164	499	151	N	-	Ν	Y	4	N	Y	N	N	N	Y	N	N	N	N	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.	
165	649	NT	Y	11	N	Ν	-	N	Y	N	N	Ν	Y	N	N	N	N	Y		
				SUMMARY OF GOTECHNICAL DATA FOR INDIVIDUAL LOTS										G3						



DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

	A			Subsu	rface data			Foundatio	ons	Building Restr	S/W Specific E	S/W Soakage	S/W Reticulate	Designated Bu	Minimum Buil	Compressible	On-Site Efflue	Consent Notice		
Lot No:	Area (m²)	Shear Strength (kPa)		livision Iling	Natural Topography Unworked	Торо	tural graphy worked	Conventional Shallow Foundation to NZS	Specific Design	Restriction Line	Design		D	Building Platform	Building Platform	Soils	Effluent Disposal	ë		
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	NZS 3604:2011 Y/N/NA	Y/N/NA					form	orm				Comments	
166	481	>183	Y	11	Ν	N	-	Ν	Y	N	N	N	Y	N	N	N	N	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.	
167	468	NT	Y	16	Ν	Ν	-	Y	Ν	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Ν		
168	649	NT	Y	16	Ν	Ν	-	Y	Ν	N	N	N	Y	N	N	N	N	N	Suitable for standard foundations designed in accordance with NZS 3604, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.	
169	602	>240	Y	9	Ν	Ν	-	Y	Ν	Ν	N	Ν	Y	Ν	N	Ν	Ν	Ν		
170	546	NT	Y	3	Ν	Ν	-	Ν	Y	N	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y		
171	544	NT	Y	2	Ν	Ν	-	Ν	Y	Ν	N	Ν	Y	Ν	N	Ν	Ν	Y	Pod-raft type foundations specifically designed	
172	548	>240	Y	1	Ν	Y	3	Ν	Y	Ν	N	Ν	Y	Ν	Ν	Ν	Ν	Y	for geotechnical ultimate bearing capacity	
173	587	>183	Ν	-	Ν	Y	7	N	Y	Ν	N	Ν	Υ	Ν	Ν	Ν	Ν	GENZTAUC13086AP-AG.		
174	596	215	Y	5	Ν	Y	7	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Υ		

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Tauranga City		VERSION 1	
	INFRASTRUCTURE DEVELOPMENT CODE	Julv 2011	

DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

_	A			Subsu	rface data			Foundations Restric		S/W Specific E	S/W Soakage	S/W Reticulate	Designated Building	Minimum Building Platform	Compressible Soils	On-Site Efflue	Consent Notice			
Lot No:	Area (m²)	Shear Strength		livision Iling	Natural Topography	Торс	itural ography	Conventional Shallow	Specific Design	Restriction Line	Design		æ		ding Pla	Soils	Effluent Disposal	ë		
		(kPa) at 0.5m depth	Y/N	Depth (m)	Unworked Y/N	Earth Y/N	Depth (m)	Foundation to NZS 3604:2011 Y/N/NA	Y/N/NA	ine				Platform	atform		osal			Comments
					.,			1,11,10,1	.,,.											connents
175	418	N/A	Y	5	N	Y	3	Ν	Y	N	N	N	Y	N	N	N	N	Y	for geot	pe foundations specifically designed echnical ultimate bearing capacity oject to Section 9.7 of Coffey GCR ref:
176	526	>183	Y	5	N	Y	6	N	Y	N	N	N	Y	N	N	N	Ν	Y	asses	GENZTAUC13086AP-AG. Is underlying building platform to be ssed and/or remediated before opment per Section 9.5 of GCR.
177	582	N/A	Ν	-	Ν	Y	6	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y		
178	576	114	Ν	-	N	Y	9	N	Y	Ν	N	Ν	Y	Ν	N	N	Ν	Y		
179	610	>240	Ν	-	N	Y	10	N	Y	Ν	N	Ν	Y	Ν	Ν	Ν	Ν	Y		
180	711	120	Ν	-	N	Y	7	N	Y	Ν	N	Ν	Y	Ν	Ν	N	Ν	Y		pe foundations specifically designed echnical ultimate bearing capacity
181	629	111	Ν	-	N	Y	6	N	Y	Ν	N	Ν	Y	Ν	N	N	Ν	Y		oject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.
182	587	133	Ν	-	N	Y	4	Ν	Y	N	N	Ν	Y	Ν	N	N	Ν	Y		
183	571	N/A	Y	3	N	Y	2	Ν	Y	N	N	Ν	Y	Ν	N	N	Ν	Y		
184	573	NT	Y	5	N	Ν	-	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Υ		
		T				SL	IMMAR	Y OF GOTECH		ATA	FOR			DUAL	LO	٢S				G3



DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

	A			Subsu	rface data			Designated Bu	Minimum Buil	Compressible	On-Site Efflue	Consent Notice								
Lot No:	Area (m²)	Shear Strength (kPa)		livision Iling	Natural Topography Unworked	Торс	itural ography worked	Conventional Shallow Foundation to NZS	Specific Design	Restriction Line	Design		e	I Building Platform	Building Platform	Soils	Effluent Disposal	ĕ		
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	3604:2011 Y/N/NA	Y/N/NA					form	irm				Comments	
185	592	NT	Y	13	N	N	_	Y	N	N	N	N	Y	N	N	N	N	N	Suitable for standard foundations designed in	
			-																accordance with NZS 3604, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.	
186	531	>240	Y	13	N	N	-	Y	N	N	N	N	Y	N	N	N	N	N		
187	484	NT	Y	7	Ν	Ν	-	Ν	Y	N	N	N	Y	N	N	N	N	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.	
188	514	>240	Y	10	Ν	Ν	-	Y	Ν	N	N	N	Y	N	N	N	N	N	Suitable for standard foundations designed in accordance with NZS 3604, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.	
189	514	NT	Y	9	Ν	Ν	-	N	Y	N	N	Ν	Y	Ν	Ν	Ν	Ν	Y		
190	514	>183	Y	3	Ν	Y	2	N	Y	N	N	N	Y	Ν	N	Ν	Ν	Y	Pod-raft type foundations specifically designed	
191	514	>240	N	-	Ν	Y	5	N	Y	Ν	N	Ν	Υ	Ν	Ν	Ν	Ν	Υ	Y for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:	
192	514	>183	N	-	Ν	Y	6	N	Y	N	N	N	Y	Ν	N	N	Ν	GENZTAUC13086AP-AG.		
193	515	136	N	-	Ν	Y	8	N	Y	N	N	Ν	Y	Ν	Ν	Ν	Ν	Y		

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Tauranga City		VERSION 1	
		Julv 2011	

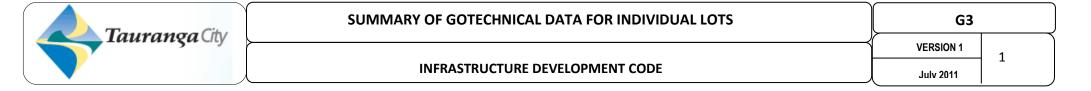
DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

_	A			Subsu	rface data			Foundatio	ons	Building Restriction Line	S/W Specific E	S/W Reticulate S/W Soakage S/W Specific Design		Designated Building Platform	Minimum Building Platform	Compressible Soils	On-Site Effluent Disposal	Consent Notice		
Lot No:	Area (m²)	Shear Strength (kPa)		livision Iling	Natural Topography Unworked	Торо	tural graphy worked	Conventional Shallow Foundation to	Specific Design	iction Lin	Design		e	uilding Pla	lding Plat	Soils	nt Dispos	ĕ		
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	NZS 3604:2011 Y/N/NA	Y/N/NA	ē				atform	form		sal			Comments
194	450	175	N	-	Ν	Y	8	N	Y	N	N	N	Y	N	N	N	N	Y		
195	450	86	Ν	-	Ν	Y	8	N	Y	N	Ν	Ν	Y	N	N	Ν	Ν	Y		
196	499	>183	Ν	-	Ν	Y	8	N	Y	Ν	Ν	Ν	Y	N	N	Ν	N	Y		
197	621	N/A	Ν	-	Ν	Y	8	N	Y	Ν	Ν	Ν	Y	N	Ν	Ν	Ν	Y		
198	540	176	Ν	-	Ν	Y	8	N	Y	Ν	Ν	Ν	Y	N	Ν	Ν	Ν	Y	Pod-raft ty	pe foundations specifically designed
199	540	N/A	Ν	-	Ν	Υ	9	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	for geote 200kPa, sub	chnical ultimate bearing capacity ject to Section 9.7 of Coffey GCR ref:
200	543	N/A	Ν	-	Ν	Υ	9	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y		GENZTAUC13086AP-AG.
201	556	233	Ν	-	Ν	Y	7	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y		
202	555	N/A	Ν	-	Ν	Y	6	N	Y	Ν	Ν	Ν	Y	N	Ν	Ν	Ν	Y		
203	587	>183	Ν	-	Ν	Y	5	N	Y	Ν	Ν	Ν	Y	N	Ν	Ν	Ν	Y		
204	488	NT	Ν	-	Ν	Υ	4	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y		
		SUMMARY OF GOTECHNICAL DATA FOR INDI										DUAL	. LO1	ſS				G3		



DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

	A			Subsu	rface data			Foundatio	ons	S/W Reticulate S/W Soakage S/W Specific Design Building Restriction Line		Designated Building Platform	Minimum Building Platform	Compressible	On-Site Effluent Disposal	Consent Notice			
Lot No:	Area (m²)	Shear Strength (kPa)		livision Iling	Natural Topography Unworked	Торо	itural ography worked	Conventional Shallow Foundation to	Specific Design	iction Line	Design		P	uilding Plat	Iding Platfu	Soils	nt Disposa	ĕ	
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	NZS 3604:2011 Y/N/NA	Y/N/NA					tform	orm		=		Comments
								1											
205	470	NT	Ν	-	Ν	Y	4	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
206	488	NT	Y	1	N	Υ	2	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
207	488	103	Y	1	N	N	-	N	Y	N	N	Ν	Y	N	Ν	Ν	Ν	Y	
208	510	NT	Y	1	N	Y	1	N	Y	N	N	Ν	Y	Ν	Ν	Ν	Ν	Y	
209	640	109	Ν	-	N	Y	5	N	Y	N	N	Ν	Y	N	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity
210	590	NT	Ν	-	N	Y	7	N	Y	N	N	Ν	Y	Ν	Ν	Ν	Ν	Y	200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.
211	544	165	Ν	-	N	Υ	7	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
212	537	NT	Ν	-	N	Υ	7	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
213	513	111	Ν	-	N	Y	6	Ν	Y	N	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
214	506	NT	Ν	-	Ν	Υ	5	Ν	Y	Ν	Ν	Ν	Υ	Ν	Ν	Ν	Ν	Υ	



DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

	Area (m²)	Subsurface data						Foundations		Building Restr	S/W Specific I	S/W Soakage	S/W Reticulate	Designated Bu	Minimum Buil	Compressible	On-Site Efflue	Consent Notice	
Lot No:		Shear Strength (kPa)	ength Filling		Natural Topography Unworked	hy Topography		Conventional Shallow Foundation to	Specific Design	Restriction Line	Design		ſĎ	Iding	Building Platform	Soils	Effluent Disposal	ë	
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	NZS 3604:2011 Y/N/NA	Y/N/NA	'/N/NA				Platform	orm		_		Comments
					[1			1	1				
215	540	>240	Ν	-	Ν	Y	4	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity
216	443	NT	Ν	-	N	Y	4	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.
217	444	NT	Ν	-	N	Y	4	Ν	Y	Y	N	N	Y	N	N	N	Ν	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG. Development subject to BRL restrictions per Section 9.4 of GCR.
218	632	215	Ν	-	N	Y	5	N	Y	Ν	N	Ν	Y	N	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed
219	455	NT	Ν	-	N	Y	5	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:
220	421	NT	Ν	-	Ν	Y	5	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	GENZTAUC13086AP-AG.
221	526	>240	Ν	-	N	Y	4	N	Y	Y	N	Ν	Y	N	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed
222	501	NT	Ν	-	N	Y	4	N	Y	Y	N	Ν	Y	Ν	Ν	Ν	Ν	Y	for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:
223	518	215	Ν	-	N	Υ	4	N	Y	Υ	N	Ν	Y	N	Ν	Ν	Ν	Y	GENZTAUC13086AP-AG. Development subject to BRL restrictions per
224	720	NT	Ν	-	Ν	Υ	4	Ν	Y	Y	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	Section 9.4 of GCR.

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DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

	Area (m²)		Subsurface data						Foundations		S/W Specific Design	S/W Soakage	S/W Reticulate	Designated Building Platform	Minimum Building Platform	Compressible	On-Site Efflue	Consent Notice	
Lot No:		Shear Strength (kPa)	rength Filling		Natural Topography Unworked	aphy Topography		ConventionalSpecificShallowDesignFoundation to		Restriction Line	Design		rD	uilding Plat	ding Platfo	Soils	Effluent Disposal	'n	
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N Depth 3604:2011 (m) Y/N/NA Y/		Y/N/NA					form	orm		_		Comments	
										1		1			1				
225	459	>240	Ν	-	N	Y	4	N	Y	N	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
226	453	NT	Ν	-	N	Y	5	Ν	Y	Ν	Ν	Ν	Y	N	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:
227	708	NT	Ν	-	N	Y	5	Ν	Y	Ν	Ν	Ν	Y	N	Ν	Ν	Ν	Y	GENZTAUC13086AP-AG.
228	756	123	Ν	-	N	Y	6	N	Y	N	N	Ν	Y	N	Ν	N	Ν	Y	
229	3525	NT	Ν	-	N	Y	1	N	Y	Y	N	N	Y	N	N	N	Ν	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG. Development subject to BRL restrictions per Section 9.4 of GCR.
230	543	N/A	Ν	-	N	Y	6	Ν	Y	N	N	N	Y	N	N	N	Ν	Y	
231	463	>240	Ν	-	N	Y	5	Ν	Y	N	N	N	Y	N	N	N	Ν	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.
232	619	N/A	Ν	-	Ν	Y	6	Ν	Y	N	N	N	Y	N	N	N	Ν	Y	GENZTAUCISU80AP-AG.

	SUMMARY OF GOTECHNICAL DATA FOR INDIVIDUAL LOTS	G3			
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	INFRASTRUCTURE DEVELOPMENT CODE	Julv 2011	·		

DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

	A			Subsu	rface data			Foundatio	ons	Building Restriction Line	S/W Specific Design	S/W Soakage	S/W Reticulate	Designated Building Platform	Minimum Building Platform	Compressible Soils	On-Site Effluent Disposal	Consent Notice	
Lot No:	Area (m²)	Shear Strength		livision Iling	Natural Topography	Торо	itural ography	Conventional Shallow	Specific Design	iction L	Design		e	uilding F	Iding PI	Soils	nt Disp	ë	
	C	(kPa) at 0.5m depth	Y/N	Depth (m)	Unworked Y/N	Earth Y/N	worked Depth (m)	Foundation to NZS 3604:2011 Y/N/NA	Y/N/NA	ine				platform	atform		osal		Comments
000	652	400	N		N	V		N	X				V					Y	
233	653	>183	N	-	N	Y	5	N	Y	N	N	N	Y	N	N	N	N	Ŷ	
234	700	196	Ν	-	N	Y	4	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
235	654	>183	Y	4	N	Y	2	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
240	578	>240	Y	4	N	Y	5	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
241	551	120	Ν	-	N	Y	6	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed
242	544	>183	Y	0.7	N	Y	6	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:
243	542	>183	Ν	-	N	Y	6	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	GENZTAUC13086AP-AG.
244	580	>240	N	-	N	Y	6	N	Y	Ν	Ν	Ν	Y	N	N	Ν	Ν	Y	
245	585	147	Ν	-	N	Y	6	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
246	546	N/A	Ν	-	N	Y	7	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
247	515	72	Ν	-	N	Υ	8	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Υ	
				SUMMARY OF GOTECHNICAL DATA FOR INDIVIDUAL LOTS										G3					



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DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

	A			Subsu	rface data			Foundati	Foundations		S/W Specific Design	S/W Soakage	S/W Reticulate	Designated Building	Minimum Buil	Compressible	On-Site Efflue	Consent Notice		
Lot No:	Area (m²)	Shear Strength (kPa)		livision Iling	Natural Topography Unworked	Торо	itural ography worked	Conventional Shallow Foundation to	Specific Design	Restriction Line	Design		e	uilding Plat	Building Platform	Soils	Effluent Disposal	ĕ		
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	NZS 3604:2011 Y/N/NA	Y/N/NA					Platform	orm		<u> </u>		Comments	
					[1	1				1					
248	520	>240	N	-	N	Y	8	N	Y	N	N	Ν	Y	Ν	N	Ν	Ν	Y		
249	543	156	Ν	-	Ν	Y	9	Ν	Y	Ν	Ν	Ν	Υ	Ν	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed	
250	535	N/A	Ν	-	N	Y	9	N	Y	N	N	N	Y	N	Ν	Ν	Ν	Y	for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:	
251	552	>183	Ν	-	N	Y	7	N	Y	N	N	N	Y	N	Ν	Ν	Ν	Y	GENZTAUC13086AP-AG.	
252	541	233	Ν	-	Ν	Y	3	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y		
253	834	>183	Ν	-	Ν	Y	2	Ν	Y	N	N	N	Y	N	N	N	N	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.	
254	615	NT	Y	10	Ν	Ν	-	Ν	Y	N	N	N	Y	N	N	N	N	Y	Ground level in front 3m yard to be maintained at least RL55.2m (Moturiki Datum) per Section 9.6 of GCR.	
255	473	N/A	Ν	-	N	Y	7	N	Y	N	N	N	Y	N	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed	
256	436	176	Ν	-	Ν	Y	7	N	Y	Ν	Ν	Ν	Y	N	Ν	Ν	Ν	Y	for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:	
257	526	215	Y	0.6	Ν	Y	9	Ν	Y	Ν	N	Ν	Y	N	Ν	Ν	Ν	Y	GENZTAUC13086AP-AG. Y	

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DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

	A			Subsu	rface data			Foundations Foundations Restriction Conventional Specific Shallow Design		S/W Specific Design	S/W Soakage	S/W Reticulate	Designated Building	Minimum Building Platform	Compressible Soils	On-Site Efflue	Consent Notice		
Lot No:	Area (m²)	Shear Strength (kPa)		livision Iling	Natural Topography Unworked	Торо	tural graphy worked	Conventional Shallow Foundation to	Specific Design	iction Line	Design		æ	uilding Pla	ding Plat	Soils	Effluent Disposal	ö	
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	NZS 3604:2011 Y/N/NA	Y/N/NA	е				Platform	form		a		Comments
258	444	>240	Ν	-	Ν	Y	9	N	Y	N	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
259	507	120	Ν	-	N	Y	10	N	Y	N	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
260	547	103	Ν	-	N	Y	10	N	Y	N	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
261	593	83	Ν	-	N	Y	9	N	Y	N	N	Ν	Y	N	Ν	Ν	Ν	Y	
262	461	176	Ν	-	N	Y	10	N	Y	N	N	Ν	Y	Ν	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed
263	526	>183	Ν	-	N	Y	9	N	Y	N	N	Ν	Y	N	Ν	Ν	Ν	Y	for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:
264	450	166	Ν	-	N	Y	7	N	Y	N	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	GENZTAUC13086AP-AG.
265	445	62	Ν	-	N	Y	5	N	Y	N	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
266	520	N/A	Ν	-	N	Y	3	N	Y	N	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
267	402	120	Ν	-	N	Y	6	N	Y	N	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
268	417	196	Ν	-	Ν	Y	8	N	Y	N	Ν	Ν	Υ	Ν	Ν	Ν	Ν	Υ	



DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

_	Aı			Subsu	rface data			Foundatio	ons	Building Restrict		S/W Soakage	S/W Reticulate	Designated Building Platform	Minimum Building Platform	Compressible Soils	On-Site Effluent Disposal	Consent Notice	
Lot No:	Area (m²)	Shear Strength (kPa)		livision Iling	Natural Topography Unworked	Торо	tural graphy worked	Conventional Shallow Foundation to	Specific Design	Restriction Line	S/W Specific Design		τD	iilding Pla	ding Platf	Soils	nt Dispos	ē	
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	NZS 3604:2011 Y/N/NA	Y/N/NA	ίυ				tform	orm		al		Comments
269	449	160	N	-	N	Y	8	N	Y	Ν	N	Ν	Y	N	N	N	Ν	Y	
270	462	>240	Ν	-	Ν	Y	7	N	Y	N	N	N	Y	N	N	N	N	Y	
271	451	>240	Y	2	N	Y	3	N	Y	Ν	N	Ν	Y	N	Ν	Ν	Ν	Y	
272	514	100	Y	8	N	Ν	-	N	Y	Ν	N	Ν	Y	N	Ν	Ν	Ν	Y	
273	514	NT	Y	4	Ν	Y	3	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed
274	515	176	Y	1	Ν	Y	3	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:
275	450	NT	Y	3	Ν	Y	2	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	GENZTAUC13086AP-AG.
276	413	>240	Y	4	Ν	Ν	-	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
277	461	NT	Y	4	Ν	Ν	-	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
278	453	220	Y	5	Ν	Ν	-	Ν	Y	Ν	Ν	Ν	Υ	Ν	Ν	Ν	Ν	Y	
279	458	NT	Y	5	Ν	Ν	-	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	



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SUMMARY OF GOTECHNICAL DATA FOR INDIVIDUAL LOTS

DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

	A			Subsu	rface data			Foundatio	Foundations		S/W Specific Design	S/W Soakage	S/W Reticulate	Designated Building	Minimum Buil	Compressible	On-Site Efflue	Consent Notice	
Lot No:	Area (m²)	Shear Strength (kPa)		livision Iling	Natural Topography Unworked	Торо	tural graphy worked	Conventional Shallow Foundation to	Specific Design	Restriction Line	lesign		D		Building Platform	Soils	Effluent Disposal	e	
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	NZS 3604:2011 Y/N/NA	Y/N/NA					Platform	orm		_		Comments
280	462	>240	Y	6	Ν	Ν	-	Ν	Y	N	N	N	Y	N	N	N	N	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.
281	464	NT	Y	7	Ν	Ν	-	Y	Ν	N	N	N	Y	N	N	N	N	N	Suitable for standard foundations designed in accordance with NZS 3604, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.
282	466	>240	Y	6	Ν	Ν	-	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
283	466	NT	Y	3	Ν	Ν	-	Ν	Y	Ν	Ν	N	Y	Ν	Ν	Ν	Ν	Y	
284	659	>240	N	-	Ν	Y	4	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed
285	674	NT	N	-	Ν	Y	6	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:
286	675	>183	Y	1	Ν	Y	6	N	Y	Ν	Ν	N	Y	N	Ν	N	Ν	Y	GENZTAUC13086AP-AG.
287	679	NT	N	-	Ν	Y	5	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
288	683	>183	Y	0.7	Ν	Y	5	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	N	Ν	Y	

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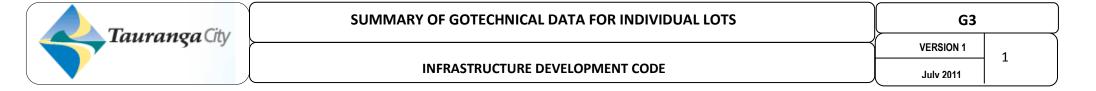
DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

_	Aı			Subsu	rface data			Foundatio	ons	Building Restri	S/W Specific Design	S/W Soakage	S/W Reticulate	Designated Building Platform	Minimum Building Platform	Compressible Soils	On-Site Effluent Disposal	Consent Notice	
Lot No:	Area (m²)	Shear Strength (kPa)		livision Iling	Natural Topography Unworked	Торо	tural graphy worked	Conventional Shallow Foundation to	Specific Design	Restriction Line	esign		ťD	iilding Pl	ding Plat	Soils	nt Dispo	e	
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	NZS 3604:2011 Y/N/NA	Y/N/NA	Ĩ				atform	form		sal		Comments
289	685	NT	Ν	-	Ν	Y	5	N	Y	N	N	Ν	Y	N	Ν	N	N	Y	
290	682	>240	Ν	-	N	Y	5	N	Y	N	N	N	Y	N	N	N	N	Y	
291	676	NT	N	-	Ν	Y	5	Ν	Y	Ν	N	Ν	Y	N	Ν	Ν	N	Y	
292	675	>240	Ν	-	Ν	Y	6	N	Y	Ν	Ν	Ν	Υ	Ν	Ν	Ν	Ν	Y	
293	663	NT	Ν	-	Ν	Y	8	Ν	Y	Ν	Ν	Ν	Υ	Ν	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity
294	540	NT	Ν	-	Ν	Y	5	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.
295	490	NT	Ν	-	Ν	Y	8	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
296	479	>240	Ν	-	Ν	Y	9	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
297	496	NT	Ν	-	Ν	Y	9	N	Y	N	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
298	542	101	Ν	-	Ν	Y	9	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
299	531	NT	Ν	-	Ν	Y	6	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	



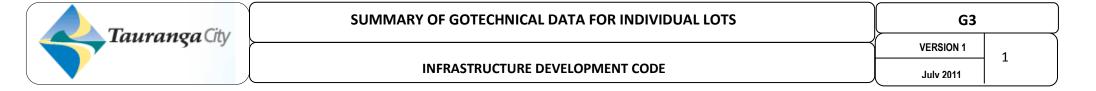
DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

	A			Subsu	rface data			Foundatio	ons	Building Restriction Line	S/W Specific Design	S/W Soakage	S/W Reticulate	Designated Building Platform	Minimum Building Platform	Compressible Soils	On-Site Effluent Disposal	Consent Notice	
Lot No:	Area (m²)	Shear Strength (kPa)		livision Iling	Natural Topography Unworked	Торо	tural graphy worked	Conventional Shallow Foundation to	Specific Design	iction Line	Design		D	uilding Pla	ding Platf	Soils	nt Disposa	'n	
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	NZS 3604:2011 Y/N/NA	Y/N/NA					tform	orm		<u> </u>		Comments
000	507	N1/A	V	0.75	N	V	_	N	X				V					V	
300	507	N/A	Y	0.75	N	Y	5	N	Y	N	Ν	N	Y	N	Ν	N	N	Y	
301	511	NT	Ν	-	N	Y	5	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
302	538	196	Ν	-	N	Y	6	N	Y	N	N	Ν	Y	Ν	Ν	N	Ν	Y	
303	537	>183	Y	0.5	N	Y	6	N	Y	N	N	Ν	Y	Ν	Ν	N	Ν	Y	
304	561	NT	Ν	-	Ν	Y	5	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed
305	536	196	Ν	-	Ν	Y	5	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:
306	532	NT	Ν	-	Ν	Y	5	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	GENZTAUC13086AP-AG.
307	513	>183	Ν	-	Ν	Y	5	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
308	513	NT	Ν	-	Ν	Y	5	Ν	Y	Ν	Ν	Ν	Υ	Ν	Ν	Ν	Ν	Y	
309	513	>240	Ν	-	Ν	Y	5	Ν	Y	Ν	Ν	Ν	Υ	Ν	Ν	Ν	Ν	Y	Y
310	485	NT	Ν	-	Ν	Y	4	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	



DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

	A			Subsu	rface data			Foundati	ons	Building Restriction Line	S/W Specific Design	S/W Soakage	S/W Reticulate	Designated Building Platform	Minimum Building Platform	Compressible	On-Site Effluent Disposal	Consent Notice	
Lot No:	Area (m²)	Shear Strength (kPa)		livision Iling	Natural Topography Unworked	Торо	tural graphy worked	Conventional Shallow Foundation to	Specific Design	iction Line	Design		æ	uilding Plat	Iding Platfi	Soils	nt Disposa	ĕ	
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	NZS 3604:2011 Y/N/NA	Y/N/NA					tform	orm		<u> </u>		Comments
311	485	>183	Y	1.25	N	Y	3	N	Y	N	N	N	Y	N	N	N	N	Y	
312	527	NT	Ν	-	Ν	Y	3	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
313	616	172	Ν	-	Ν	Y	4	N	Y	N	N	Ν	Υ	Ν	Ν	Ν	Ν	Y	
314	542	NT	Ν	-	N	Y	4	N	Y	N	N	N	Y	N	Ν	N	N	Y	
315	542	N/A	Ν	-	N	Y	4	N	Y	N	N	N	Y	Ν	Ν	Ν	N	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:
316	542	NT	Ν	-	N	Y	1	N	Y	N	N	Ν	Y	N	Ν	N	Ν	Y	GENZTAUC13086AP-AG.
317	525	N/A	Y	1	N	Y	1	N	Y	N	N	Ν	Y	Ν	Ν	Ν	Ν	Y	
318	568	NT	Ν	-	N	Y	1	N	Y	N	N	Ν	Y	Ν	Ν	Ν	Ν	Y	
319	566	147	Ν	-	N	Y	1	N	Y	N	N	Ν	Υ	Ν	Ν	Ν	Ν	Y	
320	573	NT	Ν	-	N	Y	1	N	Y	N	N	Ν	Y	N	Ν	Ν	Ν	Y	



DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

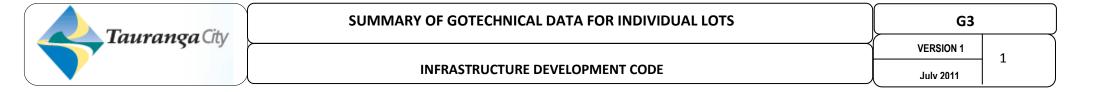
_	A			Subsu	rface data			Foundati	ons	Building Restriction Line	S/W Specific Design	S/W Soakage	S/W Reticulate	Designated Building Platform	Minimum Building Platform	Compressible Soils	On-Site Effluent Disposal	Consent Notice	
Lot No:	Area (m²)	Shear Strength		division Iling	Natural Topography	Торс	itural ography	Conventional Shallow	Specific Design	iction Li	Design		e	uilding P	Iding Pla	Soils	nt Dispo	ĕ	
		(kPa) at 0.5m depth	Y/N	Depth (m)	Unworked Y/N	Y/N	worked Depth (m)	Foundation to NZS 3604:2011 Y/N/NA	Y/N/NA	ne				latform	atform		osal		Comments
321	587	>240	N	-	N	Y	1	N	Y	N	N	N	Y	N	N	N	N	Y	
322	583	NT	N	-	N	Y	2	N	Y	N	N	N	Y	N	N	N	N	Y	
323	566	>183	N	-	N	Y	2	N	Y	N	Ν	N	Y	N	N	N	N	Y	
324	562	NT	N	-	N	Y	2	N	Y	N	Ν	N	Y	N	N	N	N	Y	
325	553	215	Ν	-	Ν	Y	3	N	Y	N	Ν	Ν	Y	N	N	Ν	Ν	Y	Pod-raft type foundations specifically designed
326	580	NT	Ν	-	Ν	Y	5	N	Y	N	Ν	Ν	Y	N	Ν	Ν	Ν	Y	for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:
327	480	83	Ν	-	Ν	Y	5	N	Y	N	Ν	Ν	Y	N	Ν	Ν	Ν	Y	GENZTAUC13086AP-AG.
328	411	>240	Ν	-	Ν	Υ	5	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
329	481	NT	Ν	-	Ν	Υ	5	N	Y	N	Ν	Ν	Y	N	Ν	Ν	Ν	Y	
330	451	92	Ν	-	Ν	Y	6	N	Y	N	Ν	Ν	Y	N	Ν	Ν	Ν	Y	
331	460	NT	Ν	-	Ν	Y	6	N	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
						IMMAR		INICAL D	ΟΑΤΑ	FOF			DUAL	. LO1	S			G3	



INFRASTRUCTURE DEVELOPMENT CODE

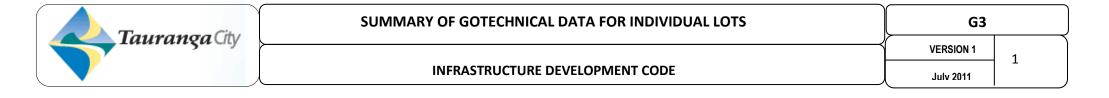
DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

	A		Subsurface data Natural Natural Conventional Specific Specific	Minimum Building Platform	Compressible	On-Site Effluent Disposal	Consent Notice												
Lot No:	Area (m²)	Strength			Topography	Торо	graphy	Shallow Foundation to		iction Line	Design		ſD	iilding Pla	ding Platf	Soils	nt Disposa	e	
		at 0.5m depth	Y/N	Depth (m)	Y/N	Y/N	Depth (m)	NZS 3604:2011 Y/N/NA	Y/N/NA					tform	orm		<u> </u>		Comments
332	426	196	N		N	Y	7	N	Y	N	N	N	Y	N	N	N	N	Y	
332	420	190	IN	-	IN	ř	1	IN	ř		IN	IN	Ť		IN	IN	IN	ř	
333	386	NT	Ν	-	N	Y	6	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
334	382	176	Ν	-	N	Y	6	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Υ	
335	444	NT	Ν	-	N	Y	5	Ν	Y	Ν	Ν	Ν	Y	Ν	Ν	Ν	Ν	Y	
336	439	NT	Ν	-	N	Y	4	Ν	Y	N	N	Ν	Y	N	Ν	N	Ν	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity
337	556	N/A	Ν	-	N	Y	3	N	Y	N	N	Ν	Y	N	N	Ν	Ν	Y	200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.
338	495	NT	Ν	-	N	Y	3	Ν	Y	N	N	Ν	Y	N	Ν	N	Ν	Y	
339	569	NT	Ν	-	N	Y	2	N	Y	N	N	Ν	Y	N	N	Ν	Ν	Y	
340	461	>240	Ν	-	N	Y	4	Ν	Y	Ν	Ν	Ν	Υ	Ν	Ν	Ν	Ν	Y	
341	516	NT	Ν	-	Ν	Y	5	Ν	Y	Ν	Ν	Ν	Υ	Ν	Ν	Ν	Ν	Y	



DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

Lot No:	Area (m²)	Shear Strength		Subsu livision lling	rface data Natural Topography		tural graphy	Foundati Conventional Shallow	ons Specific Design	Building Restriction I	S/W Specific Design	S/W Soakage	S/W Reticulate	Designated Building	Minimum Building Platform	Compressible Soils	On-Site Effluent Disposal	Consent Notice	
	2)	(kPa) at 0.5m depth	Y/N	Depth (m)	Unworked Y/N	Earth Y/N	worked Depth (m)	Foundation to NZS 3604:2011 Y/N/NA	Y/N/NA	Line				Platform	latform		oosal		Comments
342	596	>240	Ν	-	N	Y	3	N	Y	Y	N	N	Y	N	N	N	Ν	Y	
343	561	NT	N	-	N	Y	4	N	Y	Y	N	N	Y	N	N	N	Ν	Y	
344	559	106	Ν	-	N	Y	4	N	Y	Y	N	Ν	Y	Ν	Ν	Ν	Ν	Y	Pod-raft type foundations specifically designed
345	595	NT	Ν	-	N	Y	4	Ν	Y	Y	N	Ν	Y	N	Ν	Ν	Ν	Y	for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref:
346	839	225	Ν	-	Ν	Υ	4	Ν	Y	Y	N	Ν	Υ	Ν	Ν	Ν	Ν	Y	GENZTAUC13086AP-AG. Development subject to BRL restrictions per
347	944	NT	Ν	-	N	Υ	4	Ν	Y	Y	N	Ν	Y	Ν	Ν	Ν	Ν	Y	Section 9.4 of GCR.
348	1020	>240	Y	0.5	N	Y	6	N	Y	Y	N	Ν	Y	Ν	Ν	Ν	N	Y	
349	1108	NT	Ν	-	N	Υ	7	Ν	Y	Y	N	Ν	Y	Ν	Ν	Ν	Ν	Y	



DP No:	Lot 1001 DP486181 &	Property Address	279 Lakes Boulevard, Pyes Pa	RC No:	21332
	Lot 6 DP 348694				

Lot No:	Area (m²)	Shear Strength		Subsu livision lling	rface data Natural Topography	Торс	tural graphy	Foundatio Conventional Shallow	ons Specific Design	Building Restriction Li	S/W Specific Design	S/W Soakage	S/W Reticulate	Designated Building P	Minimum Building Platform	Compressible Soils	On-Site Effluent Disposal	Consent Notice	
		(kPa) at 0.5m depth	Y/N	Depth (m)	Unworked Y/N	Y/N	worked Depth (m)	Foundation to NZS 3604:2011 Y/N/NA	Y/N/NA	Line				Platform	tform		osal		Comments
350	541	NT	N	-	Ν	Y	9	Ν	Y	N	N	N	Y	N	N	N	N	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG.
351	980	149	Ν	-	Ν	Y	9	Ν	Y	Y	N	N	Y	Ν	Ν	Ν	N	Y	Pod-raft type foundations specifically designed for geotechnical ultimate bearing capacity 200kPa, subject to Section 9.7 of Coffey GCR ref: GENZTAUC13086AP-AG. Development subject to BRL restrictions per Section 9.4 of GCR.

Transaction	SUMMARY OF GOTECHNICAL DATA FOR INDIVIDUAL LOTS	G3	
Tauranga City		VERSION 1	
	INFRASTRUCTURE DEVELOPMENT CODE	Julv 2011	

Appendix C - Pre Development Investigation Data

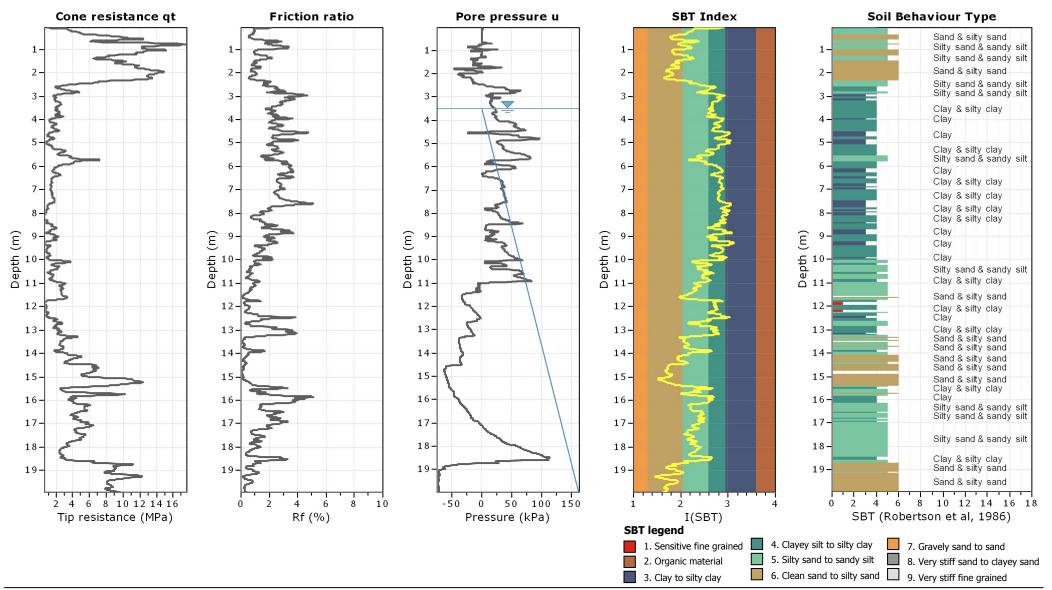
141 Cameron Road, Tauranga PO Box 13145 Tauranga 3141

Location: The Lakes, Pyes Pa

Project: GENZTAUC13086AF - The Lakes Stage 3

CPT: CPT-01

Total depth: 19.93 m, Date: 28/03/2013 Surface Elevation: 0.00 m Coords: X:0.00, Y:0.00 Cone Type: Uknown Cone Operator: Uknown



CPeT-IT v.1.7.5.17 - CPTU data presentation & interpretation software - Report created on: 15/04/2013, 10:28:41 a.m. Project file: F:\1.GENZ\1.GEOTECHNICS PROJECTS\13086AF THE LAKES STAGE 3 CONSTRUCTION\LAB & FIELD TESTING\FIELD TEST RESULTS\CPTs\13086AF-CPT Results.cpt

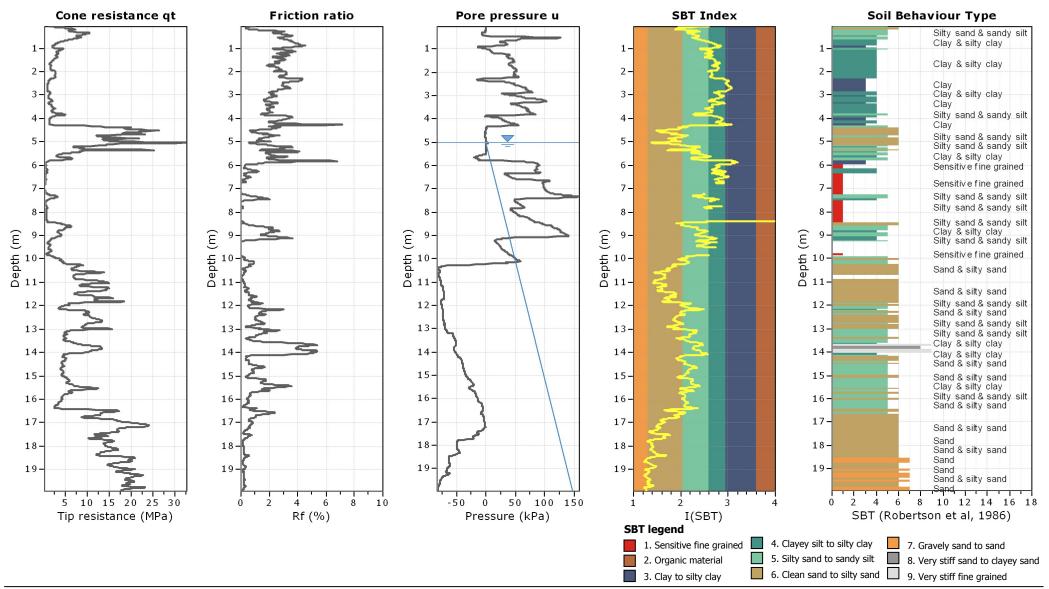
141 Cameron Road, Tauranga PO Box 13145 Tauranga 3141

Location: The Lakes, Pyes Pa

Project: GENZTAUC13086AF - The Lakes Stage 3

CPT: CPT-02

Total depth: 19.93 m, Date: 28/03/2013 Surface Elevation: 0.00 m Coords: X:0.00, Y:0.00 Cone Type: Uknown Cone Operator: Uknown



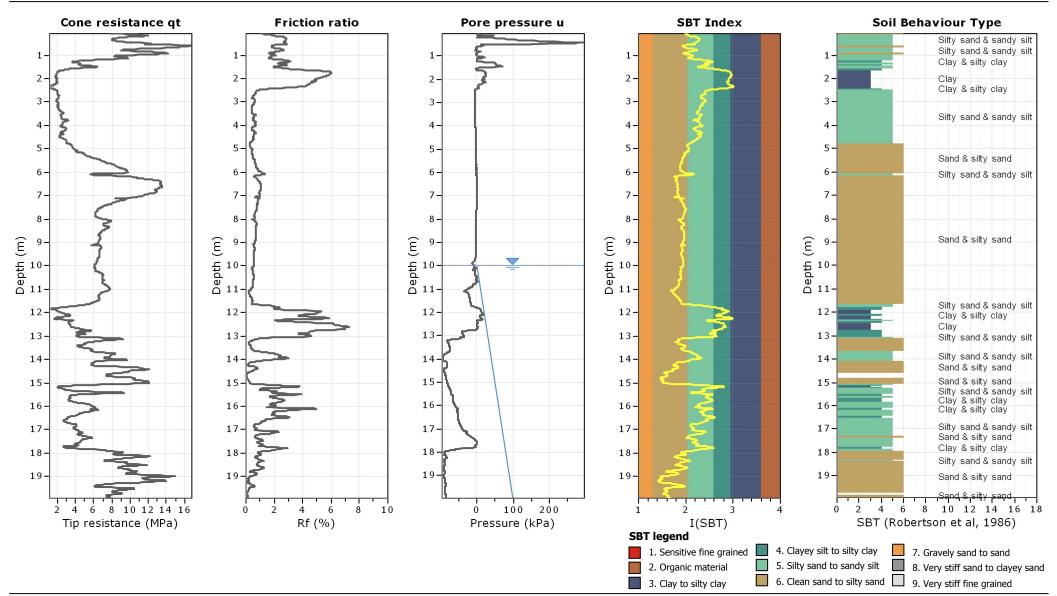
141 Cameron Road, Tauranga PO Box 13145 Tauranga 3141

Location: The Lakes, Pyes Pa

Project: GENZTAUC13086AF - The Lakes Stage 3

CPT: CPT-05

Total depth: 19.93 m, Date: 28/03/2013 Surface Elevation: 0.00 m Coords: X:0.00, Y:0.00 Cone Type: Uknown Cone Operator: Uknown



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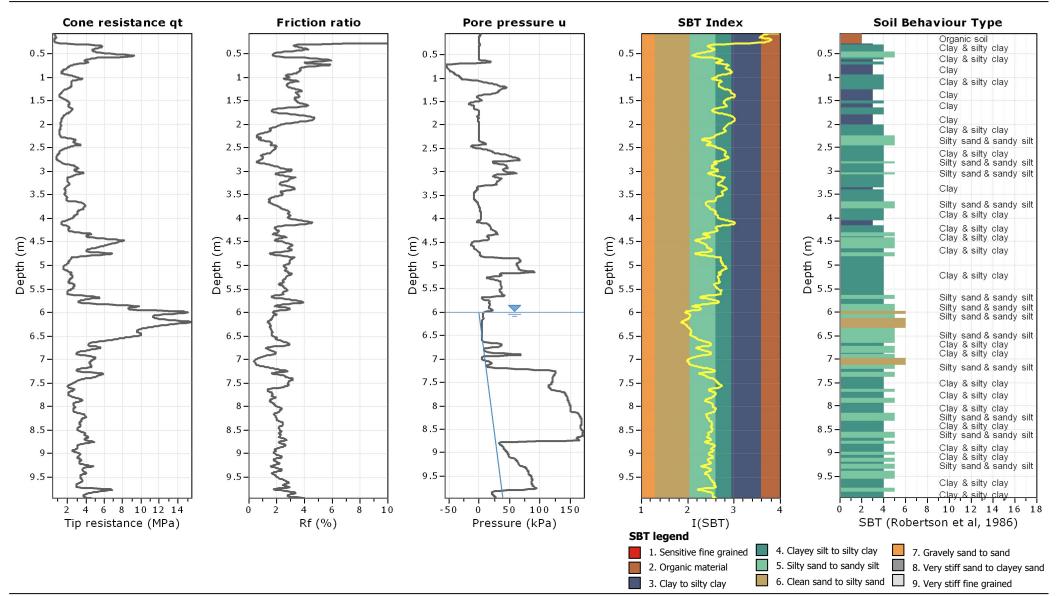
141 Cameron Road, Tauranga PO Box 13145 Tauranga 3141

Location: The Lakes, Pyes Pa

Project: GENZTAUC13086AF - The Lakes Stage 3

CPT: CPT-06

Total depth: 9.95 m, Date: 28/03/2013 Surface Elevation: 0.00 m Coords: X:0.00, Y:0.00 Cone Type: Uknown Cone Operator: Uknown



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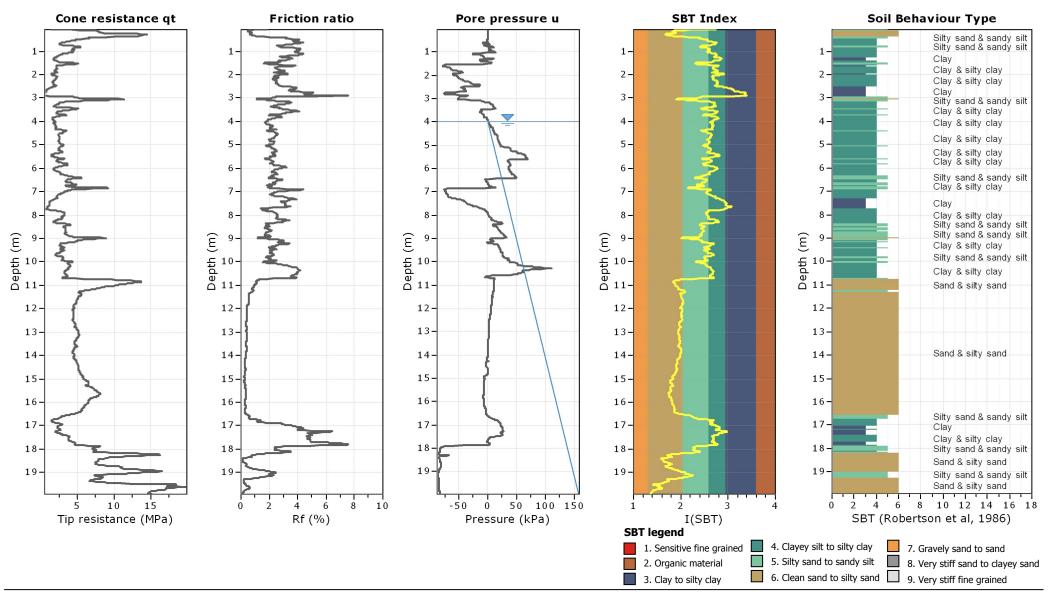
141 Cameron Road, Tauranga PO Box 13145 Tauranga 3141

Location: The Lakes, Pyes Pa

Project: GENZTAUC13086AF - The Lakes Stage 3

CPT: CPT-07

Total depth: 19.93 m, Date: 5/04/2013 Surface Elevation: 0.00 m Coords: X:0.00, Y:0.00 Cone Type: Uknown Cone Operator: Uknown



CPeT-IT v.1.7.5.17 - CPTU data presentation & interpretation software - Report created on: 15/04/2013, 10:28:42 a.m. Project file: F:\1.GENZ\1.GEOTECHNICS PROJECTS\13086AF THE LAKES STAGE 3 CONSTRUCTION\LAB & FIELD TESTING\FIELD TEST RESULTS\CPTs\13086AF-CPT Results.cpt

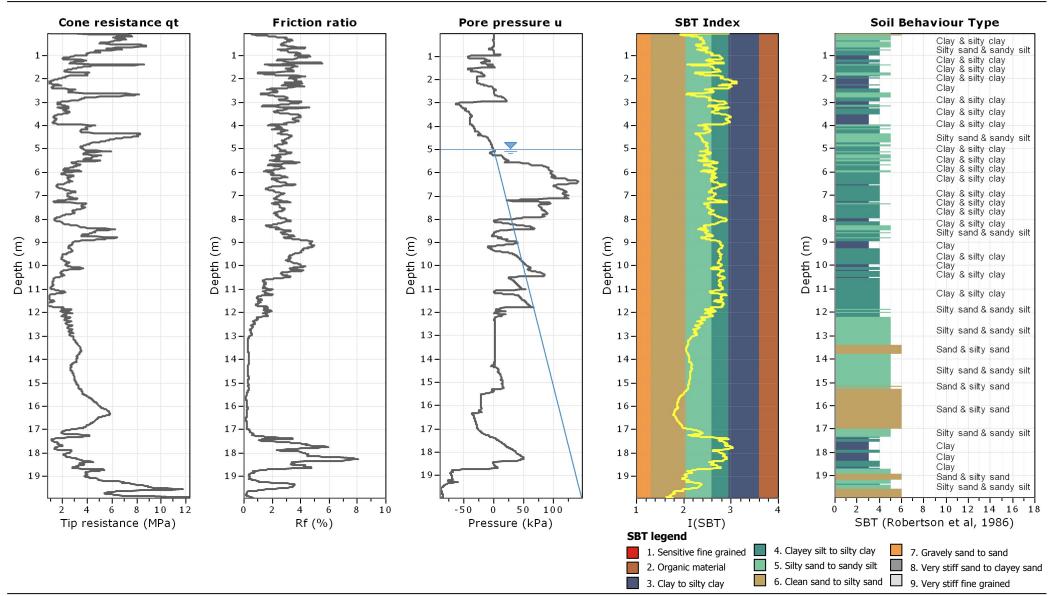
141 Cameron Road, Tauranga PO Box 13145 Tauranga 3141

Location: The Lakes, Pyes Pa

Project: GENZTAUC13086AF - The Lakes Stage 3

CPT: CPT-08

Total depth: 19.93 m, Date: 5/04/2013 Surface Elevation: 0.00 m Coords: X:0.00, Y:0.00 Cone Type: Uknown Cone Operator: Uknown



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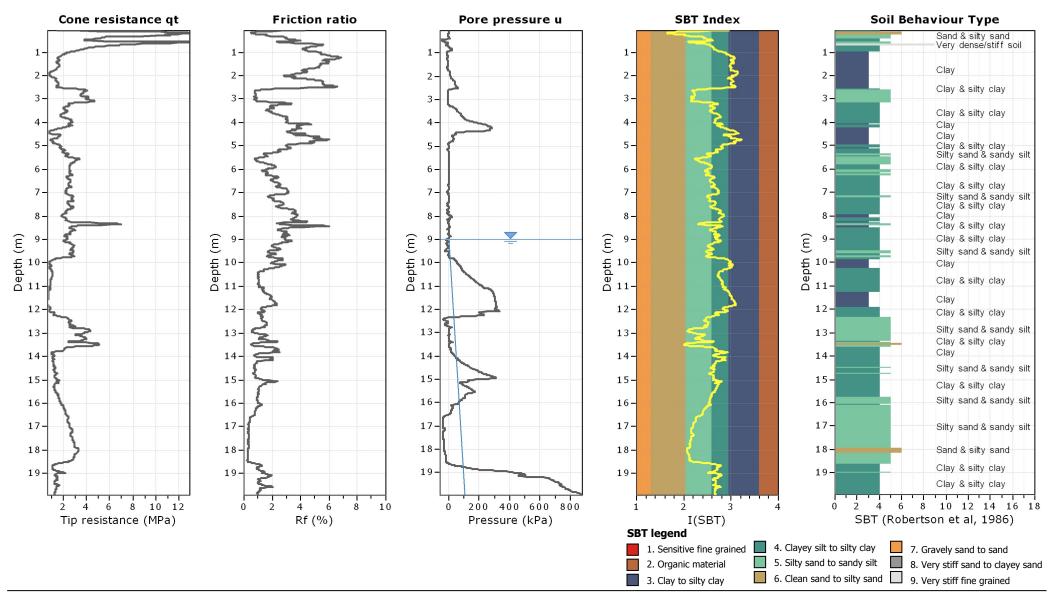
141 Cameron Road, Tauranga PO Box 13145 Tauranga 3141

Location: The Lakes, Pyes Pa

Project: GENZTAUC13086AF - The Lakes Stage 3

CPT: CPT-09

Total depth: 19.93 m, Date: 5/04/2013 Surface Elevation: 0.00 m Coords: X:0.00, Y:0.00 Cone Type: Uknown Cone Operator: Uknown



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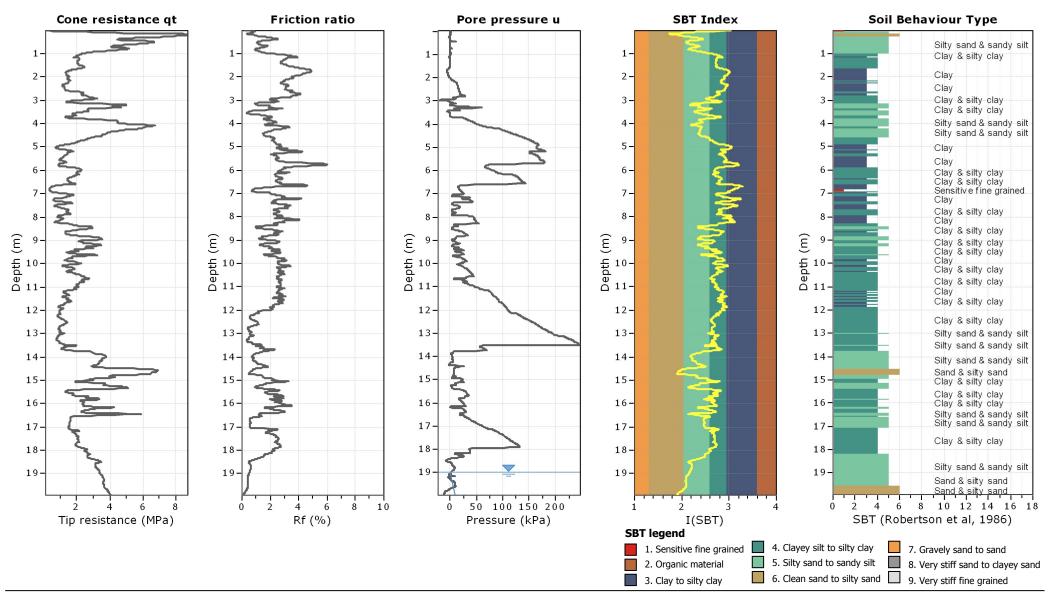
141 Cameron Road, Tauranga PO Box 13145 Tauranga 3141

Location: The Lakes, Pyes Pa

Project: GENZTAUC13086AF - The Lakes Stage 3

CPT: CPT-10

Total depth: 19.93 m, Date: 5/04/2013 Surface Elevation: 0.00 m Coords: X:0.00, Y:0.00 Cone Type: Uknown Cone Operator: Uknown



CPeT-IT v.1.7.5.17 - CPTU data presentation & interpretation software - Report created on: 15/04/2013, 10:28:44 a.m. Project file: F:\1.GENZ\1.GEOTECHNICS PROJECTS\13086AF THE LAKES STAGE 3 CONSTRUCTION\LAB & FIELD TESTING\FIELD TEST RESULTS\CPTs\13086AF-CPT Results.cpt

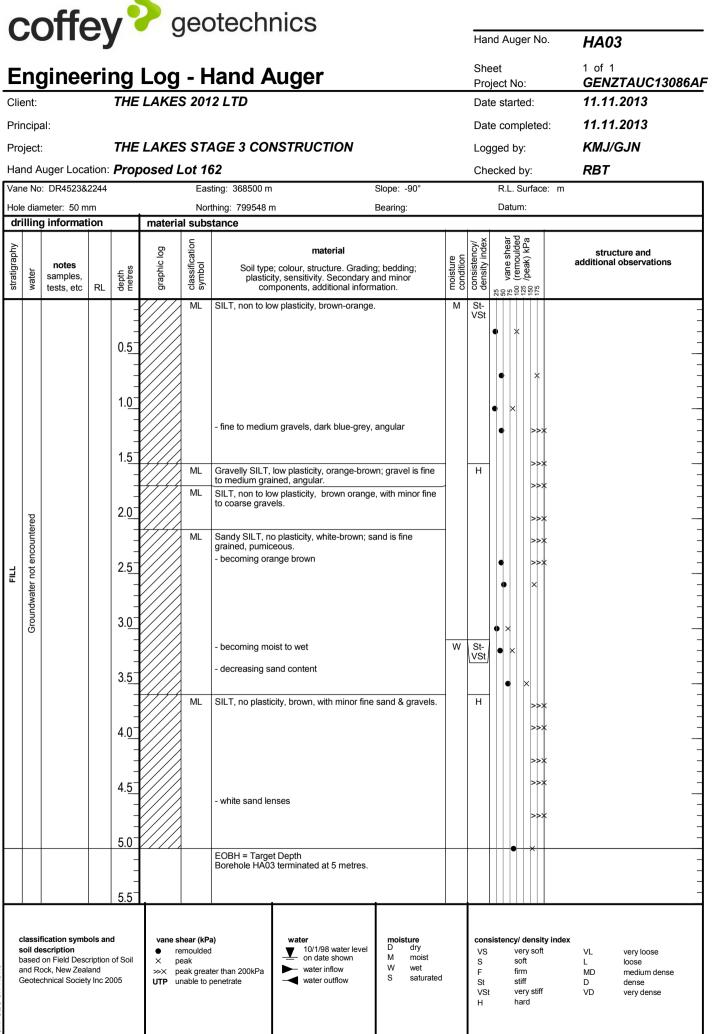
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nt:			THE	LAKES	S 201	2 LTD				Dat	e sta	arte	ed:	11.11.2013
cipa	al:									Dat	e co	mp	leteo	d: 11.11.2013
ect:	:		THE	LAKES	S ST	AGE 3 CONSTRUCT	ION			Log	ged	by	:	KMJ
A b	uger Loca	ation:	Prop	oosed L	.ot 1	86				Che	ecke	d b	y:	RBT
	: DR4523					ting: 368545 m	Ş	Slope: -90°						e: m
	neter: 50 m g informat			materia		thing: 799609 m		Bearing:			Dat	tum	:	
										iex /	ear	ded	БЧ	
_	notes		ي ي	graphic log	ificati	mate Soil type; colour, struct	ure Gradino	· beddina:	ture	ity ind	ne she	(remoulded	ak) k	structure and additional observations
water	samples, tests, etc	RL	depth metres	grapl	classification symbol	plasticity, sensitivity. S	Secondary a	nd minor	moisture condition	consistency/ density index	ros < a	00 10 10	22 /be	
			_	////	SP	Silty SAND, fine to medium gr	rained, brow	n with black &	S	VSt	49.0			
			-		ML	Sandy SILT, low to medium p	lasticity, ora	nge-brown;	-	St-			>>>	×
			0.5			sand is fine grained.				vsi				-
			-								•		×	
			- 10		SP	Silty SAND, fine grained, orar	nge-brown w	ith white		н	•	×		
			1. <u>0</u>		ML	Sandy SILT, low to medium p	lasticity, ora	nge-brown,						-
			_	/////		- medium grained dark blue g							->>>	*
			1. <u>5</u>			EOBH @ 1.2m, refusal on au Note: water ponding at 0.5m I	ger. below groun	d						-
			-			Borenole HAU1 terminated at	1.2 metres.							
			-											
			2.0											-
			-											
			2.5											
			-											
			-											
			3.0_											_
			-											
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			55											
i l de sed d Ro	on Field Desc ock, New Zeal	cription and	d of Soil	● re × pe ≫× pe	emoulde eak eak grea	ter than 200kPa	shown flow	moisture D dry M moist W wet S saturated	1	VS S F St		ver sof firm stif	ry soft ft n ff ry stiff	VL very loose L loose MD medium dense D dense
	sit de	sification symbols description ed on Field Desc Rock, New Zeal	sification symbols an description ed on Field Description Rock, New Zealand	0.5 0.5 1.0 1.0 2.0 2.5 3.0 3.5 4.0 4.0 5.0 5.5 sification symbols and description of Soil	I I I I I 0.5 0.5 I I I 1.0 I I I I 1.0 I I I I 2.0 I I I I 2.5 I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I <	sification symbols and description ed on Field Description of Soil Rock, New Zealand	SP Sity SAND, fine to medium g white inclusions, sensitive. Sandy SILT, low to medium p sand is fine grained. 1.0 SP Sity SAND, fine grained, orar inclusions. Sandy SILT, low to medium p sand is fine grained. 	sification symbols and description of Sol do f Sol sol do f Sol sol do f Sol sol sol sol sol sol sol sol s	sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll vane sheer (kPa) sification symbols and description of Soll	sification symbols and description of Soll vane shear (kPa) at of Life Description of Soll vane shear (kPa) at of Life Description of Soll vane shear (kPa) at of Life Description of Soll vane shear (kPa) at of Life Description of Soll vane shear (kPa) at of Life Description of Soll vane shear (kPa) variable and description of Soll variable and description variable at of Life Description of Soll variable and description variable at of Life Description of Soll variable and description variable at of Life Description of Soll variable and description variable at on Field Description of Soll variable and description variable at on Field Description of Soll variable variable and description of Soll variable variable and description of Soll variable variable variable	siffaction symbols and description vane shere (KPa) vane shere (KPa) vater outfow moisture moisture construction value shere (KPa) structure at the bescription of Soul vane shere (KPa) vater outfow value shore value shore value shore value shore value value value value value value value value value value value value value value value value value value	i tests, etc RL SE 5 0 ist SP Sity SAND, fine to medium plasticity, orange-brown; sand is fine grained. S VSL 0.5 ML Sardy SILT, low to medium plasticity, orange-brown; sand is fine grained. S VSL H 1.0 ML Sardy SILT, low to medium plasticity, orange-brown; sand is fine grained. S VSL H 1.0 ML Sandy SILT, low to medium plasticity, orange-brown, sand is fine grained. H H 1.0 ML Sandy SILT, low to medium plasticity, orange-brown, sand is fine grained. H H 1.5 0.5 SILT, low to medium plasticity, orange-brown, sand is fine grained. H H 2.0 S.5 SILT, notisal on augor. SILT, notisal on augor. SILT, low to medium plasticity, orange-brown, sand is fine grained. H 4.0 S.5 S.5 SILT, notisal on augor. SILT, no	strictation symbols and description et on failed Description et	stests, etc RL B E 5

HAND AUGER 13086AF INVESTIGATION DATA.GPJ COFFEY.GDT 15.3.16

Form GEO 5.1 Rev.6

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												Hai	nd Aug	er No.	HA	02	
Ε	n	ginee	eri I	ng	Log	- H	land A	Auger				She	eet ject No) .	1 of GEN	1 IZTAUC130	86 4 F
	ent:				LAKE								te start			1.2013	<u></u>
Pri	ncip	al:										Dat	te com	pleted:	12.1	1.2013	
Pro	oject	:		THE	LAKES	S ST/	AGE 3 CO	NSTRUCTIO	ON			Log	ged by	/:	GJN	1	
		uger Loca	tion:	Prop	osed L							Ch	ecked I	-	RBT		
		: DR2244 meter: 50 m	m				ting: 368512 m thing: 799583 r			Slope: -90° Bearing:			R.L. S Datun	Surface:	m		
		g informat			materia	al subs	-			Dournig.							
stratigraphy	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	plastic	materi e; colour, structur ity, sensitivity. Se nponents, additio	e. Gradino condary a	and minor	moisture condition	consistency/ density index	25 50 vane shear 100 (remoulded	¹²⁵ /peak) kPa ¹⁷⁵		ucture and al observations	
				 0.5		ML	SILT, no plasti	icity, orange-brow	'n.		D-M	St- Vst	•	×			
_	ot encountered			 1.0			- 50mm layer o	of sand, fine grain	ned, white				●×				
FILL	Groundwater not encountered			 1. <u>5</u>		GP ML		to medium graine			_	н		>>x >>x			
				2.0							M			>>* >>*			
				2.5	<u> </u>	1	EOBH @ 2.3n Borehole HA0	n, unable to auge 2 terminated at 2.	r, gravels .3 metres.	encountered				>>#			
				3. <u>0</u>													
				3.5													
				4. <u>0</u>													
				4. <u>5</u>													
				5. <u>0</u>													
				5.5				•									-
s I a	oased and R	fication symb sscription on Field Deso ock, New Zeal chnical Societ	ription and	of Soil	● re × pe ≫× pe			water ↓ 10/1/98 w on date sh water inflo water outfl	nown w	moisture D dry M moist W wet S saturated	1	Cons VS S F St VSI H	ve sc fir st	m	ndex VL L MD D VD	very loose loose medium dense dense very dense	

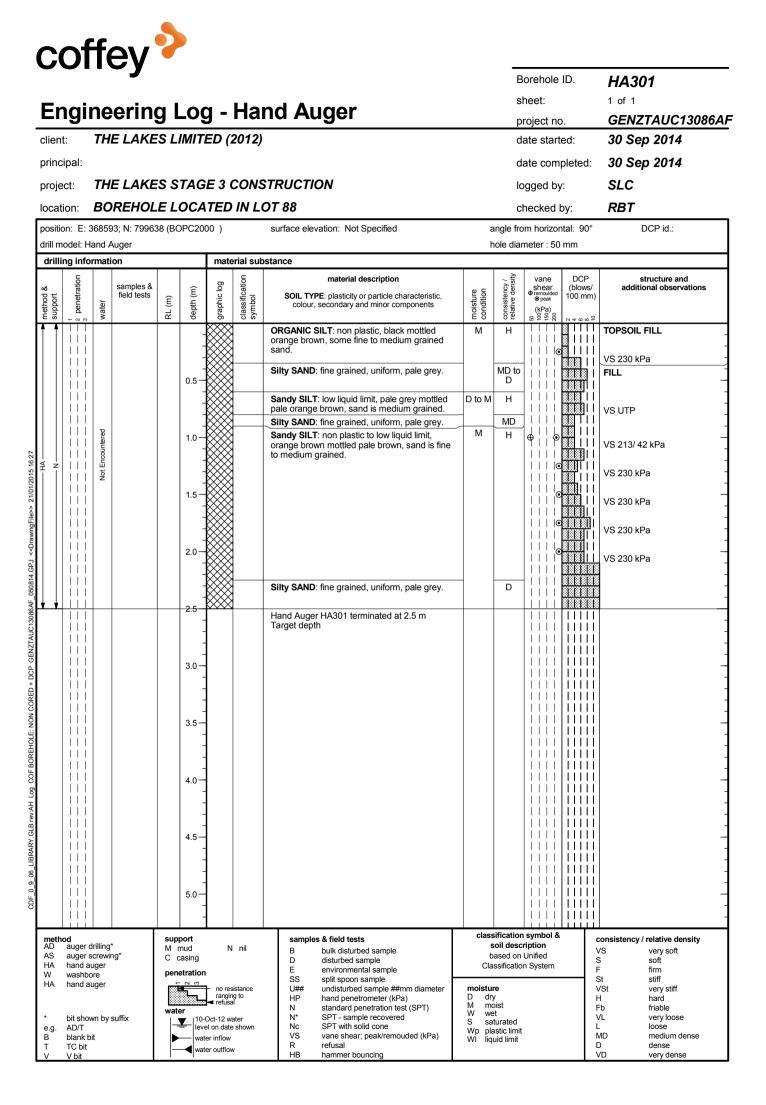
Form GEO 5.1 Rev.6



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			-									nd Auger No.	HA04
E	ng	ginee	eri	ng	Log	- ۲	land A	uger			She Pro	eet ject No:	1 of 1 GENZTAUC13086AF
Cli	ent:			THE	LAKE	S 201	2 LTD				Dat	e started:	11.11.2013
Pri	ncip	al:									Dat	e completed:	11.11.2013
Pro	oject	:		THE	LAKE	S ST/	AGE 3 CON	STRUCTION			Log	iged by:	GJN/KMJ
		uger Loca		Prop	bosed L						Che	ecked by:	RBT
): DR45238 meter: 50 n					thing: 368480 m		Slope: -90° Bearing:			R.L. Surface: m Datum:	
		g informat			materia				Scaning.				
stratigraphy	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	plasticity	material colour, structure. Grading s sensitivity. Secondary a ponents, additional inform	nd minor	moisture condition	consistency/ density index	25 50 vane shear 100 (remoulded 125 /peak) kPa 175	structure and additional observations
				0.5		ML	SILT, non to low - black staining - white inclusions	plasticity, orange-brown.		M	St- VSt	• ×	
				1. <u>0</u> - - 1. <u>5</u>			- fine to medium difficult to auger		ick, angular,	-	VSt- H	• × • >>×	
	ountered			2.0		SP	<u>↓- fine to medium</u> GRAVEL, fine to minor fine sand.	v plasticity, pale brown. black gravels. coarse grained, blue-gre		D-M		>>x	- - - - -
FILL	undwater not encountered			2. <u>5</u> 		WIL.	- becoming light					• ×	
	Ground			3. <u>0</u> - - 3.5								• ×	
				4.0		SP ML		grained, uniform grain siz plasticity, brown with blac		W-S M- W	Н	• × • ×	- - - - - - -
				4.5								>>x >>x	
				5.0				target depth. /ater table from 3.5 to 3.6 terminated at 5 metres.	m			>>X	
: 	soil de based and R	fication symbols ascription on Field Desi ock, New Zea chnical Sociel	cription land	of Soil	● re × pr ≫X pr			water 10/1/98 water level on date shown water inflow ✓ water outflow	moisture D dry M moist W wet S saturated		Cons VS S F St VSt H	sistency/ density inde very soft soft firm stiff very stiff hard	VL very loose L loose MD medium dense D dense VD very dense

Form GEO 5.1 Rev.6





		-							Borehole ID.	HA302
Ena	in	oorin	~ I	~	2	ปล	nd Augor		sheet:	1 of 1
Eng							nd Auger		project no.	GENZTAUC13086
lient:	7	THE LAKE	ES L	IMIT	ED (2012)			date started:	01 Oct 2014
orincipal	I:								date completed	: 01 Oct 2014
oroject:	7	THE LAKE	ES S	TAG	iE 3 (CONS	STRUCTION		logged by:	SLC
ocation:	: E	BOREHOL	E L	OCA	TED	IN L	OT 167		checked by:	RBT
osition: I	E: 36	8534; N: 7995	89 (BC	OPC20	00)		surface elevation: Not Specified	a	angle from horizontal: 90	° DCP id.:
rill model drilling in		-			mate	erial sub	stanco	ł	nole diameter : 50 mm	
							material description		्र <u>ह</u> े vane DCF	
support support 1 2 penetration	2 penetrat	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	treating (kPa) 000 000 000 000 000 000 000 000 000 0	m)
		Not Encountered		0.5- 			ORGANIC SILT: low liquid limit, black mottled orange brown. Sandy SILT: low liquid limit, orange brown mottled brown. 0.8 m: becoming pale brown mottled brown. 1.1 m: becoming dry to moist. 1.35 m: becoming brown mottled pale grey and orange brown.	D to M M	F WSt to H H H H H H H H H H H H H	VS 38/12 kPa VS 38/12 kPa FILL VS 130/ 37 kPa VS 140/ 41 kPa VS 230 kPa VS 142/ 32 kPa VS 124/ 35 kPa VS 131/ 41 kPa VS 172/ 33 kPa VS 187/ 44 kPa VS 206/ 62 kPa VS 146/ 41 kPa VS 200/ 46 kPa
				-			4.2 m: becoming pale brown grey. Silty SAND: fine to medium grained, pale grey.	M to W		VS UTP
				4.5 - - - 5.0 - - -			Hand Auger HA302 terminated at 4.5 m Target depth			
AS aug HA han W was HA han * bit s e.g. AD/	nd aug shbore nd aug shown /T nk bit	ewing* er	M C (etration etration er er ↓ 10- lev wa	ı	al ater e shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	b Cla moistur D dr M mo W we S sa Wp pla	y Dist	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense

hammer bouncing

very dense

TC bit V bit



GENZTAUC13086AF

BOREHOLE:

SOF

AH

GLB

-IBRARY

90

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V bit

			-							B	orehole	ID.	HA303
C,		~ ~	orin	~	~	~	La			s	heet:		1 of 1
	igii	ne	enn	<u>g</u> L	-0(J -	па	nd Auger		р	roject no		GENZTAUC13086AF
clien	t:	ΤH	E LAKE	S L	IMIT	ED (2	2012)			d	ate starte	ed:	01 Oct 2014
princ	ipal:									d	ate com	pleted:	01 Oct 2014
proje	ect:	ΤН	E LAKE	s s	TAG	E 3 (CONS	STRUCTION		lo	ogged by	:	SLC
locat	ion:	вс	REHOL	EL	ОСА	TED	IN L	OT 169		с	hecked b	by:	RBT
positio	on: E:3	36850	01; N: 79961	13 (BC	DPC20	00)		surface elevation: Not Specified	a	angle fro	om horizon	tal: 90°	DCP id.:
drill m	odel: H	and /	Auger			_			h	nole dia	meter : 50	mm	
drilli	ng info	rmat	ion			mate	erial sub	ostance					
method & support	1 2 penetration 3	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 00 00 00 00 00 00 00 00 00 00 00 00 00	DCP (blows/ 100 mm)	structure and additional observations
					-			ORGANIC SILT : non plastic, black mottled pale grey and orange brown.	D	VSt	⊕		TOPSOIL
						\mathbb{N}	4	Sandy SILT: low liquid limit, brown with nalo	D to M	VCt		闯	

brown with FILL 1 + 1grey specks, sand is fine to medium grained. | | | • 1 Ð 0.5 VS 148/ 29 kPa ||||IIII 11 Ð 0 🕅 I I I I VS 142/ 28 kPa |||||I 111 0.8 m: becoming pale grey brown with pale grey mottles and minor black specks. Μ 111 III 🕅 1 $|\mathbf{O}|$ 1.0 € T 111 VS 176/24 kPa 111 111 ⊕|•)| 111 VS 104/ 23 kPa 🇱 I I I 111 ||111 Silty SAND: fine to medium grained, poorly graded, pale grey, minor 20-30mm sandy silt 1.5 MD VS 230 kPa 1 111 1 1 1 inclusions ||||1.55 m: becoming pale brown with grey Н ||||0 VS 230 kPa ||||specks. W ||||MD ||||Sandy SILT: non plastic to low liquid limit, 2.0 ¢ Μ VSt 11 brown with black specks, minor orange brown 1 VS 220/ 51 kPa 050814.GPJ mottles. Sand is medium grained. ||||11 Silty SAND: fine to medium grained, poorly 0 ₹ | | |**⊕** | III I VS 180/ 50 kPa graded, pale brown and pale grey. ||||11 1.8 m: groundwater inflow within silty sand 25 ∉ 0 lense. Very slow inflow rate. VS 140/ 37 kPa Sandy SILT: non plastic, brown with orange brown and black specks, sand is medium ⊕ i (●) 111 VS 170/ 42 kPa grained. Minor clay, minor fine grained angular ||||gravels. ¢ 3.0 NON CORED + DCP ||||VS 126/ 54 kPa | | |କ୍ତ୍ର St VS 83/ 31 kPa ||||111 ||||3.5 VSt to VS 230 kPa н 111 11 0 P VS 137/ 41 kPa 111 <u>IIIII</u> 1 1 1 1 4.0 VS UTP 111 ||||||Log ||||||||||||||| | | | |VS UTP | | |4.3 m: becoming pale grey. | | | |4.5 Hand Auger HA303 terminated at 4.5 m Target depth VS UTP | | |||||||11111 | | || | | | |11111 11111 ||||| | | |11111 111 11111 111 5.0 11111 ||||||11111 111 | | | | |classification symbol & Method AD auger drilling* support samples & field tests consistency / relative density soil description N nil M mud bulk disturbed sample В VS very soft AS auger screwing' based on Unified C casing D disturbed sample S soft HA W hand auger Classification System environmental sample F St firm Е penetration washbore SS split spoon sample stiff no resistance ranging to
 refusal HA hand auger U## undisturbed sample ##mm diameter moisture VSt very stiff dry moist wet HP hand penetrometer (kPa) D M W н hard standard penetration test (SPT) Fb Ν friable wate SPT - sample recovered SPT with solid cone bit shown by suffix 10-Oct-12 water N* VL very loose saturated **T** Nc loose e.g. B level on date shown L AD/T plastic limit liquid limit Wp blank bit VS vane shear; peak/remouded (kPa) MD medium dense vater inflow wi D R refusal т TC bit dense water outflow

HB

hammer bouncing

VD

very dense



		- J							В	Borehole	ID.	HA304
			~	•	~	Lla			s	heet:		1 of 1
Eng	ine	erin	<u>g</u> I	-0(<u>y -</u>	па	nd Auger		р	roject no).	GENZTAUC13086AF
client:	ТН	E LAKE	S L	IMIT	'ED (2	2012)			d	ate start	ed:	30 Sep 2014
principal:									d	ate com	pleted:	30 Sep 2014
project:	ΤН	E LAKE	s s	TAG	E 3 (CONS	STRUCTION		lo	ogged by	/:	SLC
location:	BC	REHOL	EL	ОСА	TED	IN L	OT 161		с	hecked	by:	RBT
position: E	: 3685	12; N: 79953	39 (BC	DPC20	00)		surface elevation: Not Specified	á	angle fro	om horizoi	ntal: 90°	DCP id.:
drill model:	Hand	Auger						ł	nole dia	meter : 50	mm	
drilling in	Iformat	ion			mate	erial sub	ostance					
method & support 1 2 penetration	3 . water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) S 00 000	DCP (blows/ 100 mm)	structure and additional observations
	 			-			ORGANIC SILT : non plastic, black mottled orange brown.	м	St	- ⊕ ⊕ 		TOPSOIL FILL
				0.5-			Sandy SILT: low liquid limit, orange brown mottled pale brown, occasional 20-30mm silty sand pockets.		Н			FILL

drill r	nodel: H	and A	luger							hole dia	meter : 50 mm			
dril	ling info	rmati	on			mate	rial sub	stance						
method & support	2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear (ble ⊕ remoulded ⊛ peak 100	CP ows/ mm) ∞∞₽	structure and additional observations	
HA		Not Encountered wate		KL ((class	 Colour, secondary and minor components ORGANIC SILT: non plastic, black mottled orange brown. Sandy SILT: low liquid limit, orange brown mottled pale brown, occasional 20-30mm silty sand pockets. 2.1 m: 50mm silty sand lense (pale grey, fine to medium grained). 2.7 m: 50mm silty sand lense (pale grey, fine to medium grained). UTP with shear vane. 2.75 m: becoming pale brown with orange brown mottles. Minor orange brown silt inclusions 20-30mm. 	M M	St H VSt H			TOPSOIL FILL VS 97/ 31 kPa FILL VS 230 kPa VS 150/ 24 kPa VS 230 kPa VS UTP VS UTP	
								Hand Auger HA304 terminated at 3.5 m Target depth					VS 230 kPa VS 230 kPa	
met AD AS HA W HA * e.g. B T V	hod auger c auger s hand au washbc hand au bit show AD/T blank b TC bit V bit	crewir ıger re ıger vn by s	ng*	pene	nud asing etration		g to ter shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	l Cla D du M m W w S sa Wp pl	soil desc based on assificatio	t Unified on System	F F F L L	F firm St stiff /St very stiff H hard /b friable /L very loose	



		- J							В	orehole	ID.	HA305
Eng	ina	orio	~	~		Lla			s	neet:		1 of 1
Eng	me	erin	y ı	-06	<u>J -</u>	Па	nd Auger		р	roject no).	GENZTAUC13086AF
client:	TH	E LAKE	S L	IMIT	ED (2	2012)			d	ate start	ed:	30 Sep 2014
principal:									d	ate com	pleted:	30 Sep 2014
project:	TH	E LAKE	s s	TAG	E 3 (CONS	TRUCTION		lc	gged by	/:	SLC
location:	BO	REHOL	EL	ОСА	TED	IN LO	OT 159		c	necked l	by:	RBT
position: E	: 36847	76; N: 79956	68 (BC	OPC20	00)		surface elevation: Not Specified	â	angle fro	m horizor	ntal: 90°	DCP id.:
drill model:	Hand A	Auger						ł	nole diar	neter : 50	mm	
drilling in	formati	on			mate	erial sub	stance					
method & support 1 2 penetration		samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 2 0 0 0 00	DCP (blows/ 100 mm)	structure and additional observations
				- - - 0.5 - - -			ORGANIC SILT: low liquid limit, black mottled orange brown, some medium to coarse sand. Sandy SILT: low liquid limit, orange brown mottled brown, sand is medium grained. 0.5 m: becoming brown with orange brown and pale brown specks.	M	VSt VSt to H	+		TOPSOIL FILL

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ENZTAUC 13086AF	
+ DCP GI	
ON CORED +	
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Бој	Í
CDF_0_9_06_LIBRARY.GLB rev:AH	

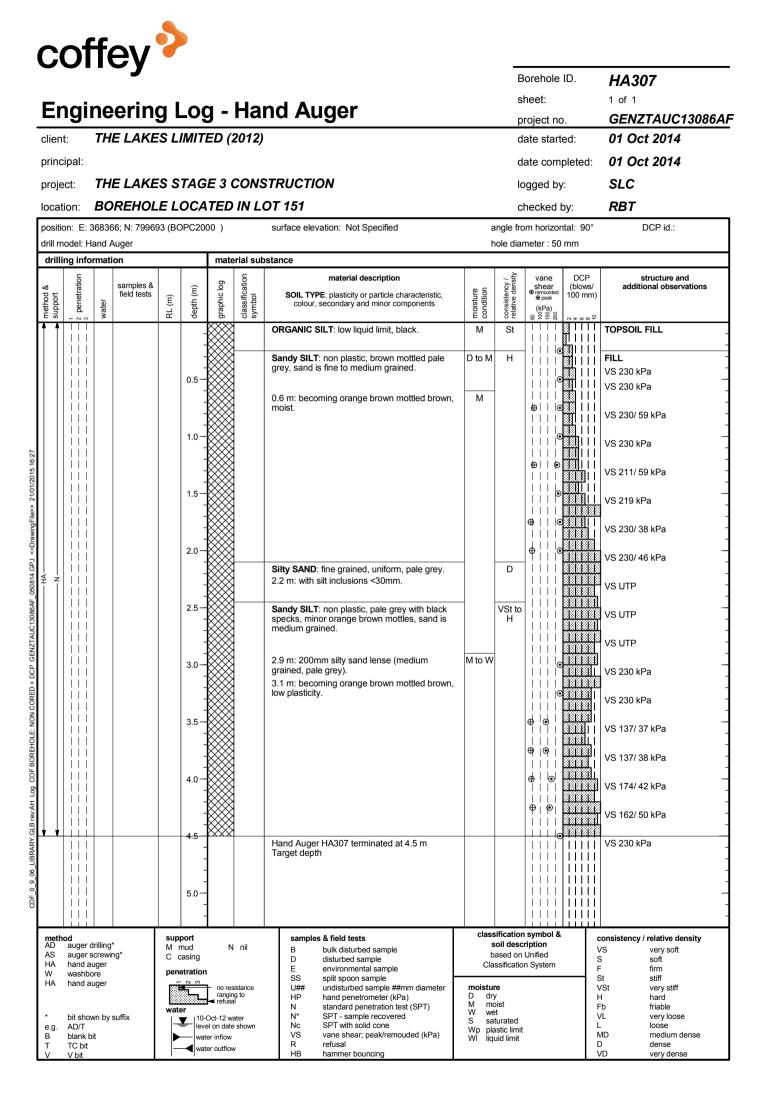
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I I I <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>support</td>									support
crewing* uger uger uger vn by suf									1 2 peneti
ıg'				Not Encountered	pa				water
									field tests
pene									RL (m)
nud easing etration s er leve wate	4.0	3.0 - 	- - - 2.5	1.5 - - 2.0	-	- - 1.0	0.5		depth (r
									graphic
g to ter shown									classific symbol
samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U# undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS van e shear; peak/remouded (kPa) R refusal	Hand Auger HA305 terminated at 3.5 m Target depth	Silty SAND: fine grained, uniform, pale grey. Sandy SILT: low liquid limit, pale grey brown mottled pale brown, sand is medium grained. 2.9 m: 50mm wet lense. 3.0 m: becoming orange brown speckled pale brown and black.			1.25 m: non plastic, becoming dry to moist.	pale brown specks.	Sandy SILT: low liquid limit, orange brown mottled brown, sand is medium grained. 0.5 m: becoming brown with orange brown and pale brown specks.	ORGANIC SILT : low liquid limit, black mottled orange brown, some medium to coarse sand.	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components
t Cla moistu D dr M mu W we S sa Wp pla		D M W M			D to M			М	moistur conditio
soil desci based on issification re y bist		D St to H					VSt to H	VSt	consister relative c
symbol &		 				● ●	⊕ @ 		● peak (kPa) 06 02 00 06 02 00
									100 mm)
consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense	VS 206 kPa	VS UTP	VS 230 kPa	VS UTP VS 230 kPa VS 137/ 33 kPa	VS 113/ 18 kPa VS 230 kPa	VS 187/ 40 kPa	VS 140/ 11 kPa FILL VS 140/ 29 kPa	TOPSOIL FILL	
	- - - - - - - -		- - - -		-	-	7 	-	



		- J							E	Borehole	ID.	HA306	
Enai	h	orio	~		~	La			s	heet:		1 of 1	
Eng	ne	erin	g I	_ O(<u>J</u> -	па	nd Auger		р	roject n	0.	GENZTAUC13086AF	
client: THE LAKES LIMITED (2012)									d	ate star	ted:	30 Sep 2014	
principal:									d	ate com	pleted:	30 Sep 2014	
project:	ΤН	E LAKE	es s	TAG	E 3 (CONS	STRUCTION		lo	bgged b	y:	SLC	
ocation:	вС	REHOL	E L	ОСА	TED	IN L	OT 156		с	hecked	by:	RBT	
oosition: E Irill model:		46; N: 79961 Auger	13 (BC	OPC20	00)		surface elevation: Not Specified		•	om horizo meter : 50		DCP id.:	
drilling inf	ormati	ion			mate	rial sub	stance						
method & support	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) B 0 0 00	100 1111)	structure and additional observation	IS
				-			ORGANIC SILT : low liquid limit, black mottled pale grey.	М	St			TOPSOIL FILL	-
				0.5-			Sandy SILT: low liquid limit, orange brown mottled brown, sand is fine to medium grained.		St to H			FILL VS 142/ 31 kPa VS 160/ 28 kPa	-
				- - 1.0-			1.0 m: becoming brown with pale brown mottles, minor clay.			⊕ @ ⁰ ⁰		VS 89/ 19 kPa VS 230 kPa	- - -
	untered			- - 1.5								VS 113/ 33 kPa VS 158/ 31 kPa	- - -
 H Z 	Not Encountered			- - 2.0-			1.8 m: becoming dry.	D	-	 ⊕ ¢ 		VS 213/ 51 kPa	-

-> 21/01/20151	
< <drawingfile></drawingfile>	
F_050814.GPJ	
AUC13086A	
NON CORED + DCP GENZT	
COF BOREHOLE: 1	
CDF_0_9_06_LIBRARY.GLB rev:AH Log	

e.g. B T V	bit shown by suffix AD/T blank bit TC bit V bit	10-Oct-12 water level on date shown water inflow water outflow	No SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S saturated Wp plastic limit WI liquid limit	L loose MD medium dense D dense VD very dense
metil AD AS HA W HA	auger drilling* auger screwing* hand auger washbore hand auger	support M mud N nil C casing penetration ranging to refusal water under the support refusal water under the support refusal water under the support ranging to refusal	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose
•			Hand Auger HA306 terminated at 3.5 m Target depth		
		3.0	Silty SAND: medium grained, uniform, yellow brown.		I VS 230 kPa I I I I I I I I I I I I I I I I I I I
		2.5-	2.15 m: 100mm silty sand lense (fine grained, pale grey).		VS UTP - - - - - - - - - - - - - - - - - - -
HA	Not Encountered	2.0-	1.8 m: becoming dry.	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	VS 213/ 51 kPa
	red		1.0 m: becoming brown with pale brown mottles, minor clay.		VS 230 kPa VS 113/ 33 kPa
					VS 160/ 28 kPa





		DUIEIIUIE ID.	HA308
Enai	nooring Log Hand Augar	sheet:	1 of 1
Engi	neering Log - Hand Auger	project no.	GENZTAUC13086AF
client:	THE LAKES LIMITED (2012)	date started:	01 Oct 2014
principal:		date completed:	01 Oct 2014
project:	THE LAKES STAGE 3 CONSTRUCTION	logged by:	SLC
location:	BOREHOLE LOCATED ON LOT 148 & 146 BOUNDARY	checked by:	RBT

Derehala ID

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position: E: 368303; N: 799714 (BOPC2000) surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density class ification g shear ⊕ remould ● peak (blows/ 100 mm) samples & additional obs vations Ē method & support penetra moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components field tests graphic lu symbol Ē depth (water (kPa) 8 8 8 R IIII ORGANIC SILT: non plastic, black mottled W St TOPSOIL FILL 811111 orange brown | | | | |11111 ||||||11111 11 1 ||||||||||VSt to⊕ |0| | | 0.5 Sandy SILT: low liquid limit, brown mottled Μ FILL 11 VS 73/ 0 kPa pale brown, sand is medium grained. н ||||||||11 € | • | VS 154/ 20 kPa ||| | |becoming pale grey brown. 11 1.0 Ð VS 128/28 kPa 111 ⊕||@ VS 191/ 37 kPa 111 11 368 I I I 1.5 111 111 3631111 VS 230 kPa 11 ||₽ ||||| | | |0 VS 230 kPa | |11 0 2.0 ¢ 11 VS 150/ 33 kPa a de 11 11 VS 230 kPa 111 ||| | ¢ ¢ 25 VS 193/ 46 kPa ⊕ j ⊕ 111 VS 137/ 49 kPa poor recovery below 2.9m due to groundwater 11 1 1 1 3.0 000 inflow from 0.3 meters. ||||||||VS 230 kPa 1 | | | | ||||**⊕**|�|| St VS 97/ 25 kPa 111 ||||St to H NON 3.5 Hand Auger HA308 terminated at 3.5 m VS 230 kPa 11111 11 BOREHOLE: Target depth ||||11111 11111 11 1 1 1 1 11111 SOF 1 1 1 1 4.0 11 1 1 1 1 11111 rev:AH Log ||||11111 |||||||||||11111 ||||| | | |11111 GLBr 11111 |||||||45 -IBRARY. 11111 11 11111 11111 ||||||||||90 11111 | | | | |11111 111 |||||||5.0 Ę 11111 ||||||11111 111 method AD auger drilling* classification symbol & support samples & field tests consistency / relative density soil description N nil mud Μ bulk disturbed sample В VS very soft AS auger screwing' based on Unified C casing D disturbed sample S soft HA W hand auger Classification System environmental sample F St firm Е penetration washbore SS split spoon sample stiff hand auger HA no resistance ranging to
 refusal U## undisturbed sample ##mm diameter moisture VSt very stiff hand penetrometer (kPa) standard penetration test (SPT) dry moist wet H Fb HP D M W hard Ν friable wate SPT - sample recovered SPT with solid cone very loose loose bit shown by suffix 10-Oct-12 water N* VL saturated ⊻ Nc e.g. B evel on date shown L AD/T Wp plastic limit liquid limit MD blank bit VS vane shear; peak/remouded (kPa) medium dense vater inflow wi D R refusal т TC bit dense water outflow HB hammer bouncing VD very dense

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•	~	ht	21		> c	aeo	technics									
•	~					,			Tria	l Pit N	0.	TP0	1			
E	ną	ginee	eri	ng	Log	- T	rial Pit			She Pro	et ject No) :	1 of 1 GENZTAUC1308		6AF	
Cli	ent:			THE	LAKE	S 201	2 LTD			Dat	e start	ed:	15.3	15.3.2013		
Pri	ncip	al:								Dat	e com	pleted:	15.3	2013		
Pro	ject	:		THE		S STA	GE 3 CONSTRUCTION	V		Log	ged b	y:	RBT			
Tria	al pit	t location:		Refe	er to sit	te plai	n			Che	ecked	bv:				
	•	ent type:					Pit Orientation:	Easting: 368192.	6 m	-		Surface:				
Exc	avati	on dimensic	ons: n	n long	m wide		Vane No: DR2244	Northing: 799930).2 m		Datur	n:				
ex	cav	ation infor	mati	on			rial substance									
stratigraphy	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material Soil - Soil type; colour, structure plasticity, sensitivity. Secondary a Rock - Colour, fabric, rock type; di information	nd minor components. scontinuities, additional	moisture condition	consistency/ density index	25 50 75 vane shear 100 (remoulded	125 /peak) kPa 175		icture and al observations		
Fill						OL ML ML ML	Organic SILT; dark greyish brown, SILT with minor clay, mottled orang moist. SILT with minor very fine sand, mo Friable, moist. - possible underfill drain.	ge. Stiff, non plastic,	M		•	× UTP				
Ash	Groundwater not encountered			2 ⁻	× × × × × × × × × × × × × × × × × × ×	ML	SILT with trace to minor clay, orang plastic, hard, moist. SILT with minor very fine sand, bro stiff to hard, moist.									
Younger Ash	Groundwater			<u>3</u>		ML	Sandy SILT; brownish orange, san grained.	Id is fine to coarse								
RA				-	XXX		Fine to medium SAND with minor									
				5 - - 6			SILT; pale yellow/grey with black fluc cohesive insitu but becomes soft a reworked. ((Target depth) RA = Rotoehu Ash Test pit TP01 terminated at 5 metr	and slightly greasy when								
S	keto	ch		-											-	
יי ו נ נ	oil de based otes, 50 63 5		and Ge ts ed sam ed sam sample	otechnic ple 50m ple 63m	cal Society In m diameter m diameter	c 2005	vane shear (kPa) ● remoulded × peak >>> peak greater than 200kPa UTP unable to penetrate water ↓ 10/1/98 water level on date shown ▶ water inflow water outflow	moisture D dry M moist W wet S saturated		Cons VS S F St VSt H	ve so fii st	d ensity in ery soft oft m iff ery stiff ard	idex VL MD D VD	very loose loose medium dense dense very dense		

TRIAL PIT TEST PITS 150313.GPJ COFFEY.GDT 28.3.13

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C	Trial Pit No.								Trial Pit No.	TP02			
Е	ng	ginee	eri	ng	Log	- T	rial Pit			Sheet Project No:	1 of 1 GENZTAUC13086AF		
Cli	ent:			THE		S 201	2 LTD			Date started:	15.3.2013		
Pri	ncipa	al:								Date completed:	15.3.2013		
Pro	oject	:		THE		S ST/	AGE 3 CONSTRUCTION			Logged by:	RBT		
	-	location:		Refe	er to sit	e pla	n			Checked by:			
		ent type:				•	Pit Orientation:	Easting: 368275	m	R.L. Surface:			
Exc	avati	on dimensio	ns: n	n long	m wide		Vane No: DR2244	Northing: 799811	.2 m	Datum:			
ex	cava	ation infor	mati	on			rial substance						
stratigraphy	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material Soil - Soil type; colour, structure. plasticity, sensitivity. Secondary an Rock - Colour, fabric, rock type; dise information.	d minor components.	consistency/ density index 25 25 25 25 25 25 25 25 25 25 25 25 25	structure and additional observations			
	-			- - 1 ⁻	× × × × × × × × × × × × × × × × × × ×	OL ML	Organic SILT; greyish brown, nume SILT with trace clay; yellowish brown moist.		D-M	UTP			
چ				<u>-</u> _	× × × × × × × × × × × × × × × ×	ML	SILT with trace clay and trace fine s Stiff in-situ, firm when reworked, nor	and; brownish yellow. 1 plastic. Occasional			-		
Younger Ash	ountered			2	× × × × × × × × × × × × × × ×	ML	fine rootlets. SILT with minor clay; yellowish brow plastic in-situ. Reworks to firm, grea	n. Very stiff and non	M- W		-		
7	Groundwater not encountered				× × × × × × × × × × × × × × × × × × × ×	ML	Sandy SILT with trace clay; pale gre Firm to stiff, non plastic, moist.	y with black flecks.	M		-		
	wpuno			3_	$\begin{pmatrix} \times & \times & \times \\ \times & \times & \times \\ \times & \times & \times \end{pmatrix}$	SP	Grading to silty fine to medium SAN	D; grey with black			_		
rs,	Ģ		flecks. Čohesive in-situ but granular when reworked.								-		
Rotoehu Ash				4 <u>-</u> 			 trace to minor silt below 3.6m. trace silt below 4.1m. 				- - - -		
				5			(max. reach of excavator) Test pit TP02 terminated at 4.8 met	res.					
				<u>6</u>	-						-		
	Sketo	:h		-									
9 1 1 1	otes, J ₅₀ J ₆₃	undisturbe	ind Ge s d sam	otechnic ple 50m ple 63m	cal Society In m diameter m diameter	c 2005	vane shear (kPa) moisture remoulded peak moisture D dry UTP unable to penetrate water W wet S saturated Interval			consistency/ density ind VS very soft S soft F firm St stiff	VL very loose L loose MD medium dense D dense		
E	ls	disturbed s bulk samp environme refusal	le				 10/1/98 water level on date shown water inflow water outflow 			VSt very stiff H hard	VD very dense		

TRIAL PIT TEST PITS 150313.GPJ COFFEY.GDT 28.3.13

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concy getter										Tri	al Pit	No.	TP03			
Ε	ng	ginee	eri	ng	Log	- T	rial Pit		Sh Pro	eet oject N	lo:	1 of 1 GENZTAUC13086AF				
Clie	ent:			THE	LAKES	S 201	12 LTD			Da	te sta	rted:	14.3.2013			
Principal:										Da	te cor	npleted:	14.3.2013			
Pro	ject	:		THE		S ST/	AGE 3 CONSTRUCTI	ON		Lo	gged I	by:	KB			
Tria	ıl pit	location:		Refe	er to sit	e pla	n			Ch	eckec	l by:				
Equ	ipme	ent type:					Pit Orientation:	Easting: 368541.	5 m		R.L.	Surface:				
Exc	avati	on dimensio	ns: n	n long	m wide		Vane No: DR2244	Northing: 799781	.1 m		Dat	um:				
ex	cava	ation infor	mati	on		mate	erial substance									
stratigraphy	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	mater Soil - Soil type; colour, struc plasticity, sensitivity. Seconda Rock - Colour, fabric, rock type informa	cture. Grading; bedding; ry and minor components. e; discontinuities, additional	moisture condition	consistency/ density index	25 50 75 vane shear	100 (remoulded 125 /peak) kPa 175	structure and additional observations			
HA RA Younger Ash	Groundwater not encountered	Sample 6 Sample 7 Sample 8 Sample 9 Sample 10		1 2 2 3 3 4	x x x x x x x x x x x x x x x x x x x	OL ML ML SP	TOPSOIL. SILT; light brown, minor rootlet - becoming orange brown and SILT with trace sand and clay, rootlets. Greasy when reworke SILT with trace to minor sand; Fine to coarse SAND with mino pumiceous. Well graded. - becoming light brown/white. Clayey SILT; brown. Medium p reworked. - becoming orange brown.	moist. orange brown, occasional d. orange. Slightly cohesive. or silt, orange brown,	M	-	• ×	ж UTP				
s	keto			5 - - - - - - - - - - - - - - - - - - -			(max. reach of excavator) RA = Rotoehu Ash HA = Hamilton Ash Test pit TP03 terminated at 4.7	metres.					- - - - - - - - - - - - - - - 			

Trial Pit No.

I

classification symbol soil description		vane s	shear (kPa) remoulded						
ο D ₅₀ undisturbed	sample 50mm diameter sample 63mm diameter mple	UTP water V	peak peak greater than 200kPa unable to penetrate 10/1/98 water level on date shown water inflow water outflow	moi D W S	sture dry moist wet saturated	consist VS S F St VSt H	tency/ density ind very soft soft firm stiff very stiff hard	lex VL L MD D VD	very loose loose medium dense dense very dense

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•											Pit No.	TP04		
E	ng	ginee	eri	ng	Log	- T	rial Pit			Sheet Proje		1 of 1 GENZTAUC13086 A		
Cli	ent:			THE	LAKE	S 201	2 LTD			Date	started:	14.3.2013	013	
Pri	ncip	al:								Date	completed:	14.3.20)13	
Pro	oject	:		THE		S STA	AGE 3 CONSTRUCTION			Logge	ed by:	RBT		
Tri	al pit	location:		Refe	er to sit	e pla	n			Chec	ked by:			
Eq	uipme	ent type:				-	Pit Orientation:	Easting: 368588.	5 m	1	R.L. Surface:			
		on dimensio		-	m wide		Vane No: DR2244	Northing: 799726	6.9 m		Datum:			
e	cava	ation infor	mati	on			rial substance			. ×	a d a			
stratigraphy	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material Soil - Soil type; colour, structure. plasticity, sensitivity. Secondary an Rock - Colour, fabric, rock type; disc information.	d minor components.	moisture condition	consistency/ density index ²⁵	 ⁵⁰ vane shear ¹⁷⁵ (remoulded ¹²⁶ /peak) kPa ¹⁷⁵ 	structu additional o		
τs		Sample 1		-		OL	Organic SILT with trace clay, dark g wood fragments and building debris	rey/brown, occasional , friable. (FILL)	D				-	
Younger Ash	ered	Sample 2		1 <u>-</u>		ML	SILT with minor very fine sand, light friable, very stiff. - occasional tree roots (2-5mm).			•	UTP ×			
Your	encount	Sample 3		2	× ×	ML ML	SILT with minor clay; orange/brown, Very slight plasticity, moist. SILT with trace to minor fine sand a	'	м				-	
RA	Groundwater not encountered			3 <u>-</u>		ML SP	SILT with trace sand and minor slightly of SILT with trace sand and minor clay in-situ but becomes greasy when re SAND with trace to minor silt; light o Puniceous, friable, moist. - becomes pale orange/white and m below 3.4m.	ohesive, moist. ; orange/brown. Stiff worked, moist to wet. range/grey.	M- W M	-				
HA		Sample 4		4 <u></u>		ML	Clayey SILT; chocolate brown, very when reworked. Non plastic, moist.				UTP			
		Sample 5		5 - - 6 -			- becoming orange brown. (max. reach of excavator) RA = Rotoehu Ash HA = Hamilton Ash Test pit TP04 terminated at 4.8 metr	res.						
5	<u>G</u> keto	ch												
r ((otes, J ₅₀ J ₆₃ J ₆₃ J ₆₃ J ₆₃		and Ge ts ed sam ed sam sample	eotechnic nple 50m nple 63m e	cal Society In m diameter m diameter	c 2005	vane shear (kPa) ● remoulded × peak >>× peak greater than 200kPa UTP unable to penetrate water ↓ 10/1/98 water level on date shown water inflow water outflow	moisture D dry M moist W wet S saturated		consist VS S F St VSt H	tency/ density in very soft soft firm stiff very stiff hard	VL L MD D	very loose loose medium dense dense very dense	

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										l ri	al P	it N	0.	TP05
Ε	n	ginee	eri	ng	Log	- T	rial Pit				eet ojec	t No	D:	1 of 1 GENZTAUC13086AF
Cli	ent:			THE	LAKE	S 201	2 LTD			Da	ite s	tart	ed:	14.3.2013
Pri	ncip	al:								Da	ite c	om	plete	d: 14.3.2013
Pro	ject	:		THE		S ST/	AGE 3 CONSTRUCTIO	N		Lo	gge	d by	y:	КВ
Tria	al pi	t location:		Refe	er to sit	e pla	n			Ch	eck	ed I	by:	
Equ	ipme	ent type:				·	Pit Orientation:	Easting: 368587.6	6 m				Surfac	ie:
Exc	avat	ion dimensio	ons: n	n long	m wide		Vane No: DR2244	Northing: 799812	.3 m		D	atur	n:	
ex	cav	ation infor	mati	on		mate	erial substance							
stratigraphy	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	materia Soil - Soil type; colour, struct plasticity, sensitivity. Secondar Rock - Colour, fabric, rock type informati	ture. Grading; bedding; y and minor components. ; discontinuities, additional	moisture condition	consistency/ density index		75 vane shear 100 (remoulded	125 /peak) kPa 175	structure and additional observations
		0		-	7/17	OL	TOPSOIL.		D					_
Ash		Sample 11		<u>1</u>	* * * * * * * * * * * * * * * * * * *	ML	SILT; light brown. Friable, dry.		M	-	•	×		
Younger Ash		Sample 13		2	× × × × × × × × × × × × × × × × × × ×	ML	SILT with trace sand and clay; c plasticity and greasy when rewo		_					
	Groundwater not encountered			-	× × × × × × × × × × × × × × × × × × ×	ML	SILT with trace to minor sand an orange. - becoming orange brown.	nd trace clay; bright						
∢	r not end			3		SP	Fine to coarse SAND with trace graded.	silt; orange brown. Well						_
УЗ	oundwate	Sample 14		-			 becoming light brown/white wit 	h occasional silt lenses.						
	Gro	Sample 14		4		ML	Clayey SILT; brown. Low plastic reworked.	ity and greasy when					UTP	
Hamilton Ash		Sample 15		5			- becoming orange brown mottle							-
Hami				-			- becoming light brown/orange b	nown.						
		Sample 16		6										-
				-	-		(Target depth) RA = Rotoehu Ash							-
S	sket	ch					Test pit TP05 terminated at 6 m	etres.						
I														

classification symbols and soil description based on New Zealand Geotechnical Society Inc 2005 remoulded peak peak undisturbed sample 50mm diameter Uso undisturbed sample 63mm diameter undisturbed sample blik sample environmental sample R refusal 10/1/98 water level on date shown water inflow water outflow 	a D dry VS very soft VL very loose M moist S soft L loose W wet F firm MD medium dense S saturated St stiff D dense VSt very stiff VD very dense H hard
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-										Tria	al Pit	No.	T	P06		
Ε	ną	ginee	eri	ng	Log	- T	rial Pit			She Pro	et ject N	No:	1 G	of 1 ENZTAUC13	086AF	
Clie	ent:			THE		S 201	2 LTD			Dat	e sta	rted:	14	1.3.2013		
Pri	ncip	al:								Dat	e cor	nplete	ed: 1 4	4.3.2013		
Pro	ject	:		THE		S STA	GE 3 CONSTRUCTION			Log	ged	by:	K	В		
Tria	al pi	t location:		Refe	er to sit	e pla	n			Che	ecked	l by:				
		ent type:					Pit Orientation:	Easting: 368704.4	4 m			. Surfa	ce:			
Exc	avat	ion dimensio	ons: n	n long	m wide		Vane No: DR2244	Northing: 799943	.7 m		Dat	um:				
ex	cav	ation info	rmati	on			rial substance					7	1			
stratigraphy	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material Soil - Soil type; colour, structure. plasticity, sensitivity. Secondary and Rock - Colour, fabric, rock type; disc information.	Grading; bedding; d minor components. continuities, additional	moisture condition	consistency/ density index	25 50 75 vane sheai	100 (remoulded 125 /peak) kPa 175		structure and tional observations		
		Sample 17		-		OL ML	TOPSOIL SILT; light brown, friable and dry.		D		•	×			-	
				-		IVIL	SILT, light brown, mable and dry.								_	
Younger Ash		Sample 18		1	× × × × × × × × × × × × × × × × × × × ×		- becoming orange brown and moist		м							
guno,	ered	Sample 19		-	× × × × × × × × × × × × × × ×	ML	SILT with trace fine sand and clay; o when reworked.	range brown. Greasy							_	
Ĺ	Groundwater not encountered			2		ML		· <u> </u>								
	ot en			-	× × × × × × × × × × × × × × × × × × × ×	SP	plasticity.		-						_	
⊿	ater n			3		3F	Fine to coarse SAND with trace silt; occasional silty lenses. Well graded.	orange brown,							_	
RA	wpun			<u> </u>			- becoming white/light brown.									
	Gro	Sample 20		-	×_ ×_ ×_ < ×_ ×_×	ML	Clayey SILT; brown. Medium plastic	ity, very stiff, greasy				UTF	5		_	
Ash				4	$(\times,\times,\times,\times)$		when reworked.									
Hamilton Ash							- becoming orange brown and less s	stiff.							_	
Han		Sample 21		5											_	
				-	-		(Target depth) RA = Rotoehu Ash								-	
				-			Test pit TP06 terminated at 5 metres	3.							_	
				6	-											
				_	-											
S	ket	ch														
							i									
5	oil d	fication symb					vane shear (kPa) ● remoulded									
t	ased	on New Zeal		eotechnic	al Society In	c 2005	 × peak ≫× peak greater than 200kPa 	moisture D dry		VS		very so				
U	50		ed sam		m diameter		UTP unable to penetrate water	M moist W wet		S F		soft firm	L	loose medium dens	e	
		undisturbe disturbed bulk samp	sample		m diameter		10/1/98 water level on date shown	S saturated		St VSt		stiff very sti	D ff VD	dense very dense		
E		environme refusal		ample			water inflowwater outflow			н		hard				
		. 510.001														

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										Trial F	'It NO.	TP07
Ε	ną	ginee	eri	ng	Log	- T	rial Pit			Sheet Projec		1 of 1 GENZTAUC13086AI
Clie	ent:			THE		S 201	2 LTD			-	started:	14.3.2013
Prir	ncip	al:								Date o	complete	ed: 14.3.2013
Pro	•			THE		S STA	AGE 3 CONSTRUCTION			Logge	-	КВ
		location:			er to sit						ed by:	
		ent type:		Nen		c più	Pit Orientation:	Easting: 368767.	5 m		R.L. Surfac	ce:
		on dimensio	ns: n	n long	m wide		Vane No: DR2244	Northing: 799923.9 m Datum:				
ex	cav	ation infor	mati	on		mate	rial substance					
stratigraphy	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material Soil - Soil type; colour, structure. plasticity, sensitivity. Secondary an Rock - Colour, fabric, rock type; dis information.	d minor components.	moisture condition		vane shear (100 (remoulded (125 /peak) kPa (175	structure and additional observations
		Sample 22		-		OL	TOPSOIL		D		×	-
				-	× × × × × × × × × × × × × × ×	ML	SILT; light brown. Friable and dry.				Î	-
Younger Ash		Sample 23		<u>1</u>	× × × × × × × × × × × × × × × × × × ×		- becoming orange brown with trace	sand and moist.	М	•	×	
ounc	red	Sample 24		-	× × × × × × × × × × × × × × ×	ML	SILT with trace sand and clay; orang when reworked.	ge brown. Greasy				-
`	ounte			2	* * * * * * *	ML	SILT with minor sand; bright orange					-
	ot enc			-	× × × × × × × × × × × ×	SP	SAND with trace silt; orange brown,	fine to coarse	-			
	Groundwater not encountered			-			grained, pumiceous. Well graded.					-
RA	ndwa			3								_
	Grou			-			- becoming light brown/white.					-
		Sample 25		- / 1 ⁻	x_ x_ x_ _ x_ xx	ML	Clayey SILT; brown. Medium plastic reworked.	ity and greasy when	1			-
_				4 <u>-</u>			- becoming orange brown.					
ЧΗ		Sample 26		-								-
				5	+ x-x- + x-x-x +							-
				-			(Target depth) RA = Rotoehu Ash HA = Hamilton Ash Tast eit TID07 termineted et 5 metre	_				
				6			Test pit TP07 terminated at 5 metre	5.				
				-								-
s	keto	ch										
-									1			
s	oil d	fication symb				- 000-	vane shear (kPa) • remoulded					14. · · · · · · · · · · · · · · · · · · ·
		on New Zeala		otechnic	al Society In	c 2005		moisture D dry		VS	very sof	ft VL very loose
U U	50	undisturbe	ed sam		m diameter m diameter		UTP unable to penetrate water	M moist W wet		S F	soft firm	L loose MD medium dense
D		disturbed : bulk samp	sample				10/1/98 water level on date shown	S saturated		St VSt	stiff very stif	D dense ff VD very dense
E		environme refusal		ample			 water inflow water outflow 			н	hard	

geotechnics

Client: THE LAKES 2012 LTD Date started: Principal: Date completed: Project: THE LAKES STAGE 3 CONSTRUCTION Logged by: Trial pit location: Refer to site plan Checked by: Equipment type: Pit Orientation: Easting: 368724 m R.L. Surface: Excavation dimensions: m long m wide Vane No: DR2244 Northing: 799993 m Datum: excavation information material substance material material material material Age Image: Soil - Soil type; colour, structure. Grading; bedding; Image: Soil - Soil type; colour, structure. Grading; bedding; Image: Soil - Soil type; colour, structure. Grading; bedding; Image: Soil - Soil type; colour, structure. Grading; bedding; Image: Soil - Soil type; colour, structure. Grading; bedding; Image: Soil - Soil type; colour, structure. Grading; bedding; Image: Soil - Soil type; colour, structure. Grading; bedding; Image: Soil - Soil type; colour, structure. Grading; bedding; Image: Soil - Soil type; colour, structure. Grading; bedding; Image: Soil - Soil type; colour, structure. Grading; bedding; Image: Soil - Soil type; colour, structure. Grading; bedding; Image: Soil - Soil type; colour, structure. Grading; bedding; Image: Soil - Soil type; colour, structure. Grading; bedding; Image: Soil - Soil type; colour, structure. Grading; bedding; Ima	TP08 1 of 1 GENZTAUC13086AF 15.3.2013 15.3.2013 RBT structure and additional observations
Client: THE LAKES 2012 LTD Date started: Principal: Date completed: Project: THE LAKES STAGE 3 CONSTRUCTION Logged by: Trial pit location: Refer to site plan Checked by: Equipment type: Pit Orientation: Easting: 368724 m R.L. Surface: Excavation dimensions: m long m wide Vane No: DR2244 Northing: 799993 m Datum: excavation information material substance Image: Districtly, sensitivity. Secondary and minor components. Information. Image: Districtly, sensitivity. Secondary and minor components. Rock - Colour, fabric, rock type, discontinuities, additional information. Image: Districtly, sensitivity. Secondary and minor components. Rock - Colour, fabric, rock type, discontinuities, additional information. D Image: Districtly, sensitivity. Secondary and minor components. Rock - Colour, fabric, rock type, discontinuities, additional information. D Image: Districtly, sensitivity. Rock - Colour, fabric, rock type, discontinuities, additional information. D Image: Districtly, sensitivity. Rock - Colour, fabric, rock type, discontinuities, additional information. D Image: Districtly, sensitivity. Rock - Colour, fabric, rock type, discontinuities, additional information. D Image: Districtly, sensitivity. Rock - Colour, fabric, rock type, discontinuities, additional information. D Image: Districtly, sensitivity. Rock - Colour, fabric, rock type, disco	GENZTAUC13086AF 15.3.2013 15.3.2013 RBT
Principal: Date completed: Project: THE LAKES STAGE 3 CONSTRUCTION Logged by: Trial pit location: Refer to site plan Checked by: Equipment type: Pit Orientation: Refer to site plan Checked by: Equipment type: Pit Orientation: Multic Vane No: DR2244 Northing: 799993 m Datum: excavation dimensions: m long m wide Vane No: DR2244 Northing: 799993 m Datum: oright by: motes Soil - Soil type; colour, structure. Grading; bedding; samples, server, structure. Grading; bedding; samples, server, structure. Grading; bedding; samples, server, structure, grading; bedding; samples, se	15.3.2013 RBT
Project: THE LAKES STAGE 3 CONSTRUCTION Logged by: Trial pit location: Refer to site plan Checked by: Equipment type: Pit Orientation: Easting: 368724 m R.L. Surface: Excavation dimensions: m long m wide Vane No: DR2244 Northing: 799933 m Datum: excavation information material substance material mate	RBT
Trial pit location: Refer to site plan Checked by: Equipment type: Pit Orientation: Easting: 368724 m R.L. Surface: Excavation dimensions: m long m wide Vane No: DR2244 Northing: 799993 m Datum: excavation information material substance material Soil - Soil type; colour, structure. Grading; bedding; plasticity, sensitivity. Secondary and minor components. samples, samples, tests, etc RL Building and the sensitivity. Secondary and minor components. Information. a Value Sample 27 OL Organic SILT with numerous fine rootlets; greyish brown. D Building and the sensitivity. State to minor clay, some fine rootlets; yellowish brown. Stiff, dry, friable. D Image: State to the sensitivity of the sensitivity. State to the sensitivity of the sensitivity. State to the sensitivity of the sensitity of the sensitivity of the sensitivity of the sensit	structure and
Trial pit location: Refer to site plan Checked by: Equipment type: Pit Orientation: Easting: 368724 m R.L. Surface: Excavation dimensions: m long m wide Vane No: DR2244 Northing: 799993 m Datum: excavation information material substance material Soil - Soil type; colour, structure. Grading; bedding; plasticity, sensitivity. Secondary and minor components. samples, samples, tests, etc RL Building and the sensitivity. Secondary and minor components. Information. Image: Sensitivity of the sensitivity of the sensitivity of the sensitivity. Secondary and minor components. Information. Image: Sensitivity of the sensitivity. Secondary and minor components. Information. Image: Sensitivity of the sensitivity. Secondary and minor components. Rock - Colour, fabric, rock type; discontinuities, additional information. Image: Sensitivity of the sense sensititity of the sensitivity of the sense sensitivi	
Equipment type: Pit Orientation: Easting: 368724 m R.L. Surface: Excavation dimensions: m long m wide Vane No: DR2244 Northing: 799993 m Datum: excavation information material substance Northing: 799993 m Datum: excavation information material substance material substance material signature material sinformation material signature	
excavation information material substance Add notes samples, RL est Soil - Soil type; colour, structure. Grading; bedding; plasticity, sensitivity. Secondary and minor components. Rock - Colour, fabric, rock type; discontinuities, additional information. additional information a	
Arder birts notes samples, tests, etc RL grad birts Soil - Soil type; colour, structure. Grading; bedding; plasticity, sensitivity. Secondary and minor components. Rock - Colour, fabric, rock type; discontinuities, additional information. until type of the plasticity of the plasticity and the plasticity. Sensitivity. Secondary and minor components. Rock - Colour, fabric, rock type; discontinuities, additional information. until type of the plasticity of the plasticity. Sensitivity. Secondary and minor components. Rock - Colour, fabric, rock type; discontinuities, additional information. until type of the plasticity of the plasticity. Sensitivity. Secondary and minor components. Rock - Colour, fabric, rock type; discontinuities, additional information. until type of the plasticity of the plasticity. Sensitivity. Secondary and minor components. Rock - Colour, fabric, rock type; discontinuities, additional information. until type of the plasticity of the plasticity. Sensitivity. Secondary and minor components. Rock - Colour, fabric, rock type; discontinuities, additional information. until type of the plasticity of the plasticity. Sensitivity. Secondary and minor components. Rock - Colour, fabric, rock type; discontinuities, additional information. until type of the plasticity of the plasticity. Sensitive of the plasticity of the plasticity of the plasticity. Sensitive of the plasticity of the plasticity. Sensitive of the plasticity of the plasticity of the plasticity. Sensitive of the plasticity of the plasticity of the plasticity of the plasticity of the plasticity. Sensitive of the plasticity of the plasticity of the plasticity of the	
image: solution in the set of the s	
Sample 27 Sample 27 Sample 28 Sample 28	- - - - - -
Sample 28 A X	- - - - - -
Sample 28	
Sample 29 2	-
SP Fine to coarse SAND with trace silt; yellow/brown with black flecks. SP Fine to medium SAND with minor silt; pale yellow/white. M- 3	-
Image: second	-
g Sample 20 plastic.	
Sample 30 Sample 30	-
Sample 31 Image: Sample 31	-
5 Sample 32 5 5 5 5 5 5 5 5 5 5 5 5 5	-
6 (Target depth) RA = Rotoehu Ash HA = Hamilton Ash Test pit TP08 terminated at 5.2 metres.	
Sketch	

TRIAL PIT TEST PITS 150313.GPJ COFFEY.GDT 28.3.13

classification symbols and soil description based on New Zealand Geotechnical Society Inc 2005 vane shear (kPa) remoulded ● × ≫× moisture consistency/ density index peak peak greater than 200kPa unable to penetrate very soft soft very loose loose medium dense
 notes, samples, tests

 U₅₀
 undisturbed sample 50mm diameter

 U₆₃
 undisturbed sample 63mm diameter

 D
 disturbed sample

 Bs
 bulk sample

 E
 environmental sample

 R
 refusal
 D M W S VL dry VS UTP moist wet L MD S F Form GEO 5.5 Rev.6 firm water St VSt D VD dense very dense stiff saturated 10/1/98 water level on date shown very stiff hard Н ► water inflow water outflow 4

		-tt	~				otechnics									
C)(JIE	=)		U	jec	lechines			Tria	I Pit I	No.		TP0	9	
E	n	ginee	eri I	ng	Log	- T	rial Pit	She		lo [.]		1 of 1 GENZTAUC13086AI				
Cli	ent:	-		THE		S (201	12) LTD		Project No Date start					30.5.		
Pri	ncip	al:				•				Date completed:			d:	30.5.	2013	
Pro	ject	:		STA	GE 3					Logged by:				RBT		
Tri	al pi	t location:		Refe	er to sit	e pla	n			Che	cked	by:		RBT		
Equ	iipme	ent type:				-	Pit Orientation:	Easting: m			R.L.	Surfac	e:			ĺ
		ion dimensio		-	m wide		Vane No:	Northing: m			Datu	ım: MC	DTURIK	1953		
	cav	ation infor	mati	on			rial substance			_ ×	a	a C				
stratigraphy	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material Soil - Soil type; colour, structure. plasticity, sensitivity. Secondary an Rock - Colour, fabric, rock type; dis information.	d minor components.	moisture condition	consistency/ density index		125 /peak) kPa 175 /peak) kPa 175			cture and I observations	
Fill				-		SP	SAND with minor silt, pale grey, fine Occasional bricks and constructiona		D-M							-
ВТ				<u>1</u> -	× × × × ×	OL	Highly organic SILT, dark brown (bu									
s	ountered			2	X X X X X X X X X X X X X X X X X X X	ML	SILT with some clay and fine sand, stiff, moist.	orange brown, tirm to	м							-
Younger Ashes	Groundwater not encountered				X X X X X X X X X X X X X X X X X X X											
You	Groundwa			-	X X X X X X X X X X X X X X X X X X X X											
RA				<u>4</u>	× × × × × × × × × × × ×	SP	- Grades to very fine silty SAND, be grey.	coming brownish								
ЧЧ				5	× × × × × × × × × × × ×	MH	SILT with some clay and trace sand hard, sand is fine grained, moist (Ha	, chocolate brown, amilton Ash).								-
				-	<u> </u>		5m, becoming dark orange brown. EOBH, target depth BT=Burried Topsoil RA=Rotoehu Ash HA= Hamilton Ash									
F	sketo			6			Test pit TP09 terminated at 5.2 met	res.								
	otes,		and Ge t s ed sam ed sam sample le	otechnic ple 50m ple 63m	al Society Ind m diameter m diameter	c 2005	vane shear (kPa) ● remoulded × peak >>× peak greater than 200kPa UTP unable to penetrate water 10/1/98 water level on date shown ▶ water inflow ✓ water outflow	moisture D dry M moist W wet S saturated		cons VS S F St VSt H	:	// densit very soft soft firm stiff very stiff hard		VL L MD D VD	very loose loose medium dense dense very dense	e

C	offe	21/	7	0	iec	otechnics							
	one	· y		0	,				Tria	II Pit N	No.	TP10	
En	ginee	rin	g L	.og	- T	rial Pit			She Pro	et ject N	o :		1 UC13086AF
Client:	:	T	ΉE L	AKES	S (20'	12) LTD			Dat	e star	ted:	30.5.201	3
Princip	pal:								Dat	e con	pleted:	30.5.201	3
Projec	xt:	S	TAG	E 3					Log	ged b	y:	RBT	
Trial p	it location:	R	Refer t	to site	e pla	n			Che	ecked	by:	RBT	
Equipm	ent type:					Pit Orientation:	Easting: m			R.L.	Surface:		
	tion dimension			wide	mate	Vane No: rial substance	Northing: m			Datu	m: MOT	URIKI 1953	
						material			X	ar	a		
stratigraphy water	notes samples, tests, etc	RL f	metres	graphic log	classification symbol	Soil - Soil type; colour, structure plasticity, sensitivity. Secondary a Rock - Colour, fabric, rock type; di information.	nd minor components. scontinuities, additional	moisture condition	consistency/ density index	25 50 75 vane she 400 (romould	125 /peak) kPa 175	structure additional obs	
Matua Subgroup TS Groundwater not encountered Groundwater not encountered			1 	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	ML	Topsoil, highly organic silt (Fill). SILT with trace sand, pale orange ; becomes soft and greasy when re- medium grained, moist. Sandy SILT/Silty SAND, pale grey to stiff insitu, silty portion becoming when re-worked, sand is fine to me wet. - Increasing sand content below 4. With some silt-silty sand. EOBH, target depth TS=Topsoil Test pit TP10 terminated at 4.5 me	with black flecks, firm firm and slightly plastic dium grained, moist to 5m. Grading to SAND	/ M M- W					
soil o base	sification symbo description d on New Zealan s, samples, tests undisturbed disturbed sa bulk sample	d Geote sample sample	50mm di	iameter	: 2005	vane shear (kPa) ● remoulded × peak >>× peak greater than 200kPa UTP unable to penetrate water ↓ 10/1/98 water level on date shown	moisture D dry M moist W wet S saturated		Cons VS S F St VSt	۲ f s	// density i very soft soft irm stiff	VL ver L loo	dium dense nse

TRIAL PIT

Appendix D - Post Development Investigation Data



TC bit

V bi

water outflow

HB

hammer bouncing

VD

very dense

Borehole ID. HA3A-104 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd client: 07 Mar 2016 date started: 09 Mar 2016 principal: date completed: The Lakes Stage 3 GCR logged by: NM project: Stage 3C & Stage 3D RBT location. checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density class ification g (blows/ 100 mm) samples & shear ⊕ remould ⊚ peak additional obs /ations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components field tests graphic I symbol Ē depth (water (kPa) 8 8 8 R ML SILT: low plasticity, brown, with minor fine to D Н FILL iii medium grained sand. Ì At 0.1m: becoming orange brown with minor clay, trace fine to coarse grained sand, trace 111 1 + 1111 |||||||medium grained angular gravel. 11 VS >240 kPa 11 ||1 11 11 1 I I I I 0.5 ML SILTY SAND: fine to medium grained, yellow М VS >240 kPa 11111 111 brown. 11 1 1 1 111 1111 | | | | |SP SAND: fine to medium grained, pale pink, with VD 11 some silt ||||UTP 11 1 11 11 SM SILTY SAND: fine to medium grained, white. н Encountered ||||11 Ъ 11111 ||||09-03-2016 ODS 11 1 11 1111 ¥ ż 1.0 11111 UTP Not 11111 111 111 | | | |1111 111 11111 |||||SP SAND: fine to medium grained, white, with D 11 |||||||11111 + DCP minor silt | | |11111 UTP 11 NON CORED ||ł 111 11 MI SILT: low plasticity, orange brown, with minor н 11 1111 11 clay, trace fine to coarse grained sand. 111 BOREHOLE: 1.5 VS >240 kPa 11 11111 11 11 SOF 11 SP SAND: fine to coarse grained, white, with D 11111 minor silt. ||VS >240 kPa ||||SILT: low plasticity, orange brown, with minor clay, trace fine to coarse grained sand. 11111 ML н 11111 ||à 11 ||11111 11111 1111 2.0 Hand Auger HA3A-104 terminated at 2.0 m VS >240 kPa Target depth 11111 111 Ē 11111 ||||||11111 111 111 classification symbol & Method AD auger drilling* support consistency / relative density samples & field tests soil description N nil bulk disturbed sample mud VS Μ В very soft AS auger screwing' disturbed sample environmental sample based on Unified soft firm C casing D S F hand auger HA Classification System Е penetration w split spoon sample undisturbed sample ##mm diameter washbore SS St stiff hand auger no resistance ranging to refusal HA very stiff VSt U## moisture HP hand penetrometer (kPa) hard н dry moist wet D M W standard penetration test (SPT) Fb Ν friable wate N* SPT - sample recovered VL very loose bit shown by suffix 10-Oct-12 water saturated T SPT with solid cone Nc loose L e.g. B evel on date shown AD/T plastic limit liquid limit VS vane shear; peak/remouded (kPa) Wp MD medium dense blank bit vater inflow wi R refusal D dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3A-106
sheet:	1 of 1
project no.	GENZTAUC13086AP-A
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

position: Not Specified						surface elevation: Not Specified				angle fro	om horizont	al: 90°	DCP id.:
		Hand A				drilling fluid:				nole dia	meter : 50 r	nm	
drill	<u> </u>	format	on			mate	rial sub			>			
method & support	method & method & support support & support & fill & standard & st			graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	(kPa)	DCP (blows/ 100 mm)	structure and additional observations		
		Image:						SILT: non plastic, dark brown, with trace fine to coarse sand. 0.35 to 0.6 m: becoming mottled orange brown, with some fine to coarse sand and trace sub-rounded fine to coarse gravel. 0.5 to 0.6 m: becoming mottled pale grey 0.9 to 1.0 m: trace clay SAND: fine to coarse grained, pale brown, with some silt. Sandy SILT: non plastic, orange brown, sand is fine to coarse grained, pale brown, with some silt. SAND: fine to coarse grained, pale brown, with some silt. SAND: fine to coarse grained, pale brown, with some silt. 1.3 to 1.85 m: trace fine to medium gravel 1.75 to 1.85 m: trace clay. SILT: non plastic, orange brown, with minor sand and trace clay. 1.75 to 1.85 m: trace clay I.75 to 1.85 m: trace clay. 1.75 to 1.85 m: trace clay. 1.75 to 2.0 m: becoming mottled dark brown and pink Hand Auger HA3A-106 terminated at 2.0 m	D to M	VSt VSt VSt			TOPSOIL VS >183 kPa FILL VS >183 kPa VS >183 kPa VS >183 kPa UTP VS >183 kPa VS >183 kPa
mett AD AS HA W HA * e.g. B T	auge auge hand wash hand	k bit it	ng*	M r C c pene	etration	I	l ater shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	b Cla moistuu D dr M moi W we S sa Wp pla	soil desc based on ussificatio re y bist	Unified on System	5 F 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	F firm St stiff /St very stiff H hard Fb friable /L very loose



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-149
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

				x 01	aye								RBI	
	on: Not	•						surface elevation: Not Specified drilling fluid:			om horizon meter : 50	DCP id.:		
	rill model: Hand Auger drilling fluid: drilling information material substance									hole diameter : 50 mm				
	-							material description		₹	vane	DCP	structure and	
support	1 2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	valle shear ⊕remoulded ⊚peak (kPa) 02 02 00 03 00	(blows/ 100 mm	additional observations	
					-			SILT : non plastic, brown, with trace fine grained sand.	D	VSt				
					-			SILT: low plasticity, orange brown, with minor clay and trace fine to coarse sand.	M				FILL	
					0.5 —			0.6 m: white specks present					VS 133/ 25 kPa	
		ountered			-			0.8 m: becomes mottled grey. Presence of trace red medium to coarse gravel that break down easily when manipulated.			 © 0 		VS >183 kPa	
 z 		Not Encountered			1.0			1.0 m: trace fine to coarse pumiceous gravel 1.1 m: sand becomes minor and clay becomes			 		VS >183 kPa	
					-			trace					VS 133/ 54 kPa	
					1.5 — -			1.6 m: becoming mottled pale pink . Clay becomes minor.					VS >183 kPa	
					-						 0 		VS >183 kPa	
_					-2.0	~~~*		Hand Auger HA3C-149 terminated at 2.0 m Target depth						
neth D S A / A	od auger o auger s hand a washbo hand a	screwii uger ore			nud asing etration		nil stance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	s D Cla moistu D dr	soil desc ased on ssification re	•		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable	
.g.	bit sho AD/T blank b TC bit V bit		suffix	wate	Leve	Oct-12 wa el on date er inflow er outflow	ter shown	N Standard perietration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla		t		VL very loose L loose MD medium dense D dense VD very dense	



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-150
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	NM
checked by:	RBT

	auc			iye sc a								necked by.	RDI
		n: Not del: Ha	•								om horizontal: 90 meter : 50 mm	DCP id.:	
		g info		0			mate	erial sub	drilling fluid:	r		neter . 30 mm	
un		-	mau					· · · · ·	material description		. ≩	vane DCP	structure and
method &	1 modeline .	¹ ² penetration ³	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕remoulded ⊚ peak (kPa) B 2 2 2 8 2 2 ∞	/ additional observations
						-		ML	SILT: non plastic, brown, with trace fine grained sand.	D	Н		FILL
						-		ML	SILT : low plasticity, orange brown mottled brown, with minor clay, trace fine to medium grained sand.	_			VS >240 kPa
						0.5			At 0.6m: becoming flecked white.	M			VS >240 kPa
			ered			-			At 0.7m: becoming minor fine to coarse grained sand.				 VS >240 kPa
			Not Encountered			1.0							 VS >240 kPa
						-							 VS >240 kPa
						1.5							 VS >240 kPa
						-		ML	At 1.75m: becoming orange brown with trace fine to coarse grained sand. SILT : low plasticity, orange brown, with minor clay, trace fine to medium grained sand.	_			VS >240 kPa
	•					-2.0-			Hand Auger HA3C-150 terminated at 2.0 m Target depth				 VS >240 kPa
Met AD AS HA W HA	2 2 1 1	d auger d auger s nand au washbo nand au	crewin uger re	* ng*	pen	nud asing etration		l nil sistance ng to al	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	s b Cla moistu D dr	soil desc ased on ssification re		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable
* e.g. B T V	. / k	oit show AD/T olank bi TC bit V bit		suffix	wate	leve	Dct-12 w I on date er inflow er outflo	e shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla			VL very loose L loose MD medium dense D dense VD very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-153
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

ositic	on: No		cified					surface elevation: Not Specified	a		om horizon	•	° DCP id.:		
	odel: H	•						drilling fluid:	ł	nole dia	meter : 50	mm			
drilli	ng info	rmati	on			mate	rial sub	stance					-		
support &	¹ 2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊛peak (kPa) ₂₅ 00 05 00	DCP (blows/ 100 mm	n) additional observations		
					-			SILT : non plastic, brown, with trace fine grained sand.	D	VSt					
					-			SILT: low plasticity, orange brown, with minor clay and trace fine sand.	D to M		 ⊕ ℗ 		FILL VS 180/ 21 kPa 		
					0.5—						 0 0 		 VS >183 kPa 		
							-								 VS >183 kPa
		Not Encountered			1.0								 VS >183 kPa 		
						-			1.2 m: clay becomes trace 1.3 m: sand becomes minor and is fine-coarse					 VS >183 kPa 	
					1.5			SAND: fine to coarse grained, orange to					 VS >183 kPa 		
					-			SILT: low plasticity, orange brown, with minor clay, trace fine-coarse sand and trace fine							
V					-			gravel.					 VS >183 kPa 		
					-			Hand Auger HA3C-153 terminated at 2.0 m Target depth					1 1 1		
netho D S IA V IA	od auger s hand a washbo hand a	screwin uger ore		pen	nud casing etration		nil istance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	s b Cla moistu D dr	soil desc based on ssification re	•		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable		
e.g. 3 -	bit show AD/T blank b TC bit V bit		suffix	wate	■ 10-0 leve	Oct-12 wa I on date er inflow er outflow	ater shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla		t		VL very loose L loose MD medium dense D dense VD very dense		



Borehole ID. HA3C-156 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 07 Mar 2016 date started: principal: 09 Mar 2016 date completed: The Lakes Stage 3 GCR logged by: NM project: Stage 3C & Stage 3D location: RBT checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density classification ğ samples & field tests (blows/ 100 mm) shear ⊕ remould ⊚ peak additional obs ations Ê method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ē depth (water (kPa) 8 8 8 R SILT: non plastic to low plasticity, dark brown mottled orange, flecked white, with minor fine grained sand, trace clay. ML D Н FILL Шİ | | | | |||||||11111 11111 11 | | | | |1 + 1| | | || | | | |11111 11 ```**`** 11 VS >240 kPa 11 111 11111 TIT 1111 11 | | | | |11111 11 | | | |0.5 MI SILT: low plasticity, orange brown, with minor VS >240 kPa 111 fine to medium grained sand, trace clay. 1111 11111 11 |||||||11111 111 111 |||||||||||11111 | | ||||||VS >240 kPa | | | |11111 ||||11 | | | | |11111 Encountered | | | |11111 ||||Ъ 11111 | | | |||||09-03-2016 ODS | | | | | | | | @ | | |11111 ¥ ż 1.0 VS >240 kPa Not 111 1111 11111 11111 111 1111 11111 GCR HA ||||||||||11111 11111 NON CORED + DCP |||||||||VS >240 kPa | | | |11111 11111 11 ||||||11 | | | | |111 | | | |. 11111 111 COF BOREHOLE: 15 ||||VS >240 kPa | | | | |11111 111 11111 1 1 1 1 11111 11 ||||||11111 0 At 1.7m: becoming grey mottled brown. 11 | | | | |VS >240 kPa ||||11111 |||||At 1.8m: becoming orange brown. 20 11111 111 ž 11111 11 11111 1111 11 2.0 Hand Auger HA3C-156 terminated at 2.0 m Target depth ٤ VS >240 kPa liiii 111 Ę 11111 ||||||| | | |11111 111 method AD auger drilling* classification symbol & support samples & field tests consistency / relative density soil description N nil bulk disturbed sample very soft soft firm mud VS Μ В AS auger screwing' based on Unified C casing D disturbed sample S F HA W hand auger Classification System Е environmental sample penetration washbore SS split spoon sample St stiff hand auger HA undisturbed sample ##mm diameter very stiff no resistance ranging to refusal VSt U## moisture HP hand penetrometer (kPa) hard н dry moist wet D M W standard penetration test (SPT) Fb Ν friable wate N* SPT - sample recovered VL very loose bit shown by suffix 10-Oct-12 water saturated ⊻ SPT with solid cone Nc loose L e.g. B evel on date shown AD/T plastic limit liquid limit VS vane shear; peak/remouded (kPa) Wp MD medium dense blank bit vater inflow wi

R

HB

water outflow

TC bit

V bi

refusal

hammer bouncing

D

VD

dense

very dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-159
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

	Cation: Stage 3C & Stage 3D										пескеа ру		RBI
	bosition: Not Specified surface elevation: Not Specified drill model: Hand Auger drilling fluid:							surface elevation: Not Specified	angle from horizontal: 90° hole diameter : 50 mm				DCP id.:
	ling inf		-			mate	rial sub		ļ				
method & support	5	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	⊕ remoulded ⊚ peak 1 (kPa)	DCP (blows/ 00 mm)	structure and additional observations
				<u>~</u>	-		<u>3 0</u>	SILT: non plastic, brown, with trace fine grained sand.	D	VSt			TOPSOIL
					-			SILT : low plasticity, orange brown, with some clay and trace fine sand.	D to M		 		FILL VS >183 kPa
					0.5						 		VS >183 kPa -
					-								VS >183 kPa
					1.0			1.15 to 1.25 m: becomes dark brown					VS >183 kPa
					- - 1.5			SILT: low plasticity, orange brown with mottled dark brown, with minor fine to coarse sand and minor clay.					VS >183 kPa VS >183 kPa
					-								VS >183 kPa
<u>v</u>					-2.0	××××		Hand Auger HA3C-159 terminated at 2.0 m Target depth					VS >183 kPa
met AD AS HA W HA	auger hand washl hand	auger	ing*		mud casing etration	− no resi rangin refusa		samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPIF - sample recovered	s D Cla moistu D dr	soil desc ased on ssification re (bist	n symbol & ription		consistency / relative density /S very soft S soft firm St stiff /St very stiff H hard Fb friable /L very loose
* B T V	bit sh AD/T blank TC bit V bit		suffix		■ 10- leve wat	Oct-12 wa el on date er inflow er outflow	shown	N° SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S sa Wp pla	turated astic limit uid limit		L N	



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-162
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	NM
checked by:	RBT

position: Not Specified drill model: Hand Auger						surface elevation: Not Specified drilling fluid:		-	om horizontal: 9 meter : 50 mm	0° DCP id.:		
	ing info		-			material substance						
method & support	¹ ² penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	ç	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane DC shear ⊕remoulded ⊚peak 100 n (kPa) B 00 00 00 00 00 00 00 00 00 00 00 00 00	<pre>ws/ additional observations nm)</pre>
					-		ML	SILT: low plasticity, dark brown flecked white and orange, with minor fine grained sand, trace clay.	D	H	· · · · · · · · · · · · · · · · · · ·	FILL VS >240 kPa
		buntered			0.5		ML	SILT : non plastic to low plasticity, orange brown flecked white, with some fine to medium grained sand, trace clay.	_			VS >240 kPa VS >240 kPa
		Not Encountered			1.0 — - - -		ML-MH	SILT: low to medium plasticity, orange brown flecked white, with some fine to medium grained sand, some clay.				VS 233/ 54 kPa VS >240 kPa
					1.5 — - -		• ML	Sandy SILT: non plastic, grey mottled black, with fine to medium grained sand. At 1.7m becoming orange brown mottled white.		VSt to H		VS 196/33 kPa VS >240 kPa
					-2.0	<u> </u>		Hand Auger HA3C-162 terminated at 2.0 m Target depth			<u> </u> 	VS >240 kPa
meth AD AS HA W HA	auger s auger s hand a washb hand a bit sho	screwin uger ore uger	ng*	pene wate	nud casing etration	− no ran ◄ refu	N nil resistance ging to usal water ate shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	t Cla moistu D dr M ma W we S sa	soil desc pased on assificatio re y oist et uturated	n symbol & ription Unified n System	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose
e.g. B T V	AD/T blank t TC bit V bit	bit			- leve	el on di er inflo er outf	w	VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	astic limit uid limit		MD medium dense D dense VD very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3C-163
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	NM
checked by:	RBT

position: Not Specified		surface elevation: Not Specified	angle from horizontal: 90	DCP id.:
drill model: Hand Auger drilling information	material su	drilling fluid:	hole diameter : 50 mm	
samples t selection set the selection set the set	ation	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition condition consistency / consistency / consistency / consistency / consistency / consistency / condition condi condition condition conditi	s/ additional observations m)
HA Image: Second seco	0.5 - ML 0.5 - ML 0.5 - ML 0.5 - ML ML-MH - ML ML-MH - ML - ML	pale yellow brown, with trace fine sand. SAND: fine to medium grained, white, with minor silt. SILT: low plasticity, orange brown, with minor fine to medium grained sand, trace clay.	D H 	FILL VS >240 kPa VS 125/25 kPa VS 156/39 kPa
method AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger * bit shown by suffix	support M mud N nil C casing penetration ranging to ranging to refusal water 10-Oct-12 water	Hand Auger HA3C-163 terminated at 2.0 m Target depth samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	classification symbol & soil description based on Unified Classification System moisture D dry M moist S saturated	



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-164
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

	sition: Not Specified I model: Hand Auger								surface elevation: Not Specified		-	om horizon		90°	DCP id.:
_		infor		-			mate	rial sub	drilling fluid:	1	nole diar	meter : 50	mm		
method &		penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚ peak (kPa) ⊛ 00 00 00 00 00	DC (blov 100 r	ws/ mm)	structure and additional observations
Ā		3 5 7				0	Ň	0 0	SILT: non plastic, brown, with trace fine grained sand.	D	VSt	× ∓ 7 8	0 4 0	П	TOPSOIL
						-			Clayey SILT: low plasticity, orange brown.	M					YOUNGER ASH
						-									VS >183 kPa
						0.5									VS 151/ 31 kPa
НА — — — АН	z		Not Encountered						0.8 to 1.3 m: becomes orange and has trace fine-coarse sand						VS 126/ 22 kPa
			Not			-					St VSt	⊕' ● ' ' ⊕			VS 96/ 21 kPa VS 138/ 19 kPa
						- 1.5—			1.3 to 2.0 m: becomes orange brown and has trace fine sand		St	+ + + + + + + + + + + + + + + + + + +			VS 94/ 19 kPa
						-					VSt	+ + ⊕ ⊕ + + + +			VS 107/ 19 kPa
۲						-2.0			Hand Auger HA3C-164 terminated at 2.0 m Target depth						VS 121/ 14 kPa
AE AS H/ W H/	6 4 4	auger d auger s hand au washbo hand au	crewir Iger re Iger	ng*	M r C c pene	etration		nil istance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT	t Cla moistu D dr	soil desc based on assificatio re y oist				consistency / relative density /S very soft S soft = firm St stiff /St very stiff H hard -b friable // very doce
* B T V	g.	bit show AD/T blank bi TC bit V bit		suffix		■ 10-0 leve	Oct-12 wa el on date er inflow er outflov	shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S sa Wp pla	et iturated astic limit uid limit				/L very loose loose MD medium dense D dense /D very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3C-166
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

	on: No	t Spe			· J ·	-		surface elevation: Not Specified		angle fro	om horizor	ntal: 90°	DCP id.:
drill model: Hand Auger drilling fluid: drilling information material substance						drilling fluid:	ł	nole dia	meter : 50	mm			
support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear @remoulded @peak	DCP (blows/ 100 mm)	structure and additional observations
		BM		RI		Bri	clá sy	SILT : non plastic, brown, with trace fine grained sand.	Ĕ 8	VSt	(kPa) 80 1100 1100 1100 1100 1100 1100 1100	 	TOPSOIL
					- - 0.5-			SILT : non plastic to low plasticity, orange brown, with minor clay and trace fine sand.	D to M	-			VS >183 kPa FILL
					-								VS >183 kPa
z		Not Encountered			- 1.0 <i>-</i> -								
								1.2 m: clay becomes trace and sand becomes minor					VS >183 kPa
					1.5 —			1.5 to 1.6 m: becomes mottled light grey1.6 m: clay becomes minor and sand becomes trace					VS >183 kPa
					- 			Hand Auger HA3C-166 terminated at 2.0 m					
					_			Target depth					
meth AD AS HA W HA	auger auger hand a washb hand a	screwii auger ore		Min Co pen	etration		nil istance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	t Cla moistu D dr M mo	soil desc based on assificatio re y oist			consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable
 bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit 			shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	et Iturated astic limit uid limit			VL very loose L loose MD medium dense D dense VD very dense				



Borehole ID. HA3C-169 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: date started: 07 Mar 2016 principal: date completed: 09 Mar 2016 project: The Lakes Stage 3 GCR logged by: NM Stage 3C & Stage 3D RBT location. checked by:

ocai	ion:	Sla	ige 3C 8	2 31	age	3D				C	hecked b	by:	RBT
ositio	on: No	t Spec	cified					surface elevation: Not Specified	â	angle fro	om horizon	tal: 90°	DCP id.:
	odel: H		-			·		drilling fluid:	ł	nole dia	meter : 50	mm	
drilli	ng info	ormati	on			mat	erial sub	stance			· · · ·		1
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊛peak (kPa) 00 00 000	DCP (blows/ 100 mm)	structure and additional observations
	0 0 -	-			-		ML	SILT : low plasticity, brown mottled orange, with minor fine to medium grained sand, minor clay.	D	Н		 	FILL
					-			At 0.2m: becoming streaked black.			 		VS >240 kPa
					-	-	ML	Sandy SILT: low plasticity, orange brown, with minor fine to medium grained sand, minor clay.					
					0.5-			At 0.6m: becoming trace pockets of low			 	, , , , , , , , , , , , , , , , , , ,	VS >240 kPa
					-			plasticity, white, sandy silt.				 	VS 240 kPa
		Not Encountered			-		ML-MH	CLAYEY SAND: low plasticity, pale orange grey, with fine to coarse grained sand, trace clay.	м	VSt			
- HA		Not Enc			1.0		ML	SILT : low plasticity, pale orange grey, with some fine to coarse grained sand, trace clay.		Н	+ • + • - • - − - −		VS 196/ 20 kPa
					-						 	11111	VS 233/ 25 kPa
					- 1.5—							 	VS 240 kPa
					-		ML-MH	Clayey SILT: low plasticity, orange grey, with fine to coarse grained sand, trace clay.	M to W				VS 240 kPa
.					2.0-			Hand Auger HA3C-169 terminated at 2.0 m Target depth				<u> </u> 	VS 240 kPa
								- <u> </u>				 	
meth AD AS HA W HA * e.g. B T	od auger : hand a washb hand a bit sho AD/T blank t TC bit	screwir luger ore luger wn by s	ng*	pen wat	etration	no re rangi refus Oct-12 v	vater e shown v	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	s Cla moistu D dr M ma W we S sa Wp pla	soil desc ased on ssification re y bist	Unified on System		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



mud

penetration

C casing

wate

T

Μ

AS

НА

W

HA

e.g. B

auger screwing'

bit shown by suffix

hand auger

washbore

hand auger

AD/T

blank bit

TC bit

V bi

N nil

no resistance ranging to
 refusal

10-Oct-12 water

vater inflow

water outflow

evel on date shown

В

D

Е

SS

U##

HP

Ν

N*

Nc

VS

R

HB

Borehole ID. HA3C-172 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd client: 07 Mar 2016 date started: 09 Mar 2016 principal: date completed: The Lakes Stage 3 GCR logged by: NM project: Stage 3C & Stage 3D RBT location. checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density class ification ğ (blows/ 100 mm) samples & shear ⊕ remould ⊚ peak additional obs ations Ē method & support moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components penetra field tests graphic I symbol Ē depth (water (kPa) 8 8 8 R TOPSOIL: SILT: low plasticity, brown mottled orange, with minor fine to medium grained sand, trace organics. ML D Н TOPSOIL I 111 111 ||||||1 + 111 11 VS >240 kPa Sandy SILT: low plasticity, pale grey, with fine ML YOUNGER ASH ł ||¥111 to coarse grained sand 11 111 111 111 0.5 VS >240 kPa 111 1 1 1 1 11 | | | |111 381 I I I 11 ||||SP SAND: fine to medium grained, pale grey, L with minor silt 1111 11 Encountered ||||Ъ CLAYEY SAND: low to medium plasticity, ML-MH VSt to ++++11111 ||||09-03-2016 ODS orange brown $\left| \cdot \right|$ 1 11111 ¦ø ¢ ¥ ż 1.0 11111 VS 196/ 54 kPa Not 111 11111 |||||||11111 111 |||||||11111 GCR HA 111 11111 ||111 ||||||11111 NON CORED + DCP ||||VS >240 kPa 11111 ||||||SILT: low plasticity, orange brown, with minor fine to medium grained sand, trace clay. М М 11 ||||||11111 11 ||||||11111 11111 111 ||||| . | **|** | **|** 111 COF BOREHOLE: 1.5 θ 11111 VS 196/ 25 kPa 11111 111 11111 At 1.6m: becoming some fine grained sand. 11111 11 ||||||11111 0 . . . 11111 11 |||||VS >240 kPa ||||| | | |11111 Clayey SILT: low to medium plasticity, ML-MH VSt | | | |11111 11 orange brown, with trace fine sand. ž 11111 11 ||||||11111 1111 2.0 Hand Auger HA3C-172 terminated at 2.0 m VS 196/ 40 kPa Target depth 11111 111 Ę 11111 ||||||11111 11 11 classification symbol & Method AD auger drilling* support consistency / relative density samples & field tests

bulk disturbed sample

disturbed sample environmental sample

hand penetrometer (kPa)

SPT - sample recovered

SPT with solid cone

hammer bouncing

refusal

undisturbed sample ##mm diameter

standard penetration test (SPT)

vane shear; peak/remouded (kPa)

split spoon sample

soil description

based on Unified

Classification System

moisture

Wp

wi

dry moist wet D M W

saturated

plastic limit liquid limit

VS

S F

St

н

Fb

VL

MD

VD

D

1

VSt

very soft

very stiff

very loose

very dense

medium dense

soft firm

stiff

hard

friable

loose

dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-173
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

Not Specified surface elevation: Not Specified							angle from horizontal: 90°						5.05.	
									•				90°	DCP id.:
		-			mate	rial cub		n		nete	0 . D			
	au		1		mate				ž					
	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative densit	sh ⊕rer ⊚	near moulded peak	(blo 100	ows/ mm) ∞∞♀	structure and additional observations
				-			SILT: low plasticity, brown mottled orange, with minor fine to medium grained sand, trace organics.	D	VSt					TOPSOIL
				-			Sandy SILT: non plastic to low plasticity, orange brown, with trace clay. Sand is fine to coarse. 0.3 m: trace fine gravel become present	D to M						YOUNGER ASH VS >183 kPa
				0.5 —			0.7 to 0.9 m; becoming dark brown							VS >183 kPa
	ered			-			SILT: non plastic to low plasticity, orange brown, with minor fine sand and trace clay.	М						VS >183 kPa
	Not Encounte			1.0-						€ 	•			VS 151/ 33 kPa
				-			Clayey SILT : low plasticity, orange brown, with trace of fine sand.			 ⊕ 	•			VS 154/ 36 kPa
				1.5—							•			VS 151/43 kPa
				-			Silty CLAY: low plasticity, orange brown.				9 		 	VS 112/ 31 kPa
				-2.0			Hand Auger HA3C-173 terminated at 2.0 m Target depth						<u> </u> 	VS >183 kPa
ger dril ger scr nd aug shbore nd aug shown /T	rewin ler e ler	-	M n C c pene	nud asing tration	 no res rangin refusa Oct-12 watel 	istance g to il	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear, neak/remouded (kPa)	s bi Clas moistur D dry M mo W we S sat	roil desc ased on ssificatio re / bist t turated	n sym riptic Unifie n Sys	nbol & on ed	Lii		consistency / relative density /S very soft S soft = firm St stiff /St very stiff H hard "D friable /L very loose - loose MD medium dense
	or or 0 0	formation formation	∞ ≥ I I	Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: stamples & field tests Image: st	Image: semples & field tests (i) (ii) (iii) (iiii) (iii) (iii) <t< td=""><td>Image: stand of the stand</td><td>formation material sub image: samples & field tests (image: black b</td><td>Mormation material substance samples & indicitests (i) (i)</td><td>Normation material substance interview interview intervi</td><td>Information material substance indicates i</td><td>Internation material substance asymptes & field tests g g g Soll_TYPE_lability opartice characteristic. colur, secondary and minor components g <t< td=""><td>information material substance asymptex 8, we take tests</td><td>Intervision material substance a surplus all the trade trade to the billing of the billing</td><td>Internation material substance and bases E</td></t<></td></t<>	Image: stand of the stand	formation material sub image: samples & field tests (image: black b	Mormation material substance samples & indicitests (i) (i)	Normation material substance interview interview intervi	Information material substance indicates i	Internation material substance asymptes & field tests g g g Soll_TYPE_lability opartice characteristic. colur, secondary and minor components g <t< td=""><td>information material substance asymptex 8, we take tests</td><td>Intervision material substance a surplus all the trade trade to the billing of the billing</td><td>Internation material substance and bases E</td></t<>	information material substance asymptex 8, we take tests	Intervision material substance a surplus all the trade trade to the billing of the billing	Internation material substance and bases E



=n	ai	ne	erin	u I	0	а – К	Ha	nd Auger		s	heet:		1 of 1	
							1 Ia				roject no		GENZTAUC13086AP	
lient			e Lakes	201	2 10	1				ate start		07 Mar 2016		
	rincipal: -						_				ate com		09 Mar 2016	
rojeo	et:		e Lakes		-		R			lc	ogged by	r <u>:</u>	NM	
cation: Stage 3C & Stage 3				age :	3D					hecked I	,	RBT		
								surface elevation: Not Specified drilling fluid:		0	m horizor meter : 50		DCP id.:	
		Hand Auger					erial sub	-						
	tion		samples &			БĊ	ition	material description		⊳y / insity	vane	DCP (blows/	structure and additional observations	
support	2 penetration	water	field tests	RL (m)	depth (m)	graphic log	class ification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕ remoulded ⊚ peak (kPa) 00 00 00 00 00 00 00	100 mm)		
					-		ML	TOPSOIL: SILT: non plastic, dark brown mottled orange, with some fine to medium grained sand, minor organics.	D	H				
					0.5-		ML	Sandy SILT: non plastic to low plasticity, pale orange flecked white, with fine to coarse grained sand.					YOUNGER ASH 	
- z		Not Encountered			- - 1.0		SP	SAND: fine to coarse grained, pale orange brown, with some silt.	_				- VS >240 kPa - VS >240 kPa -	
					- - 1.5		ML	SILT : low plasticity, orange brown, with some fine to coarse grained sand.		VSt to H	⊕ □		-	
					-			At 1.8m: becoming trace pockets of orange brown sandy SILT, non plastic.			 		- VS >240 kPa	
					- 2.0			Hand Auger HA3C-174 terminated at 2.0 m Target depth					VS 196/ 54 kPa -	
S A A	auger (auger : hand a washb hand a	ger drilling* der screwing* dauger shobore dauger water scheme huguffix			etration			samples & field tests B bulk disturbed sample D disturbed sample E environmental sample S split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	b Cla moistur D dr M mo W we	soil desc pased on ussificatio re y pist et	on symbol & scription on Unified		oonsistency / relative density /S very soft S soft firm St stiff /St very stiff H hard /b friable /L very loose	
bit shown by suffix .g. AD/T 3 blank bit TC bit				e shown	Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	turated astic limit uid limit		D	ID medium dense				



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3C-175
sheet:	1 of 1
project no.	GENZTAUC13086AP-A(
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

location: S	stage 3C	s Slaye	30			Che	ecked by:	RBT
position: Not S	pecified				surface elevation: Not Specified	angle from	n horizontal: 90°	DCP id.:
drill model: Han	d Auger				drilling fluid:	hole diame	eter : 50 mm	
drilling inform	nation		mate	rial sub	stance			
support support 2 penetration 3	samples & field tests	RL (m) depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components		vane shear © peak (kPa) $g_{0} \ g_{0}	structure and additional observations
					SILT : non plastic, brown, with trace fine grained sand.	D VSt		TOPSOIL VS 110/21 kPa
		0.5-			SAND: fine to coarse grained, pale brown, with minor silt and trace fine-coarse sub-rounded to sub-angular gravel. 0.5 m: trace gravel become fine 0.65 m: becoming mottled dark brown	D to M MD		FILL
Z	Not Encountered	1.0-			0.9 to 1.1 m: silt becomes some			
		1.5-	-		1.45 m: trace clay SILT : low plasticity, brown, with some clay and trace fine-coarse sand.	Ð		YOUNGER ASH VS 65/ 24 kPa
		2.0-			Hand Auger HA3C-175 terminated at 2.0 m Target depth			VS 101/ 39 kPa
hethod AD auger drill AS auger scre HA hand auge W washbore HA hand auge	ewing* er er		n no resi rangin refusa	iter	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	classification s soil descrip based on Ur Classification s moisture D dry M moist W wet S saturated	ymbol & constraints of the second sec	firm St stiff /St very stiff h hard /b friable /L very loose
e.g. AD/T B blank bit T TC bit V V bit			vel on date ater inflow ater outflow		Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp plastic limit WI liquid limit	N	AD medium dense D dense /D very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location.

Borehole ID.	HA3C-176
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

location:	Sta	ge 3C 8	s St	age :	3D				С	hecked b	oy:	RBT
position: No	ot Spec	ified					surface elevation: Not Specified	a	ingle fro	om horizon	tal: 90°	DCP id.:
drill model:	Hand A	uger					drilling fluid:	h	ole dia	meter : 50	mm	
drilling inf	ormatio	on			mate	rial sub	stance					
method & support	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) S	DCP (blows/ 100 mm)	structure and additional observations
				-			SILT: non plastic, dark brown, with trace fine to coarse sand.	D	VSt	• • • • • • • • • • • • • • • • • • •		
				0.5			SLT: non plastic to low plasticity, orange brown with mottled dark brown, with some clay and trace fine sand. 0.6 to 1.1 m: becoming mottled pale brown	D to M				FILL VS >183 kPa VS >183 kPa
	Not Encountered			- 1.0—					St			VS 128/ 43 kPa
				-			SILT: non plastic, dark brown, with trace fine sand and trace clay. SILT: non plastic, brown, with minor fine to medium sand and trace clay.	M		· · · · · · · · · · · · · · · · · · ·		BURIED TOPSOIL VS 92/ 41 kPa FILL
							SILT : low plasticity, orange brown, with minor clay and minor fine to medium sand.	_				YOUNGER ASH VS 84/ 37 kPa
				-2.0			Hand Auger HA3C-176 terminated at 2.0 m Target depth					VS 43/ 22 kPa
AS auger HA hand W washi HA hand	drilling* • screwin auger bore auger auger	g*	pen wat	etration	 no res rangin refusa Oct-12 wa 	ater	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	b Cla moistur D dry M mo W we	re bist		F 	Consistency / relative density //S very soft S soft = firm St stiff //St very stiff H hard Fb friable /L very loose
e.g. AD/T B blank T TC bit V V bit				- leve	el on date er inflow er outflow		Nc SPT with solid cone VS vane shear, peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	astic limit uid limit		n C	- loose MD medium dense D dense VD very dense



TETRA TECH	H COMPA	ANY							E	Borehole ID.		HA3C-177	-
Ena	ino	orin	u I	~	- r	Ha	nd Auger		s	heet:		1 of 1	
				-	-	<u> </u>			р	roject no.		GENZTAUC13086	<u>AP-A</u>
lient:	The	e Lakes	201	2 Itc	1				d	late started:		07 Mar 2016	
orincipal:	-								d	late complete	d:	09 Mar 2016	
roject:	The	e Lakes	Sta	ge 3	GC	R			lo	ogged by:		NM	
ocation:	Sta	ge 3C &	& Sta	age	3D				С	hecked by:		RBT	
osition: N	Not Speci	ified					surface elevation: Not Specified	e	angle fro	om horizontal: 9	0°	DCP id.:	٦
rill model:		-					drilling fluid:	h	nole dia	meter : 50 mm			_
drilling inf)n	<u>гт</u>		mat	terial sub			Þ		í.	-to-store and	-
mernod & support 2 penetration		samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane DC shear (blov ⊕remoulded ©peak 100 r (kPa) 05 00 00 00 00 100 r	ws/ nm)	structure and additional observations	
A 				-		ML	TOPSOIL: SILT : non plastic, dark brown flecked orange, with minor fine grained sand, trace organics.	D	VSt			TOPSOIL VS 149/ 40 kPa	-
				+		ML	SILT : low plasticity, orange brown, with some fine to coarse grained sand, trace clay.		н	- 	Ш	MATUA SUBGROUP	
				0.5		ML	Sandy SILT: non plastic, pale grey mottled orange, with fine to coarse grained sand.					UTP	
	ountered			_								VS >240 kPa	-
z 				1.0-		SP	SAND: fine to coarse grained, pale grey, with minor silt.			_ 		N/A	-
				-		ML	Sandy SILT: non plastic, pale grey mottled orange, with fine to coarse grained sand.	М	Н	-		VS >240 kPa	
				- 1.5— -			At 1.4m: becoming low plasticity, orange brown with minor clay.	D				VS >240 kPa	-
				 - 				M	VSt			VS 196/ 40 kPa	-
				-2.0		· ·	Hand Auger HA3C-177 terminated at 2.0 m Target depth					VS 116/ 25 kPa	
AS auge HA hand W wash	er drilling* er screwing d auger hbore d auger		pene		I ¶− nore	N nil	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa)	s b	soil desc based on bassification re	•	C V S F S	firm St stiff /St very stiff	

environmental sample split spoon sample undisturbed sample ##mm diameter hand penetrometer (kPa) standard penetration test (SPT) SPT - sample recovered SPT with solid cone vane shear; peak/remouded (kPa) refueal

water

⊻

no resistance ranging to
 refusal

10-Oct-12 water level on date shown

water inflow

water outflow

HP N N* Nc VS

R HB

refusal

hammer bouncing

AD/T blank bit

TC bit V bit

bit shown by suffix

*

e.g. B T

moisture D dry M moist W wet S saturated Wp plastic limit WI liquid limit

stiff very stiff hard

friable

loose

dense

very loose

very dense

medium dense

H Fb VL

L MD

D VD



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-178
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

posi		: Not		cified		J			surface elevation: Not Specified	a		om horizor	•	DCP id.:
drill r	no	del: Ha	and A	luger					drilling fluid:	h	iole dia	meter : 50	mm	
dril	ling	g info	mati	on			mate	erial sub	stance			1		
method & support	:	² penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) B 0 0 00	DCP (blows/ 100 mm)	structure and additional observations
	•					-			SILT: non plastic, dark brown, with trace fine to coarse sand.	D	VSt			TOPSOIL
						-			SILT: non plastic to low plasticity, pale brown with black specks and mottled dark brown, with some fine to coarse sand and trace clay.	D to M		© 		MATUA SUBGROUP VS >183 kPa
						0.5			0.5 m: trace manganese	M		$\begin{array}{c c c c c c c c c c c c c c c c c c c $		VS 114/ 15 kPa
	-		Not Encountered			- - 1.0			SILT: low plasticity, pale brown with black specks and mottled dark brown, with minor clay and trace fine to coarse sand. Is "sticky".	_		 ⊕ • 		VS 115/ 27 kPa
						-						€ ● 		VS 107/ 31 kPa
						-			SILT: low plasticity, pale brown with black specks and mottled dark brown, with some clay and trace fine to coarse sand. Is "sticky". 1.25 to 2.0 m: becoming pinky brown			$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		VS 130/ 68 kPa
						1.5 — - - -								VS 133/ 55 kPa
<u> </u>						-2.0			Hand Auger HA3C-178 terminated at 2.0 m Target depth					VS 101/ 38 kPa
met AD AS HA W HA	a a h v	l auger d and au vashbo and au	crewir ıger re		M r C c pen	etration		I nil sistance ng to al	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	s b Cla moistur D dry M mo	soil desc ased on ssification re / bist			firm St stiff /St very stiff I hard 5b friable
* B T V	А b Т	oit show AD/T olank bi ⁻C bit / bit		suffix	wate	■ 10-0 leve wate	Oct-12 w I on date er inflow er outflow	e shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	et turated astic limit uid limit		L	ID medium dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-179
sheet:	1 of 1
project no.	GENZTAUC13086AP-A(
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	NM
checked by:	RBT
le from berizontel: 00°	

			<u>ye oo c</u>		<u> </u>								
	on: Not	·						surface elevation: Not Specified		-	om horizontal: 9	U	DCP id.:
	nodel: Ha		-		i	moto	rial sub	drilling fluid:		iole dia	meter : 50 mm		
urm	ing info	mau	011			mate				~		_	
method & support	1 2 penetration 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane DC shear (blow ⊕ remoulded ⊚ peak 100 m (kPa) ⊛ 9 9 8 0 × 4 ∞	vs/ nm)	structure and additional observations
					-		ML	TOPSOIL: SILT : non plastic, dark brown mottled orange, with some fine to medium grained sand.	D	VSt			TOPSOIL - - - VS 196/ 40 kPa
					- 0.5-		ML	SILT: low plasticity, orange brown, with some fine to coarse grained sand, trace clay.		H	-		MATUA SUBGROUP
					-					VSt		 	VS 186/ 40 kPa
- HA		Not Encountered			- - 1.0-		ML	Sandy SILT: non plastic, pale orange mottled white, with fine to coarse grained sand, minor pockets of pure fine to coarse grained sand.	D to M				VS 129/ 40 kPa -
		Z			-			At 1.2m: sand pockets become absent.	M			 	VS 120/ 25 kPa
					1.5								VS 103/ 33 kPa
.					- - 2.0			Hand Auger HA3C-179 terminated at 2.0 m Target depth				 	VS 106/ 10 kPa
metr AD AS HA W HA	nod auger d auger s hand au washbo hand au	crewir ıger re		pene	nud asing etration		nil istance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	b Cla moistu D dru M mo	soil desc ased on ssification re	n symbol &		soft firm stiff t very stiff hard
* B T V	bit show AD/T blank bi TC bit V bit		Suffix	wate	leve	oct-12 wa on date r inflow r outflov	shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla		t	VL L MC D VD	. very loose loose D medium dense dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-180
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT
a fram harizantalı 00°	DCD id :

pos	position: Not Specified								surface elevation: Not Specified	á	angle fro	om horizon	tal: 90°	DCP id.:
<u> </u>				Auger					drilling fluid:	ł	nole dia	meter : 50	mm	
dr	illin	-	forma	tion			m	aterial sub			~			
method &	support	penetration	s water	samples field tests		depth (m)	araphic loa	classification	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 03 00 05 00	DCP (blows/ 100 mm)	structure and additional observations
	A						- (SILT : non plastic, dark brown, with minor fine to medium grained sand.	D	VSt			TOPSOIL
									Clayey SILT: low plasticity, orange brown with mottled pink and mottled dark brown, with trace fine sand.	М		● ● ● ●		MATUA SUBGROUP VS 140/ 27 kPa
									SILTY SAND : fine to coarse grained, brown, with trace clay.	_				
						0.5-			Clayey SILT: low plasticity, orange, with trace fine sand.					– VS 120/ 25 kPa
									0.7 to 0.8 m: becoming orange brown and is "sticky"					
- HA			untered						Silty CLAY: low plasticity, orange brown, with trace fine sand. Is "sticky".		St	⊕ © 		VS 81/ 19 kPa
AH	2		Not Encountered			1.0-			1.2 m: silt becomes some and sand is absent					- VS 68/ 16 kPa
						1.5 -			1.4 m: silt becomes minor. Is "sticky"					VS 77/ 32 kPa
											VSt	 ⊕		VS 123/ 28 kPa
I			i I			2.0-		~~	Hand Auger HA3C-180 terminated at 2.0 m Target depth					VS 160/ 43 kPa
MA AS H/ W H/	A A	auge auge hand wash hand	r drillin r screw auger bore auger own by	īng*	M C pe	pport mud casing netratio	no ra ra	N nil presistance nging to fusal	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (KPa) N standard penetration test (SPT) N* SPT - sample recovered	t Cla moistu D dr M m W wa	soil desc ased on ssificatio re y bist et			consistency / relative density consistency / relative density VS very soft F firm St stiff VSt very stiff H hard Fb friable VL very loose
e.g B T V	3.	AD/T blank TC bi V bit	bit	r Sullix		lev wa)-Oct-1 vel on (ater infl ater out		Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	turated astic limit uid limit			L loose MD medium dense D dense VD very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

	Borehole ID.	HA3C-181
	sheet:	1 of 1
	project no.	GENZTAUC13086AP-A(
	date started:	07 Mar 2016
	date completed:	09 Mar 2016
	logged by:	NM
	checked by:	RBT
-		

	.uge 50 (000	DODIN
position: Not Sp drill model: Hand					surface elevation: Not Specified drilling fluid:		-	om horizontal: meter : 50 mm		DCP id.:
drilling informa	-		mat	erial sub	-					
method & support 2 penetration 3 water	samples & field tests	RL (m) depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕ remoulded ⊚ peak (bl 100 (kPa)	CP ows/ mm) ∞∞₽	structure and additional observations
				ML	SILT: non plastic, dark brown flecked orange, with minor fine to coarse grained sand.	D	H			TOPSOIL VS >240 kPa
		0.5		ML	SILT: low plasticity, orange, with minor fine grained sand, trace clay, trace green sand.		VSt	⊕		MATUA SUBGROUP VS 111/ 18 kPa
ountered					At 0.7m: becoming pale pink mottled orange with minor clay, minor organics, trace fine grained sand. At 0.9m: becoming minor pockets of orange low plasticity silt.	M	St to F	_		VS 142/ 25 kPa
HA-HA-HA-HA-HA-HA-HA-HA-HA-HA-HA-HA-HA-H		1.0	-		At 1.2m: becoming pink brown with some clay. Pockets of orange silt become absent.			$\begin{array}{c} \oplus_{ \bullet } \oplus_{ \bullet } & & & & \\ & & & & \\ & & & & \\ & & & & $		VS 78/ 18 kPa VS 94/ 25 kPa
		1.5	-							VS 40/ 14 kPa
				. ML 	Sandy SILT: non plastic, orange brown mottled white and dark brown, with fine to coarse grained sand, trace fine grained angular gravel.		VSt		<u>iii</u>	VS 103/ 40 kPa
		2.0	<u></u>	<u>.</u>	Hand Auger HA3C-181 terminated at 2.0 m Target depth					VS 111/ 33 kPa
method AD auger drillin AS auger screw HA hand auger W washbore HA hand auger	wing*	support M mud C casing penetrati	on	N nil esistance ing to sal	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	b Cla moistur D dru M mo	soil desc based on ussificatio re y bist	n symbol & ription	C S F S V F	F firm St stiff /St very stiff H hard Fb friable
 bit shown b e.g. AD/T B blank bit T TC bit V V bit 	y suffix		0-Oct-12 v evel on dat vater inflow vater outflo	te shown v	N* SPT - sample recovered Nc SPT with solid cone VS vane shear, peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	et Iturated astic limit uid limit			/L very loose loose MD medium dense dense /D very dense



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111

11

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COF BOREHOLE:

AN Log (

Borehole ID. HA3C-182 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 07 Mar 2016 date started: 09 Mar 2016 principal: date completed: The Lakes Stage 3 GCR ODS project: logged by: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance classification symbol consistency / relative density DCP structure and material description vane samples & field tests graphic log shear ⊕ remould ● peak (blows/ 100 mm) additional obs rvations method & support Ê penetrat moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components Ê depth (water (kPa) RL SILT: non plastic, dark brown, with minor fine D VSt TOPSOIL 11111 to medium grained sand. | | | | |||||||11111 11 1 ||||||||||| | | |11111 11111 11 11111 11 | | | | |11 | | | | |11111 | | |@ ||||VS >183 kPa 11111 ||||||||Silty CLAY: low plasticity, orange brown, with trace fine sand. MATUA SUBGROUP D to M ||| | | |11111 Not Encountered $\phi | \phi |$ 0.5 iiiii 111 VS 133/ 49 kPa 11111 11/04/2016 1 ₽ ż 111 | | | | |11111 11111 | | | | |11111 ||||0.7 to 1.1 m: becomes low to medium plasticity | | | |11111 | | | | |11111 11 | | | |11111 11 ||||11111 11111 ||||⊕ ⊚ ∣ GPJ. VS 125/ 33 kPa 11111 2016 ODS 1111111 1.0 liiii |||||||111 । । । व | । । । । । VS >183 kPa 111 ||||||11111 **₫** GCRF 11 11111 Hand Auger HA3C-182 terminated at 1.2 m Target depth ||||11111 NON CORED + DCP | | || | | |11111 | | | |11111 |||| | | |11111

CDF_0_9_06_LIBRARY.GLB rev.4		2.0-			
metil AD AS HA W HA	auger drilling* auger screwing* hand auger washbore	support M mud N nil C casing penetration	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample	classification symbol & soil description based on Unified Classification System	consistency / relative density VS very soft S soft F firm St stiff
* e.g. B T V	hand auger bit shown by suffix AD/T blank bit TC bit V bit	water 10-Oct-12 water level on date shown water inflow water outflow	U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	moisture D dry M moist W wet S saturated Wp plastic limit WI liquid limit	VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense

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HA3C-183 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd client: 07 Mar 2016 date started:

Borehole ID.

lient.	••	-							ŭ	ale start	ou.	07 War 2010			
rincipal:	-								d	ate com	pleted:	09 Mar 2016			
roject:	The Lakes Stage 3 GCR							logged by:				ODS			
ocation:	S	tage 3C	& Sta	age	3D				с	hecked b	by:	RBT			
osition: N	ot Sp	pecified					surface elevation: Not Specified	â	angle fro	om horizor	ital: 90°	DCP id.:			
rill model:	Hand	d Auger					drilling fluid:	ł	nole dia	meter : 50	mm				
drilling inf	orm	ation			mate	erial sub	ostance								
method & support 1 2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	DCP (blows/ 100 mm)	structure and additional observations			
	Not Encountered			- - - - - - - - -			SILT: non plastic, dark brown, with minor fine to medium grained sand. SAND: fine to coarse grained, pale brown, with some silt and trace fine gravel. SILT: non plastic to low plasticity, orange brown, with minor clay and trace fine to coarse sand.	M				TOPSOIL VS >183 kPa FILL YOUNGER ASH VS >183 kPa VS >183 kPa			
				1.0			Hand Auger HA3C-183 terminated at 1.2 m Target depth					VS >183 kPa			
				 2.0 -											
HA hand W wash HA hand	own bit	ewing* er	pene vate	nud asing etration	ı	ater e shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	s Cla moistu D dr M ma W we S sa Wp pla	soil desc based on ussificatio re y bist	Unified n System		consistency / relative density /S very soft S soft = firm St stiff /St very stiff H hard = friable /L very loose loose MD medium dense O dense /D very dense			



Borehole ID. HA3C-186 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 07 Mar 2016 date started: 09 Mar 2016 principal: date completed: The Lakes Stage 3 GCR NM project: logged by: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm material substance drilling information consistency / relative density DCP material description vane structure and classification go samples & field tests shear ⊕ remould ● peak (blows/ 100 mm) additional obs vations method & support Ê penetra moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ê depth (water (kPa) R SILT: low plasticity, dark brown mottled orange brown, with minor fine to medium grained sand, trace clay. ML D VSt FILL 11111 ||||||11111 11111 11 | | | | |1 + 111111 11 |||||||;;;**@;;;;**; 11 VS >240 kPa 11 ||11111 At 0.3m: becoming flecked white and black. 1111 |||||| | | | ||||||11111 ||TIT ||Not Encountered 0.5 111 ML SILT: low plasticity, orange brown, with minor Μ Н VS >240 kPa fine to medium grained sand, trace clay. 11/04/2016 ₽ ż 111 1111 11111 111 |||||||11111 At 0.7m: becoming some pockets of white and pink low plasticity silt. ||||11111 ||||||11 VS >240 kPa 11111 At 0.8m: white and pink silt pockets become 11 | | | | |11111 absent. 1111 ||||| | | |Ъ 11111 | | | | |ods 11111 1.0 VS >240 kPa 111 11111 | | | | |11111 At 1.1m: becoming trace specks of white. 111 | | | | |11111 **₫** 11111 GCR 1.1 Hand Auger HA3C-186 terminated at 1.2 m Target depth VS >240 kPa ||||||NON CORED + DCP | | || | | |11111 | | | |11111 | | |11111 ||||||111 | | | | |11111 11111 ||||| | | |11111 ||||||06_LIBRARY.GLB rev:AN Log COF BOREHOLE: 1.5 11111 111 11111 111 11111 111 |||||||||||||||||||| | | | |11111 |||||||||11111 ||||||11 11111

	2.0-			
method AD auger drilling* AS auger screwing* HA hand auger W washbore	support M mud N nil C casing penetration	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample	classification symbol & soil description based on Unified Classification System	consistency / relative density VS very soft S soft F firm St stiff
HA hand auger * bit shown by suffix e.g. AD/T	water 10-Oct-12 water level on date shown	Solution Split split is sp	moisture D dry M moist W wet S saturated Wp plastic limit	VSt very stiff H hard Fb friable VL very loose L loose MD medium dense
B blank bit T TC bit V V bit	water inflow water outflow	R refusal HB hammer bouncing	Wi liquid limit	D dense VD very dense



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Borehole ID. HA3C-188 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 07 Mar 2016 date started: principal: 09 Mar 2016 date completed: The Lakes Stage 3 GCR NM project: logged by: Stage 3C & Stage 3D location: RBT checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density classification g samples & field tests shear ⊕ remould ● peak (blows/ 100 mm) additional obs /ations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ē depth (water (kPa) R ML SILT: low plasticity, dark black brown mottled D Н FILL orange, red and white, with trace fine grained sand, trace clay. 11111 | | | | |||||||11111 11111 11 ||||||1 + 1| | | || | | | |11111 11 ```**`** |||VS >240 kPa 11 11111 TIT 1111 |||||| | | | |11111 11 1 | | | |Not Encountered 0.5 VS >240 kPa 111 11/04/2016 ₽ ż 111 |||||||11111 111 111 |||||||||||11111 |||||||||||11 VS >240 kPa | | | |11111 11 | | | | |11111 11111 ||||| | | |ã 11111 |||||SUC 111 11111 1.0 Sandy SILT: non plastic, pale grey, with fine VS >240 kPa ML 111 to coarse grained sand. | | | | |11111 11111 111 | | | | |11111 ∎ 11111 aCc 1.1 Hand Auger HA3C-188 terminated at 1.2 m Target depth VS >240 kPa ||||||+ DCP | | || | | |11111 | | | |11111 NON CORED 11111 111 ||||||111 | | | | |11111 11111 111 | | | |11111 ||||||COF BOREHOLE: 15 ||||11111 11111

LIBRARY.GLB rev:AN Log 11111 11 1 + 111111 11111 ||||||||||90 2.0 11111 | | | | |liiii 111 |||||||Ę 11111 ||||||11111 111 consistency / relative density VS Verv soft method AD auger drilling* classification symbol & support samples & field tests soil description N nil bulk disturbed sample mud Μ В AS auger screwing' disturbed sample environmental sample based on Unified soft firm C casing D S F HA W hand auger Classification System Е penetration split spoon sample undisturbed sample ##mm diameter washbore SS St stiff hand auger HA very stiff VSt no resistance ranging to
 refusal U## moisture HP hand penetrometer (kPa) hard н dry moist wet saturated D M W standard penetration test (SPT) Fb Ν friable wate N* SPT - sample recovered VĹ very loose bit shown by suffix 10-Oct-12 water **T** SPT with solid cone Nc loose L e.g. B evel on date shown AD/T plastic limit liquid limit VS vane shear; peak/remouded (kPa) Wp MD medium dense blank bit vater inflow wi R refusal D dense TC bit water outflow HB hammer bouncing VD very dense V bi

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client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-190
sheet:	1 of 1
project no.	GENZTAUC13086AP-A
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

	ation:	- 01	age 3C		aye	50				C	hecked by:		RBI
posi	ition: N	Not Spe	cified					surface elevation: Not Specified	a	angle fro	om horizontal	: 90°	DCP id.:
drill	model	: Hand	Auger			· · · · ·		drilling fluid:	ł	nole dia	meter : 50 mi	n	
dri	lling in	nformat	ion			mate	rial sub	stance					
method &	2 penetration		samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear (⊕remoulded ⊚peak 10 (kPa)	DCP blows/)0 mm) ₁ ∞ ∞ ₽	structure and additional observations
					-			TOPSOIL: SILT : non plastic, dark brown, with minor fine to medium grained sand.	D	VSt			TOPSOIL
					-			Clayey SILT: low plasticity, orange brown- orange, with trace fine sand.	M	MD			FILL VS >183 kPa
H H	2 	Not Encountered			0.5			SAND : fine to coarse grained, pale brown, with trace fine gravel and trace silt.		VSt			VS >183 kPa _
					-			SILT: non plastic, orange brown, with minor fine sand and trace clay. 0.9 to 1.2 m: becoming mottled orange and dark brown					YOUNGER ASH VS >183 kPa
					1.0			1.0 to 1.2 m: clay becomes minor Hand Auger HA3C-190 terminated at 1.2 m					VS >183 kPa
					- - 1.5—			Target depth					
					-								
					2.0-								
Me AD AS HA W HA * e.g. B	auge hand wash hand bit s	er drilling er screw d auger hbore d auger hown by T	ing*	pene wate	mud casing tration	ı	ater	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear, peak/remouded (kPa)	b Cla moistur D dr M mo W we S sa	soil desc pased on pasificatio pre y poist	I I I I I I I I I I I I I I I I I I I	F S F V F V L	F firm St stiff /St very stiff H hard Fb friable /L very loose



TETRA TECH COMPANY								Borehole ID. sheet:					HA3C-191		
													1 of 1		
	-			<u> </u>	-			project no.					GENZTAUC13086	<u>86AP-</u>	
lien	t:	The Lakes 2012 Itd								date started				07 Mar 2016	
rinc	ipal:	-								d	late com	pleteo	d:	09 Mar 2016	
roje	ct:	The	e Lakes	s Sta	ige 3	GC	R			lo	ogged by	y:		NM	
ocat	ion:	Sta	ige 3C	& St	age :	3 D				С	hecked	by:		RBT	
	on: No							surface elevation: Not Specified		-	om horizor		0°	DCP id.:	
	odel: ⊢ ng info					mat	erial sub	drilling fluid:	ł	hole dia	meter : 50) mm			-
	-						-	material description		sity	vane	DCI		structure and	
support	¹ 2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE : plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕ remoulded ⊚ peak (kPa) 05 00 05 000	(blow 100 m	nm)	additional observations	
					-		ML	TOPSOIL: SILT: non plastic, dark brown mottled orange, with some fine to coarse grained sand.	D	Н				TOPSOIL	_
					-							 		VS >240 kPa	-
					-		ML	SILT: non plastic to low plasticity, orange brown, with some fine grained sand, trace clay.	_					MATUA SUBGROUP	
 		t Encountered			0.5-							9 		VS >240 kPa	-
		Not			-			At 0.7m: becoming minor fine grained sand with minor clay.	M	VSt	□ □ □ □			VS 103/ 23 kPa	-
					1.0-			At 1.1m: becoming flecked white.			$ \begin{array}{c} \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ \bullet & \cdot & \bullet & \bullet \\ \bullet & \cdot & \bullet & \bullet \\ \cdot & \cdot & \bullet & \bullet \\ \cdot & \cdot & \cdot & \bullet & \bullet \\ \cdot & \cdot & \cdot & \bullet & \bullet \\ \cdot & \cdot & \cdot & \bullet & \bullet \\ \cdot & \cdot & \cdot & \bullet & \bullet \\ \cdot & \cdot & \cdot & \bullet & \bullet \\ \cdot & \cdot & \cdot & \bullet & \bullet \\ \cdot & \cdot & \cdot & \bullet & \bullet \\ \cdot & \cdot & \cdot & \bullet & \bullet \\ \end{array} $			VS 156/ 25 kPa	-
								Hand Auger HA3C-191 terminated at 1.2 m Target depth						VS 138/ 28 kPa	
					_										-
					1.5										_
					-										-
					-								ii II		
					2.0										-
neth	 			sun	port			samples & field tests			n symbol &			consistency / relative density	
method AD suger drilling* support AD auger drilling* M mud AS auger screwing* C casing HA hand auger penetration HA hand auger T T				mud casing etration	⊢ no re	N nil esistance ing to sal	B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	t Cla moistu D dr	ire V				/S very soft s soft firm 3t stiff /St very stiff		
e.g. 3 7	bit sho AD/T blank t TC bit V bit	/T lev.				Dct-12 v	vater te shown	N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla	oist et aturated astic limit juid limit	t			/L very loose loose /D medium dense	



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-192
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

1000	atior	1.	510	ge 3C 8	x 01	aye .					C	hecked by	/.	RBT
posit	position: Not Specified								surface elevation: Not Specified	angle from horizontal: 90° DCP id.:				DCP id.:
drill r	mod	el: Ha	and A	luger			drilling fluid:				nole dia	meter : 50 n	nm	
dril	ling	infor	mati	on			mate	rial sub	stance					
method & support		² penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	(kPa)	DCP (blows/ 100 mm)	structure and additional observations
						_			SILT: non plastic, dark brown, with minor fine to medium grained sand.	D	VSt			TOPSOIL -
- N N			Not Encountered						Clayey SILT: low plasticity, orange brown- orange, with trace fine sand.	D to M				YOUNGER ASH VS >183 kPa - VS >183 kPa - -
						- 1.0								VS >183 kPa
						- 1.5 — -			Hand Auger HA3C-192 terminated at 1.2 m Target depth					VS >183 kPa - - - - -
met AD	:hod	uger d			supj M r	nud	N	nil	samples & field tests B bulk disturbed sample	s	oil desc	1	1	
AS HA W HA * e.g. B T V	ha wa ha bi Al bl T	uger so and au ashbo and au t show D/T ank bi C bit bit	ger re ger n by s		C c pene wate	etration		istance g to l ater shown	D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Cla moistu D dr M mo W we S sa Wp pla	re V Dist	n System	5 F F F V L L U U	S soft = firm St stiff /St very stiff H hard =b friable /L very loose



Borehole ID. HA3C-193 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 07 Mar 2016 date started: 09 Mar 2016 principal: date completed: The Lakes Stage 3 GCR NM project: logged by: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm material substance drilling information consistency / relative density DCP material description vane structure and classification go samples & field tests shear ⊕ remould ● peak (blows/ 100 mm) additional obs vations method & support Ê penetrat moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ê depth (water (kPa) RL **TOPSOIL: SILT**: low plasticity, dark brown mottled orange, with minor fine to medium grained sand. ML D Н TOPSOIL шii ||||||||||||||| | | | | 11111 1.1.1 ||||||||||**↓** | | **↓** | **●** 11111 11 11111 11 VS 215/ 47 kPa 11 |||||11111 SILT: non plastic to low plasticity, orange ML VSt MATUA SUBGROUP ||||| | | |brown, with minor fine to medium grained sand, 11111 ||||| | | |trace clay. ||| | | |11111 Not Encountered 0.5 € liiiii ||VS 136/ 25 kPa ML-MH SILT: low to medium plasticity, orange brown, М with some clay, trace fine grained sand, trace fine grained angular black gravel. ₽ ż 111 |||||||11111 ||||||||11111 € VS 176/ 33 kPa ||||11111 11 ||11111 1111 ||||| | | |iiii | | | |||||11111 1.0 Ð, iiiii VS 156/ 25 kPa D to M At 1.0m: becoming pale orange brown with minor fine to medium grained sand. ||||||11111 111 11111 ||||||11111 111 11 Hand Auger HA3C-193 terminated at 1.2 m Target depth 10 VS 138/ 25 kPa ||||ĨΙ ||||||||||||11111 11111 11 ||||||

CDF_0_9_06_LIBRARY.GLB rev/an Log_COF BOREHOLE: NON CORED + DCP_GCR HA - 09-03-2016 ODS.GPJ_<<DrawingFile>> 11/04/2016 12:09

	1.5			
method AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud N nil C casing penetration ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System	consistency / relative densityVSvery softSsoftFfirmStstiffVStvery stiffHhardFbfriableVLvery looseLlooseMDmedium denseDdenseVDvery dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-194
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT
angle from horizontal: 90°	DCP id.:

positi	ioi	n: N			ified		<u> </u>			surface elevation: Not Specified	á	angle fro		iorizo		90°	DCP id.:
drill m	-				-					drilling fluid:	ł	nole dia	mete	er : 50) mm		
drilli	in	-		nati	on			mat	erial sub								
method & support		2 penetration	3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	⊕ re @	ane hear moulded peak kPa)	DC (blor 100 r	ws/ mm)	structure and additional observations
							-			SILT : non plastic, dark brown, with minor fine to medium grained sand.	D	VSt					TOPSOIL
							-		· · · · · · · · · · · · · · · · · · ·	SILTY SAND: fine to coarse grained, pale brown.	D to M		1 .				MATUA SUBGROUP
			i	Not Encountered			0.5			Silty CLAY: low plasticity, orange brown, with trace fine to coarse sand. 0.5 m: trace black manganese	M		<u>_</u> — — — — — — — — — — — — —				VS 175/ 36 kPa VS 160/ 28 kPa
							- - 1.0-			SILT: low plasticity, pale grey with mottled orange brown and brown, with some clay and minor fine to coarse sand.			⊕				VS 140/ 28 kPa
, y							-			Hand Auger HA3C-194 terminated at 1.2 m Target depth							VS 151/61 kPa
							1.5— - -										
							- 2.0—										
meth AD AS HA W HA	; ; ;	auge auge hand wasi	er dri er sci d aug hbore d aug	rewin ger e					N nil	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard pagetarian test (SPT)	t Cla moistu D dr	у	n syn riptio Unifi	nbol & on ed			consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable
* B T V	ļ	AD/	nk bit bit		suffix	wate	L 10-0 leve wate) Dct-12 v	vater te shown v	N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla	oist et iturated astic limit uid limit	t				Fb friable VL very loose L loose MD medium dense D dense VD very dense



Engineering Log - Hand Auger client: The Lakes 2012 Itd principal: project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-195
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	NM
checked by:	RBT
e from horizontal: 90°	DCP id.:

ро	sitio	n: Not		cified		-			surface elevation: Not Specified	a		om horizon	tal: 90°	DCP id.:
dri	ll mo	odel: Ha	and A	Auger					drilling fluid:	ł	nole dia	meter : 50	mm	
d	rillir	ng info	mati	on			mate	erial sub	stance					1
method &	support	¹ 2 penetration 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) S 0 0 0 00	DCP (blows/ 100 mm)	structure and additional observations
						_		ML	SILT: low plasticity, dark brown, with minor fine to medium grained sand.	D				TOPSOIL
						-		CL-ML	Clayey SILT: low plasticity, orange brown, with trace fine grained angular black gravel.	М	Н	_ 		MATUA SUBGROUP VS >240 kPa
- HA						- 0.5			At 0.4m: becoming low plasticity to medium plasticity.	M to W	St	- 		
			itered			-						⊕ • ⊕ • • • • • •		VS 86/ 18 kPa
— HA	 Z		Not Encountered			1.0-						□ ⊕ 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		VS 103/ 25 kPa
						-								VS 103/ 18 kPa
						1.5 —								VS 120/ 33 kPa
						-		ML	Sandy SILT: non plastic to low plasticity, dark orange brown, with medium to coarse grained sand, trace fine grained angular gravel.	D to M			11111	VS 176/ 25 kPa
<u>v</u>						- <u>2.0</u>			At 1.95m: becoming white. Hand Auger HA3C-195 terminated at 2.0 m Target depth		VSt			VS 196/ 25 kPa
m Ai H. H. H.	S A /	d auger d auger s hand au washbo hand au	crewin Iger re		pen			l nil sistance og to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	s b Cla moistu D dr	soil desc ased on ssification re			Consistency / relative density /S very soft S soft f firm St stiff /St very stiff H hard -D friable
* e. B T V	g.	bit show AD/T blank bi TC bit V bit		suffix	wate	Leve	Oct-12 w el on date er inflow er outflow	ater e shown	N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla		1		Fb friable /L very loose _ loose MD medium dense D dense /D very dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-196
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

		Not		ified		0			surface elevation: Not Specified			m horizon	-	DCP id.:
		lel: Ha							drilling fluid:		-	neter : 50		
dril	ling	infor	mati	on			mate	erial sub	stance					
method & support	: -	² penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 000 000 000 000 000 000 000 000 000 0	DCP (blows/ 100 mm)	structure and additional observations
						-			SILT: non plastic, dark brown, with minor fine to medium grained sand.	D	VSt			TOPSOIL
						-			SILT: non plastic to low plasticity, orange brown, with minor fine sand and trace clay. SILT: non plastic, pale brown to pale grey with mottled black and orange, with minor fine to coarse sand and trace clay.	D to M		· · · · · · · · · · · · · · · · · · ·		MATUA SUBGROUP VS >183 kPa
						0.5						• • • • • • • • • • • • • • • • • • •		VS >183 kPa -
		ΪÌ	Not Encountered			- - 1.0-			0.8 m: sand becomes some					VS 140/ 22 kPa
	1.1		Z			-			1.1 m: sand becomes minor and clay becomes minor1.2 m: trace manganese	M				VS 173/ 43 kPa
						- 1.5— -						⊕ ⊙ 		VS 133/ 31 kPa
						-			SILTY SAND: non plastic, pale brown, with trace clay.	_				VS 132/ 55 kPa
<u>'</u>						-2.0			Hand Auger HA3C-196 terminated at 2.0 m Target depth					VS 126/ 37 kPa
met AD AS HA W HA	ai ai hi w	uger di uger si and au ashbo and au	crewir ger re			nud asing etration		istance	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	b Cla moistur D dry M mo	soil desci based on issification re y bist			consistency / relative density /S very soft 5 soft 5 firm 5t stiff /St very stiff 1 hard 5 friable
* e.g. B T V	A bl Ti	t show D/T ank bi C bit bit		suffix		leve	Oct-12 wa I on date er inflow er outflow	e shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	et turated astic limit uid limit		1 1 1	/L very loose loose MD medium dense D dense /D very dense



Borehole ID. HA3C-197 1 of 1 sheet: **Engineering Log - Hand Auger** project no. GENZTAUC13086AP-AG The Lakes 2012 Itd client: 07 Mar 2016 date started: 09 Mar 2016 principal: date completed: The Lakes Stage 3 GCR NM project: logged by: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP (blows/ 100 mm) consistency / relative density structure and additional observat material description vane classification go samples & field tests shear ⊕ remould ● peak rvations method & support Ê penetra moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ê depth (water (kPa) RL ML TOPSOIL: SILT: non plastic to low plasticity, D Н TOPSOIL iiiii brown mottled orange, flecked white, with minor fine to coarse grained sand, trace clay. ||||||||||||||| | | | | 11111 1.1.1 ||||||||||ф VS 224/ 33 kPa 11 |||||||||||MATUA SUBGROUP ML SILT: low plasticity, orange brown, with minor |||||1111 |||||clay, trace fine grained sand. 11111 | | | |||| | | |111 11111 1111 0.5 iiiii ||||||UTP 111 111 |||||||111 111 | | | | |||||At 07m: becoming some fine to coarse grained sand. Μ € | | |VS 231/ 31 kPa |||Sandy SILT: non plastic to low plasticity, orange brown, with fine grained sand. ML VSt untered 11111 ||||||20-03 Ā

CDF_0_9_06_LIBRARY.GLB rev.AN Log COF BOREHOLE: NON CORED + DCP GCR HA - 09-03-2016 ODS.GPJ <<DrawingFile>> 11/04/2016 12-10

Not Encor	1.0-	At 1.0m: becoming flecked white and black with trace fine grained angular gravel.	⊕	
		At 1.2m: minor pockets of fine to coarse grained orange brown sand.		
	1.5			 VS 111/ 33 kPa
			St	
		Hand Auger HA3C-197 terminated at 2.0 m Target depth		VS 120/ 40 kPa
nethod D auger drilling* S auger screwing* IA hand auger V washbore IA hand auger	support M mud N nil C casing penetration ranging to ranging to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa)	classification symbol & soil description based on Unified Classification System moisture D dry	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard
bit shown by suffix e.g. AD/T 3 blank bit 7 TC bit	water 10-Oct-12 water level on date shown water inflow water outflow	N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	M moist W wet S saturated Wp plastic limit WI liquid limit	Fb friable VL very loose L loose MD medium dense D dense VD very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3C-198
sheet:	1 of 1
project no.	GENZTAUC13086AP-A
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

position drill mod		•						surface elevation: Not Specified drilling fluid:		-	om horizont meter : 50 i		DCP id.:
drilling			-			mate	rial sub						
method & support	¹ ² penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 8 00 000	DCP (blows/ 100 mm)	structure and additional observations
- НА - N -		Not Encountered			- - - - - - - - - - - - - - - - - - -			SILT: non plastic, dark brown, with minor fine to medium grained sand. Silty CLAY: low plasticity, orange brown, with trace fine sand. 1.0 m: black specks are present SILTY SAND: fine to coarse grained, yellow brown, with trace clay.	D to M	VSt	$\begin{array}{c} \vdots\\ $		MATUA SUBGROUP VS >183 kPa VS 176/ 19 kPa VS 114/ 14 kPa VS 151/ 28 kPa VS 133/ 61 kPa VS 111/ 50 kPa
methoo AD a AS a HA h	d auger d auger s hand au	crewir .ger	Ig*	M r C c	port mud casing etration		nil	Hand Auger HA3C-198 terminated at 2.0 m Target depth samples & field tests B bulk disturbed sample D disturbed sample E environmental sample	s t	soil dese ased or	 n symbol & cription	N S F	consistency / relative density /S very soft S soft firm
HA h * b e.g. A B b T T	bit shov AD/T blank bi TC bit V bit	uger vn by s	suffix	wate	er ↓ 10 ↓ 10 ↓ 10 ↓ 10 ↓ wat		ater shown	SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla	y oist	t	H F L L	St stiff VSt very stiff H hard Eb friable VL very loose L loose MD medium dense D dense VD very dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-199
sheet:	1 of 1
project no.	GENZTAUC13086AP-A(
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	NM
checked by:	RBT
e from horizontal: 90°	DCP id.:

positi	on:					age			surface elevation: Not Specified	;	anale fr	om horizo	ntal: 90°	DCP id.:
drill m			-						drilling fluid:		-	meter : 50		
drilli	ing i	infor	mati	on			mate	erial sub	stance					
method & support		2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 02 02 08		
						-		ML	TOPSOIL: SILT : low plasticity, dark brown, with minor fine to medium grained sand.	D	VSt			TOPSOIL
						- 0.5		SM	SILTY SAND: fine to coarse grained, orange brown mottled grey, with fine to medium grained sand.		MD			MATUA SUBGROUP
- N -			Not Encountered			- - 1.0-		SP	SAND: fine to medium grained, grey, with minor silt.	M				
			Not			-			At 1.0m: becoming trace silt.		MD			
						- 1.5 - - - -		- - - - - - - - - - - - - - - - - - -						
						2.0			Hand Auger HA3C-199 terminated at 2.0 m Target depth					
meth AD AS HA W HA	aug aug hai wa hai	ger dr ger so nd au shbor nd au show	rewir ger e ger	ng*	pene wate	nud casing etration	no re rangii refusi Oct-12 w		samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	t Cla moistu D dr M m W w S sa	soil des based or assificatio rre y oist et aturated	u Unified on System	k	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose
e.g. B T V	bla	nk bit bit					er inflow er outflo		VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing		astic limi juid limit	τ		MD medium dense D dense VD very dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-200
sheet:	1 of 1
project no.	GENZTAUC13086AP-A
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

	sition: Not Specified angle from horizontal: I model: Hand Auger drilling fluid: hole diameter : 50 mm					90°	DCP id.:						
	-			mate	rial sub								
 method & support 	- 1 - 2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components SILT: non plastic, dark brown, with minor fine	D moisture condition	Consistency / relative density	shear ⊕remoulded ⊚peak (kPa) 05 00 00 00 00 00 00 00 00 00 00 00 00 0	CP ows/ mm)	
					_			to medium grained sand.					
		Not Encountered			- - - - - - - - - - - - - - - - - - -			SAND: fine to coarse grained, pale grey. 1.0 m: trace fine sub-rounded gravel present 1.2 m: trace fine to coarse pumiceous gravel					MATUA SUBGROUP
* *					2.0-			Hand Auger HA3C-200 terminated at 2.0 m Target depth					
metho AD AS HA W HA	auger auger hand wash hand	drilling screwin auger bore auger own by	ng*	pen wat	etration	 no res rangin refusa Oct-12 wa 	ater	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	t Cla moistu D dr M mo W we	soil desc based on ussificatio re y bist	n symbol & ription		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose
e.g. B T V	AD/T blank TC bi V bit				leve	el on date er inflow er outflov	shown	Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	astic limit uid limit		N	L loose MD medium dense D dense VD very dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-201
sheet:	1 of 1
project no.	GENZTAUC13086AP-A
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	NM
checked by:	RBT
le from horizontal: 90°	DCP id.:

		lot Spe Hand A			J	_		surface elevation: Not Specified drilling fluid:		angle fro	om horizon meter : 50	tal: 90°	DCP id.:
		formati	-			mate	rial sub			ioic uid			
method & support	¹ ² penetration	vater	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 00 00 000	DCP (blows/ 100 mm)	structure and additional observations
					_		ML	TOPSOIL: SILT : low plasticity, dark brown, with minor fine to coarse grained sand.	D				TOPSOIL
					-		SM	SILTY SAND: fine to medium grained, orange brown.	M	MD			MATUA SUBGROUP UTP
		 			0.5		ML	Sandy SILT: low plasticity, orange brown, with fine to medium grained sand, trace clay.		H to VSt			VS 233/ 33 kPa
					-					VSt	 - 		VS 138/ 23 kPa
N					1.0						 		VS 94/ 28 kPa VS 94/ 40 kPa
					- 1.5—			At 1.6m: becoming grey mottled orange with trace fine, angular, black gravel.		Н	- ⊕ 		VS 103/ 28 kPa
					-			adoc into, angular, black graver.			⊕ ⊙ 	8/200 hm 1 1 1 1 1 1 1 1	VS 129/ 43 kPa
					-2.0			Hand Auger HA3C-201 terminated at 2.0 m Target depth					VS 111/28 kPa
meth AD AS HA W HA	auge auge hand wash	er drilling er screwin I auger I bore I auger		Mir Co pen	etration		nil istance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	t Cla moistu D dr M m	soil desc based on assification re y oist	•		consistency / relative density /S very soft 5 soft 5 firm 5t stiff /St very stiff 1 hard 5b friable
* e.g. B T V	bit sh AD/T blank TC b V bit	< bit it	suffix	wate	✓ 10-0 leve wate	Oct-12 wa el on date er inflow er outflow	shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla		t	1 1 1	VL very loose loose MD medium dense D dense VD very dense



TETR	A TECH	COMF	ANY							E	Borehole	ŧ ID.	HA3C-202
Er	nai	ne	erin	a I		a -	На	nd Auger			sheet:		
	-		e Lakes	-							project no date star		<u>GENZTAUC13086AP</u> -) 07 Mar 2016
clien			e Lanes	201	/2 m	1							
	cipal:			24	. (-				date com	•	09 Mar 2016
proje			e Lakes		-		R				ogged by		NM
locat			age 3C &	s St	age	3D					checked	-	RBT
	on: No	•						surface elevation: Not Specified		•	om horizo ameter : 50		DCP id.:
	nodel: H		-			mat	terial sub	drilling fluid: bstance		IUIE ula		J [1111]	
	1	T	samples &	ľ				material description		.y / insity	vane	DCP (blows/	structure and
method & support	1 2 penetration	water	field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕ remoulded ⊚ peak (kPa) 00 00 00 00	100 1111)	
- N							ML	TOPSOIL: SILT: low plasticity, dark brown mottled orange, with minor fine to medium grained sand. SAND: fine to medium grained, pale grey mottled brown, with minor silt. At 0.6m: becoming pale grey with trace silt. Hand Auger HA3C-202 terminated at 2.0 m	M	VSt MD			TOPSOIL VS 166/ 10 kPa MATUA SUBGROUP
					-	-		Target depth					

classification symbol &
 consistency / relative density

 VS
 very soft

 S
 soft

 F
 firm
 Method AD auger drilling* AS auger screwing* HA hand auger support M mud samples & field tests B bulk disturbed sample soil description N nil based on Unified disturbed sample environmental sample C casing D E HA W HA Classification System environmental sample split spoon sample undisturbed sample ##mm diameter hand penetrometer (kPa) standard penetration test (SPT) SPT - sample recovered SPT with solid cone vane shear; peak/remouded (kPa) refueal penetration F St VSt washbore SS U## stiff very stiff hard moisture D dry M moist W wet S saturated Wp plastic limit WI liquid limit hand auger no resistance ranging to ო HP N N* H Fb VL ÷. friable water very loose 10-Oct-12 water level on date shown * bit shown by suffix **T** Nc VS L MD loose e.g. B T AD/T blank bit medium dense water inflow Þ R HB D VD refusal dense TC bit V bit water outflow hammer bouncing very dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3C-203
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	07 Mar 2016
date completed:	09 Mar 2016
logged by:	ODS
checked by:	RBT

location:	Sta	ge 3C &	s St	age :	3D				С	hecked by	/:	RBT
position: No	sition: Not Specified surface elevation: Not Specified angle from horizontal							al: 90°	DCP id.:			
drill model: H	land A	luger					drilling fluid:	ł	nole dia	meter : 50 m	nm	
drilling info	ormati	on			mate	erial sub	stance					
method & support 1 2 penetration 3	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	● remoulded ● peak 1 (kPa)	DCP (blows/ 100 mm)	structure and additional observations
				-			SILT: non plastic, dark brown, some fine sand.	D	VSt			TOPSOIL
				-			Sandy SILT: non plastic, orange brown, sand is fine to medium. With trace clay and trace manganese.			@ 		YOUNGER ASH VS >183 kPa
				0.5			SILT: non plastic to low plasticity, orange brown with mottled orange and black specks, with minor clay and trace fine to coarse sand and trace manganese.	M				VS >183 kPa
	Not Encountered			-			0.8 m: sand becomes minor SILT : low plasticity, orange brown, with some fine to coarse sand and minor clay.	_		 ⊕ ⊚ 		VS 175/ 28 kPa
	Not E			1.0			1.1 m: sand becomes minor and clay becomes some			 		VS 169/ 16 kPa
				- 1.5 —			1.4 m: becomes very moist					VS 169/ 31 kPa
				-			1.6 m: becomes low-medium plasticity 1.7 m: sand becomes trace					VS 151/ 125 kPa
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓				-2.0-			Hand Auger HA3C-203 terminated at 2.0 m Target depth					
method AD auger AS auger HA hand a W washb HA hand a	screwir auger ore		pen	nud casing etration		I nil sistance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	b Cla moistur D dr	soil desc ased on ssification re	n symbol &	L I I I I I I I I I I I I I I I I I I I	firm St stiff /St very stiff
* bit sho e.g. AD/T B blank I T TC bit V V bit		suffix	wate	✓ 10-0 leve wate	Oct-12 w el on date er inflow er outflow	ater e shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear, peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla			L N E	/L very loose loose MD medium dense



Borehole ID. HA3D-207 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 04 Apr 2016 date started: principal: 04 Apr 2016 date completed: The Lakes Stage 3 GCR ODS project: logged by: Stage 3C & Stage 3D location: RBT checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density class ification g samples & field tests shear ⊕ remould ● peak (blows/ 100 mm) additional obs vations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ē depth (water (kPa) 8 8 8 R SILT: non plastic to low plasticity, orange Μ St FILL 11111 brown with mottled grey and brown, with trace | | | | |fine to coarse sand. |||||||11111 11 ||||||11111 ||||| | | |11111 11111 11 11 þø 11111 11 1.1 VS 96/ 54 kPa | | | | |11111 1111 ||||| | | | |Not Encountered 11111 |||||11 1 | | | |11111 Ψ 0.5 φø 12:10 z 1111 111 VSt 11 VS 103/ 54 kPa 111 1 1 1 1 11 | | | | |11111 111 11 | | | | |11111 ||||11111 Ð ||||||11 St 11 VS 89/ 70 kPa 0.75 m: sand becomes some | | | |11111 11 11 ||||||11111 SAND: fine to coarse grained, pale brown, 11111 ||||| | | |ã with trace silt. 11111 | | | | |SUC SILT: non plastic to low plasticity, dark brown, 11 11 11111 1.0 09-03-2016 with trace fine to coarse sand. 11111 Hand Auger HA3D-207 terminated at 1.0 m 11111 ||||||Refusal 111 |||||||11111 Ā GCR H ||||||||||111 |||||||11111 NON CORED + DCP | | || | | |11111 | | | | |11111 ||||11111 |||||||||111 ||||||11111 11111 111 | | | |11111 ||||||COF BOREHOLE: 15 11111 11111 111 ||||||11111 1 | | | 11111 111 ||||||11111 GLB rev:AN Log ||||11111 |||||| | | | |11111 ||||| | | |11111 11111 ||||||-IBRARY. 11111 11 1 + 111111 11111 ||||||||||90 2.0 11111 | | | | |11111 111 |||||||Ę 11111 ||||||11111 111 consistency / relative density VS Verv 20⁴ method AD auger drilling* classification symbol & support samples & field tests soil description N nil bulk disturbed sample mud Μ В auger screwing' disturbed sample environmental sample based on Unified soft firm AS C casing D S F HA W hand auger Classification System Е penetration washbore SS split spoon sample St stiff hand auger HA very stiff undisturbed sample ##mm diameter VSt no resistance ranging to refusal U## moisture

HP

Ν

N*

Nc

VS

R

HB

wate

T

10-Oct-12 water

vater inflow

water outflow

evel on date shown

bit shown by suffix

AD/T

blank bit

TC bit

V bi

e.g. B

hand penetrometer (kPa)

SPT - sample recovered

SPT with solid cone

hammer bouncing

refusal

standard penetration test (SPT)

vane shear; peak/remouded (kPa)

hard

friable

loose

dense

very loose

very dense

medium dense

н

Fb

VL

MD

VD

D

L

dry moist wet saturated

plastic limit liquid limit

D M W

Wp

wi



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3D-209
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	04 Apr 2016
date completed:	04 Apr 2016
logged by:	ODS
checked by:	RBT

location:	ion: Stage 3C & Stage 3D								С	hecked by:		RBT
position: No	ion: Not Specified surface elevation: Not Specified							angle from horizontal: 90° DCP id.:				
drill model: I		er					drilling fluid:	h	ole dia	meter : 50 mm		
drilling inf	ormation				mate	erial sub						
method & support 2 penetration	fie	mples & eld tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear (bl ⊕ remoulded ⊚ peak (bl 100 (kPa)	ows/ ows/ omm) ∞∞♀	structure and additional observations
							SILT: non plastic, orange brown, with trace fine sand.	D to M	St VSt			VS 70/ 43 kPa
HA HA HA HA HA HA HA HA HA HA HA HA HA H				- - 1.0 — - -			1.0 m: becoming "greasy"	M	St VSt			VS 70/ 49 kPa
				- 1.5 - - - 2.0 -			Hand Auger HA3D-209 terminated at 1.5 m Target depth					VS 176/ 86 kPa
AS auger HA hand W washt HA hand	auger own by suffi bit	ix	pene	nud easing etration er er leve wate		ater e shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	s b: Cla: moistur D dry M mc W we S sat Wp pla	oil desc ased on ssificatio re / bist	Unified n System		consistency / relative density /S very soft S soft = firm St stiff /St very stiff H hard - firable /L very loose - loose MD medium dense O dense /D very dense



Borehole ID. HA3D-211 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 14 Mar 2016 date started: 09 Mar 2016 principal: date completed: project: The Lakes Stage 3 GCR logged by: ODS Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP (blows/ 100 mm) classification symbol consistency / relative density structure and additional observations material description vane samples & field tests shear ⊕ remould ● peak graphic log method & support penetrati Ē moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components Ê depth (water (kPa) R SILT: low plasticity, pale brown, with minor fine grained sand, trace fine grained angular gravel. D VSt TOPSOIL 11 |||||||11111 ||||||||11111 111 |||||||||| | | || | || | | |||||SILT: low plasticity, orange brown, with minor YOUNGER ASH Μ 111 clay. VS >183 kPa ||||11111 ||||||

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11/04/2016 12:10	
< <drawingfile>></drawingfile>	
N CORED + DCP GCR HA - 09-03-2016 ODS.GPJ	
0 + DCP (
COF BOREHOLE: NON CORED	
- Bo	l
CDF_0_9_06_LIBRARY.GLB rev:AN	

nuter ed	0.5-		$\oplus_{i=1}^{i_{i}} [[[[[]]]]]] [[[]]]]]$	 VS 165/28 kPa
U U U U U U U U U U U U U U U U U U U			⊕ • • • • • • • • •	 VS 101/15 kPa
	1.0	1.1 m: clay becomes some	St 91111	
				 VS 99/ 14 kPa
	1.5		VSt	
	- - - 2.0 - support	Hand Auger HA3D-211 terminated at 1.5 m Target depth	classification symbol &	
D auger drilling* S auger screwing* A hand auger washbore A hand auger	M mud N nil C casing penetration ranging to ranging to refusal	B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	soil description based on Unified Classification System moisture D dry M moist	VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable
bit shown by suffix g. AD/T blank bit TC bit	10-Oct-12 water level on date shown water inflow water outflow	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W wet S saturated Wp plastic limit WI liquid limit	VL very loose L loose MD medium dense D dense VD very dense



A TETRA TECH COMPANY										В	Borehole	ID.	HA3D-213		
En	ai	ne	erin	a I	_0(d -	. Ha	nd Auger			sheet:				
	<u> </u>			<u> </u>							project no		GENZTAUC13086AP-A		
client:											late start		17 Mar 2016		
princip				-			~ -				late com	•			
project			e Lakes		-		R				ogged by	•	NM		
location: Stage 3C & Stage					age :	3D					hecked l	•	RBT		
position drill mod		•						surface elevation: Not Specified drilling fluid:		•	om horizor meter : 50)° DCP id.:		
drilling			-			ma	aterial sub	-							
method & support	penetration	water	samples & field tests	L (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa)		s/ additional observations		
ĕ⊼,	- <u>0</u> 0 - <u>0</u> 0 -	Š		RL	de	- - - -	ML	TOPSOIL: SILT: low plasticity, dark brown,	Ĕ 8 D	हे हैं VSt	50 ⁽¹⁾	1111	TOPSOIL		
					- - 0.5-	-	ML	with minor fine to coarse grained gravel, minor fine grained sand. SILT: low plasticity, orange brown, with minor clay, minor pockets of manganese. 0.5 m: becoming orange with pockets of low plasticity pink silt present.	-		$\begin{array}{c} & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & & \\ & & \\ & & \\ & & \\ & & \\ & \\ & $		VS 129/ 25 kPa YOUNGER ASH		
		Not Encountered			- - 1.0-	-		1.0 m: pink silt pockets and manganese becomes absent.	M	F			VS 103/ 25 kPa		
					-			1.3 m: 50mm pink silt pocket with minor manganese present.		VSt			VS 70/ 14 kPa VS 70/ 14 kPa 		
					- 1.5 2.0 			Hand Auger HA3D-213 terminated at 1.5 m Target depth					VS 120/ 25 kPa		
AS a HA h W w HA h * b e.g. A B b T T	method AD auger drilling* AA auger screwing* HA hand auger W washbore HA hand auger * bit shown by suffix e.g. AD/T B blank bit T T C bit				etration	n nor rang refu -Oct-12	ate shown ow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear, peak/remouded (kPa) R refusal HB hammer bouncing	s b Cla moistur D dny M mo W we S sa Wp pla	soil desc based on assification ure ry loist	on System	<u> </u>	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense		



Borehole ID. HA3D-215 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd client: 17 Mar 2016 date started: principal: 17 Mar 2016 date completed: The Lakes Stage 3 GCR NM project: logged by: Stage 3C & Stage 3D location: RBT checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density class ification g samples & field tests shear ⊕ remould ● peak (blows/ 100 mm) additional obs vations Ē method & support penetra moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ê depth (water (kPa) 8 8 8 R **SILT**: low plasticity, brown, with minor organic silt, minor fine to medium grained sand. ML D Н MATUA SUBGROUP 11111 1 1 1 11 11 11 1 ||**SILT**: low plasticity, orange brown, with minor clay, trace fine grained sand. ML М VS >240 kPa [] [] 11111 111 1111 11111 0.5 111 VS >240 kPa 111 11 1 1 1 111 SAND: fine to medium grained, pale pink. SP D D Not Encountered 1 ||111 |||11 | | |1 ₹ ż | || |11 11 Ъ 11 1.0 1.0 m: becoming orange. 111 11 11 11 11 11 SILT: low plasticity, grey, with some fine to medium grained sand. н MI М NC 111 11 SORFHOLE. 1.5 Hand Auger HA3D-215 terminated at 1.5 m VS 215/ 62 kPa 11 111 1 Target depth 111 111 11 111 111 | | | | |11 8 ||||111 11 111 ||||GLB 11 IRRARY 11 11 90 2.0 11111 111 11111 Ę 11111 11111 11 11 consistency / relative density VS Verv 20⁴ method AD auger drilling* classification symbol & support samples & field tests soil description N nil bulk disturbed sample very soft soft firm mud В Μ AS auger screwing' disturbed sample environmental sample based on Unified C casing D S F HA W hand auger Classification System Е penetration split spoon sample undisturbed sample ##mm diameter washbore SS St stiff hand auger no resistance ranging to refusal HA very stiff VSt U## moisture

HP

Ν

N*

Nc

VS

R

HB

wate

T

10-Oct-12 water

vater inflow

water outflow

evel on date shown

bit shown by suffix

AD/T

blank bit

TC bit

V bi

e.g. B

hand penetrometer (kPa)

SPT - sample recovered

SPT with solid cone

hammer bouncing

refusal

standard penetration test (SPT)

vane shear; peak/remouded (kPa)

hard

friable

loose

dense

very loose

very dense

medium dense

н

Fb

VL

MD

VD

D

L

dry moist wet saturated

plastic limit liquid limit

D M W

Wp

wi



Borehole ID. HA3D-218 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 17 Mar 2016 date started: principal: 17 Mar 2016 date completed: The Lakes Stage 3 GCR logged by: NM project: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density classification g samples & field tests (blows/ 100 mm) shear ⊕ remould ⊚ peak additional obs vations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic l symbol Ē depth (water (kPa) 8 8 8 R ML TOPSOIL: SILT: low plasticity, brown, with D TOPSOIL Шİ minor fine grained sand, trace organic silt. ||||||11111 11 | | | | |11111 1 + 1Н ||||||VS >240 kPa 11 | | | |11 | | | | |11111 ML SILT: low plasticity, orange brown, with minor М MATUA SUBGROUP 1111 ||| | | |clay, minor fine grained sand 11111 ||||||11 | | | |11111 $\bigoplus_{i=1}^{|I_i|} \bigcup_{i=1}^{|I_i|} \bigoplus_{i=1}^{|I_i|} \bigoplus_{i=1}^{|I_$ 0.5 iiiii VS 215/ 37 kPa 111 |||||||||11111 Not Encountered ||11111 ||||||||11111 ||||VSt ||||||₹ ż | |111 11111 1 ¢ | |•| ||||VS 176/ 40 kPa 11 11 11111 11111 ||||GPJ. ML SILT: low plasticity. VSt to iiiii | | | |09-03-2016 ODS 1.0 ¢ VS 215/ 49 kPa 11111 11111 11111 111 1111 ⊕ | | ⊕ 11111 VS 196/40 kPa 11 |||||||||11111 11111 ||||||11111 111 ||||||||||| | | |11111 VSt 1.4 m: becoming fine to medium grained sand 11111 NC 111 | | | |(greasy). 1111 BOREHOLE: 1.5 Hand Auger HA3D-218 terminated at 1.5 m VS 166/ 33 kPa 11 Target depth 11111 111 ||||||11 1 1 1 1 11111 SOF 1 1 1 1 11 ||||||11111 8 ||||11111 'ev:AN ||||| | | | |11111 ||||GLB 11111 ||||||-IBRARY. 11111 11 11111 11111 ||||||||||90 2.0 11111 | | | | |11111 111 |||||||Ę 11111 ||||||11111 111 11 classification symbol & method AD auger drilling* consistency / relative density support samples & field tests soil description N nil bulk disturbed sample mud VS Μ В very soft AS auger screwing' disturbed sample environmental sample based on Unified soft firm C casing D S F hand auger HA Classification System Е penetration W washbore SS split spoon sample St stiff hand auger HA very stiff undisturbed sample ##mm diameter VSt no resistance ranging to refusal U## moisture HP hand penetrometer (kPa) hard н dry moist wet D M W standard penetration test (SPT) Fb Ν friable wate

N*

Nc

VS

R

HB

10-Oct-12 water

vater inflow

water outflow

evel on date shown

T

bit shown by suffix

AD/T

blank bit

TC bit

V bi

e.g. B

SPT - sample recovered

vane shear; peak/remouded (kPa)

SPT with solid cone

hammer bouncing

refusal

VL

MD

VD

D

L

saturated

plastic limit liquid limit

Wp

۱۸/i

very loose

very dense

medium dense

loose

dense



TETRA TECH COMPANY										E	Borehole	ID.		HA3D-221	
En	ai	no	orin	n I	0	g - Hand Auger							1 of 1		
client: The Lakes 2012 Ite).		GENZTAUC13086AP-A 16 Mar 2016	
					2 Ito	ltd						ed:			
princi	pal:	-								d	ate com	plete	ed:	16 Mar 2016	
projec	ct:	The	e Lakes	Sta	ge 3	B G	CR			lo	ogged by	/:		NM	
locatio	on:	Sta	ige 3C a	& St	age	3D				с	hecked	by:		RBT	
positior	n: No	ot Spe	cified					angle fro	om horizor	ntal:	90°	DCP id.:			
drill mo			-			-		drilling fluid:		hole diameter : 50 mm					
drillin	-	ormati	on			m	aterial sub	stance material description		ţ,	vane	D	СР	structure and	
method & support	1 2 penetration 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕remoulded ⊛peak (kPa) B € € 8	(blo 100	ows/ mm) ∞ ∞ Բ	additional observations	
							ML	TOPSOIL: SILT : low plasticity, brown, with trace organic silt, trace fine to medium grained sand.	м	н					
												וון	 	- VS >240 kPa	
					-		ML	SILT: low plasticity, orange brown, with minor clay, minor fine grained sand.	_					YOUNGER ASH	
		ered			0.5-							 		- VS >240 kPa -	
		Not Encountered			-	-						9		- VS >240 kPa -	
					1.0-									VS >240 kPa	
1 1 1					-				M to W	VSt				- VS 233/ 40 kPa -	
					- <u>1.5</u>			Hand Auger HA3D-221 terminated at 1.5 m Target depth						VS 176/ 37 kPa - -	
					- 2.0	-									
metho AD AS HA W HA	auger auger hand a washb hand a bit sho	ore	ng*		mud casing etratior . ∾ ∞	- no rai ref	N nil resistance nging to fusal 2 water	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Ne SPT with split optid	b Cla moistur D dr M mo W we	soil desc ased on ssificatio re y bist				consistency / relative density VS very soft S soft F firm St stiff VS very stiff H hard Fb friable VL very loose V very loose	
B I T ⁻	AD/T blank I TC bit V bit				lev wa		late shown ow	Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	astic limit uid limit				L loose MD medium dense D dense VD very dense	



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3D-223
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	29 Mar 2016
date completed:	29 Mar 2016
logged by:	ODS
checked by:	RBT

	ition:		ge 3C a	x 01	age c					U	hecked by:	
posit	tion: No	t Spec	cified					surface elevation: Not Specified	а	angle fro	om horizontal: 90	D° DCP id.:
	nodel: H		-					drilling fluid:	h	nole dia	meter : 50 mm	
dril	ling info	rmati	on			mate	rial sub	stance			· · ·	
method & support	¹ ² penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane DCf shear ⊕ remoulded ⊚ peak 100 m (kPa) B ⊆ ⊆ S R N + ∞ 0	s/ additional observations m)
					-			SILT: non plastic, dark brown, with minor fine to coarse sand.	D	VSt		Topsoil
					-			SILT: low plasticity, orange brown, with trace clay and trace fine sand.	M			YOUNGER ASH VS >240 kPa -
		Not Encountered			0.5							VS 215/ 51 kPa
		Not Er			-							
					1.0			1.2 m: clay becomes minor				
					-							
					- <u>1.5</u> - -			Hand Auger HA3D-223 terminated at 1.5 m Target depth				
					- 2.0 — -							- _
meti AD AS HA W HA	auger auger hand a washb hand a	screwin uger ore uger	ıg*	pene	nud casing etration	 no res rangin refusa 		samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	s b Cla moistu D dry	soil desc ased on ssificatio re y bist		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose
* B T V	bit sho AD/T blank I TC bit V bit		suffix		Ieve	Oct-12 wa I on date er inflow er outflow	shown	N° SP1 - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S sa Wp pla	turated astic limit uid limit		VL very loose L loose MD medium dense D dense VD very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3D-225
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	16 Mar 2016
date completed:	16 Mar 2016
logged by:	NM
checked by:	RBT
	B 6 B 1 I

position:	Not Specified					surface elevation: Not Specified	а	ngle fro	om horizonta	ıl: 90°	DCP id.:
	el: Hand Auger					drilling fluid:	h	ole diar	meter : 50 m	im	
drilling i	information			mate	erial sub	stance	- <u> </u>				
	sampl field t		depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	● remoulded ● peak 1 (kPa)	DCP (blows/ 00 mm)	structure and additional observations
HA	Image: Second second	ā	v 0.5− 1.0−		TW Class	SILT: low plasticity, orange brown, with minor clay, minor fine grained sand. SILT: low plasticity, orange brown, with minor clay, minor fine grained sand.	<u>то во</u> М М - D	VSt			TOPSOIL VS >240 kPa YOUNGER ASH VS >240 kPa VS >240 kPa VS >240 kPa VS >240 kPa
			- <u>1.5</u>			1.4 m: becoming bright orange with some fine to medium grained sand. Hand Auger HA3D-225 terminated at 1.5 m Target depth					VS 176/ 40 kPa VS 172/ 34 kPa
method AD aug AS aug HA han		N C	2.0 –		J nil	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample	s e ba	oil desc ased on			
HA han * bits e.g. AD/	nk bit bit		vater		e shown	SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetration test (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	ist		 	St stiff /St very stiff I hard Fb friable /L very loose I loose MD medium dense 0 dense /D very dense



Engineering Log					1 – 1	На	nd Auger			Borehole sheet:	ID.	HA3D-228 1 of 1		
				-	-	Пd				project no		GENZTAUC13086AP		
client: The Lakes 2012 It								date started:			ed:	16 Mar 2016		
rincipa					date						pleted	: 16 Mar 2016		
roject:	Th	e Lakes	Sta	ige 3	GC	R			le	ogged by	<i>!</i> :	NM		
cation	St	age 3C d	& St	age :	3D			c	hecked l	by:	RBT			
sition:	-						surface elevation: Not Specified		•	om horizor		° DCP id.:		
	l: Hand	-			mat	erial sub	drilling fluid:	ľ	nole dia	meter : 50	mm			
6							material description		' / isity	vane	DCP			
support	a perioriat Water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕ remoulded ⊚ peak (kPa) B 00 00 B 0	(blows 100 mr	n) 은		
				_		ML	TOPSOIL: SILT: low plasticity, brown, with minor fine to medium grained sand, trace fine grained angular gravel.	D	н					
				-		ML	SILT: low plasticity, orange brown, with minor clay, trace fine grained sand.	-						
	i –			-			ciay, trace fille grained sand.			⊕ @		1 VS 233/ 62 kPa		
	i –			_					1/01					
				0.5			At 0.5m: becoming minor fine grained sand, trace clay.		VSt			 VS 123/ 28 kPa 		
				-			0.8m: becoming trace fine to medium grained sand.	M	-			 VS 123/ 33 kPa 		
z	z			1.0								 VS 138/ 40 kPa 		
				-		ML	SILT: low plasticity, orange, with minor clay,	_	St			 VS 147/ 25 kPa 		
				-			trace fine grained sand (greasy).					1 -		
				1.5 —						⊕ <mark> </mark> 				
	1								VSt			1		
				-			1.8m: becoming pale orange, not greasy.			$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		 VS 158/ 25 kPa 		
.				2.0-			Hand Auger HA3D-228 terminated at 2.0 m Target depth					 VS 120/ 30 kPa		
	i –			-			- ·					-		
IS aug IA har V was	D auger drilling* M mud S auger screwing* C casing A hand auger washbore penetration			M mud N nil C casing			samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa)				بىينا	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard		
e.g. AD/ B blai	bit shown by suffix AD/T blank bit TC bit				refuse Oct-12 weights Oct-1	vater e shown	N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	M me W we S sa Wp pla	oist	t		Fb friable VL very loose L loose MD medium dense D dense VD very dense		



HA3D-230 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no.

Borehole ID.

< <drawingfile>> 11/04/2016 12:10</drawingfile>	
COF BOREHOLE: NON CORED + DCP GCR HA - 09-03-2016 ODS.GPJ	
CDF_0_9_06_LIBRARY.GLB rev:AN Log	

clien princ	t: ipal:		e Lakes	: 20 1	12 Ito	d					ate starte ate comp		16 Mar 2016 16 Mar 2016	
proje	ct:		e Lakes		-		R			lo	ogged by	:	ODS	
locat			age 3C	& St	age	3D				C	hecked b	by:	RBT	
	on: No							surface elevation: Not Specified		-	om horizon		DCP id.:	
	odel: H		-			mate	orial cut	drilling fluid:	h	iole dia	meter : 50	mm		
	-	l						material description		, ity	vane	DCP	structure and	
method & support	¹ 2 penetration 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕remoulded ⊚peak (kPa) 35 0 0 0 00	(blows/ 100 mm)	additional observations	
					-			SILT: low plasticity, brown, with minor fine to medium grained sand, trace fine grained angular gravel.	D	MD			TOPSOIL	
					0.5-			SAND: fine to medium grained, pink brown to pale brown, with minor silt. 0.35 m: trace manganese becomes present					MATUA SUBGROUP	
							•	0.65 m: trace clay becomes present						
					-			SILT: low plasticity, pale brown to pale pink, with minor clay, trace fine sand and trace manganese (dark brown).	M	VSt				
- HA		Not Encountered			1.0-						 		VS 117/ 30 kPa	
					-			1.3 m: becoming mottled dark brown			 		VS >183 kPa	
					1.5-	-							VS 97/ 31 kPa	
					-	-							VS 103/ 31 kPa	
<u> </u>					2.0-			Hand Auger HA3D-230 terminated at 2.0 m Target depth					VS 92/ 28 kPa	
meth AD AS HA W	iii	screwi uger		M i C d	port mud casing etratior		l nil	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample	s b	oil desc ased on	n symbol &	() () () () () () () () () () () () () (consistency / relative density /S very soft S soft = firm St stiff	
HA * e.g. B T V	bit sho AD/T blank t TC bit V bit	uger wn by	suffix	wat	er ↓ 10- ↓ 10- ↓ 10- ↓ 10- ↓ wat		aí ater e shown	SS split spoor sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	moisture D dry M moist W wet S saturated Wp plastic limit WI liquid limit			H F L L	VSt very stiff H hard Fb friable VL very loose	



A TETRA TECH COMPANY									E	Borehole	ID.	HA3D-231		
=nai	in	oorin	a I	0	ч.	Ha	nd Auger		S	heet:		1 of 1		
client: The Lakes 2012 Ite					Log - Hand Auger					project no	D.	GENZTAUC13086AP-A		
					e Lakes 2012 Itd				d	late start	ed:	16 Mar 2016		
rincipal:	-								d	late com	pleted	16 Mar 2016		
roject:	Т	he Lakes	s Sta	ige 3	G	R			lo	ogged by	/:	NM		
location: Stage 3C & Stage					3D				С	hecked	by:	RBT		
position: Not Specified							surface elevation: Not Specified	ä	angle fro	om horizor	ntal: 90°	DCP id.:		
rill model:		0				torial auk	drilling fluid:		nole dia	meter : 50	mm			
drilling in						terial sub	material description		"ity	vane	DCP	structure and		
support 1 2 penetration		samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕ remoulded ● peak (kPa) 00 00 00 000	(blows 100 mm	1)		
	i			-	-	ML	TOPSOIL: SILT : low plasticity, brown, with minor fine to medium grained sand, trace fine to medium grained angular gravel.	D	Н					
				-								VS >240 kPa		
	i l			-		ML	SILT: low plasticity, orange brown, with minor fine grained sand, trace clay.							
				0.5-							• • 	VS >240 kPa -		
				-			0.7 m: becoming minor clay.							
	Not Encountered	5		-								- -		
z 		5		1.0-					VSt	⊕ ● -		VS 215/ 40 kPa		
				-	-			М	VOL			VS 138/ 28 kPa		
				-				M to W	St					
				1.5-								VS 70/ 25 kPa 		
	 			-		ML	SILT: low plasticity, orange.	_	VSt			 VS 111/ 33 kPa 		
▼ 11 11				- 2.0			Hand Auger HA3D-231 terminated at 2.0 m							
				-			Target depth							
method DD auger drilling* support M XS auger screwing* C XS auger screwing* C XA hand auger penetration V washbore penetration VA hand auger water			uger drilling* M mud N nil B bulk disturbed sample uger screwing* C casing D disturbed sample and auger penetration E environmental sample ashbore no resistance U## undisturbed sample and auger ranging to HP hand penetromter (kPa) N standard penetration test (SPT) N		B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	t Cla moistu D dr M m W w	soil desc based on assificatio re y oist et	•		consistency / relative densityVSvery softSsoftFfirmStstiffVStvery stiffHhardFbfriableVLvery loose				
g. AD/T blank TC b V bit	F k bit bit	bit				ate shown w	Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pl	aturated astic limit juid limit	t		L loose MD medium dense D dense VD very dense		



Borehole ID. HA3D-232 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd client: 16 Mar 2016 date started: 16 Mar 2016 principal: date completed: project: The Lakes Stage 3 GCR logged by: ODS Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP (blows/ 100 mm) classification symbol consistency / relative density structure and additional observations material description vane penetratio samples & field tests shear ⊕ remould ● peak graphic log method & support depth (m) SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components moisture condition Ê water (kPa) R SILT: low plasticity, brown, with minor fine to medium grained sand, trace fine grained angular gravel. D VSt TOPSOIL | | | | || | | |111 1.1.1 ||||||| | || | | |1 စ် YOUNGER ASH SILTY SAND: fine to coarse grained, orange Μ MD

	0.5-	brown.		
		Silty: low plasticity, orange brown, with trace fine sand and trace clay.	VSt	
Not Encount I I I I I I I I Not Encount I I I I	1.0-	1.0 m: clay becomes minor		VS 163/ 28 kPa
	-	1.2 m: becomes "greasy"		
	1.5-			
		1.7 m: becomes orange		 VS 165/ 31 kPa
	2.0	Hand Auger HA3D-232 terminated at 2.0 m Target depth	→ → ⊕ ↓ ⊕ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	11
ethod D auger drilling* S auger screwing* A hand auger washbore	support M mud N nil C casing penetration	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample	classification symbol & soil description based on Unified Classification System	consistency / relative density VS very soft S soft F firm St stiff
bit shown by suffix g. AD/T blank bit TC bit V bit	water 10-Oct-12 water level on date shown water unflow water outflow	U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	moisture D dry M moist W wet S saturated Wp plastic limit Wi liquid limit	St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



FETRA	TECH	COMF	ANY							E	Borehole	ID.	HA3D-233
En	ni	no	orin	n I	~	- r	Нэ	nd Auger		S	heet:		1 of 1
	yı			_			i ia	nu Augei		р	roject no).	GENZTAUC13086AP
lient:		Th	e Lakes	201	2 Ito	1				d	ate start	ed:	16 Mar 2016
rincip	oal:	-								d	ate com	pleted:	16 Mar 2016
ojec	t:	Th	e Lakes	Sta	ge 3	GC	R			lo	ogged by	r:	ODS
catio	on:	Sta	ige 3C 8	& St	age	3D				с	hecked I	oy:	RBT
sitior	n: No	t Spe	cified					surface elevation: Not Specified	a	angle fro	om horizor	ntal: 90°	DCP id.:
		land A	-					drilling fluid:	ł	nole dia	meter : 50	mm	
rillin	-	ormati	on			mat	erial sub	estance material description		₽	vane	DCP	structure and
support	¹ 2 penetration 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕remoulded @peak (kPa) B € € 8	(blows/ 100 mm)	additional observations
	3 5 -							SILT: low plasticity, brown, with minor fine to medium grained sand, trace fine grained angular gravel.	D	VSt			TOPSOIL _
					-			SILT: low plasticity, orange brown, with minor clay and trace fine sand.	М				YOUNGER ASH VS >183 kPa
					- 0.5—			0.6 m: clay becomes trace					- VS >183 kPa -
		ered			-						 0 0 		- VS >183 kPa
z		Not Encountered			1.0						$ \left \begin{array}{c} & & \\ & \\ \\ \\ \\ \\ \\$		VS 151/ 41 kPa
					-			1.3 m: clay becomes minor and sand is absent					VS 140/ 31 kPa
					1.5—			1.6 m: trace fine sand becomes present and is					VS 120/ 41 kPa
					-			"greasy"					- VS >183 kPa
V					- 			Hand Auger HA3D-233 terminated at 2.0 m Target depth					VS 175/ 31 kPa

classification symbol & soil description method AD auger drilling* AS auger screwing*
 consistency / relative density

 VS
 very soft

 S
 soft

 F
 firm
 support M mud samples & field tests B bulk disturbed sample N nil AD AS HA W HA based on Unified disturbed sample environmental sample C casing D E hand auger Classification System environmental sample split spoon sample undisturbed sample ##mm diameter hand penetrometer (kPa) standard penetration test (SPT) SPT - sample recovered SPT with solid cone vane shear; peak/remouded (kPa) refueal penetration F St VSt washbore SS U## stiff very stiff hard moisture D dry M moist W wet S saturated Wp plastic limit WI liquid limit hand auger no resistance ranging to HP N N* H Fb VL ÷. friable water very loose 10-Oct-12 water level on date shown * bit shown by suffix ⊻ Nc VS L MD loose e.g. B T AD/T blank bit medium dense water inflow R HB D VD TC bit V bit refusal dense water outflow

very dense

hammer bouncing



TETRA	A TECH (COMF	PANY							E	Borehole	ID.	HA3D-234				
Sr	in	nc	orin	~ I	~	N _	Цэ	nd Augor		s	heet:		1 of 1				
	Iyı		enn	<u>у</u> г	<u>-0ŕ</u>	<u>J -</u>	Πα	nd Auger		р	project no		GENZTAUC13086AP-/				
client	t:	Th	e Lakes	201	2 Itd	Ī				d	late starte	ed:	16 Mar 2016				
orinc	ipal:	-								d	late comp	oleted:	16 Mar 2016				
oroje	ct:	Th	e Lakes	; Sta	ae 3	GC	R			lo	ogged by	:	NM				
ocati			age 3C &		-		• -				hecked b		RBT				
	on: Not		-	<u>x o</u>	<u>age .</u>			surface elevation: Not Specified			om horizon		DCP id.:				
	odel: H	•						drilling fluid:		0	meter : 50						
drilliı	ng info	ormat	ion			ma	iterial sub	istance									
5	ation		samples &		Ê	bo	ation	material description		iensity	vane shear	DCP (blows/	structure and additional observations				
support	¹ 2 penetration	water	field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	Premoulded ● peak (kPa) _S _S _S _S _S	100 mm)					
							ML	TOPSOIL: SILT : low plasticity, brown, with minor fine grained sand, trace fine to medium grained angular gravel.	D	Н			TOPSOIL				
							ML	SILT: low plasticity, orange brown, with minor fine grained sand, trace clay.			$ \bigoplus_{i=1}^{n} \sum_{i=1}^{n} \bigoplus_{i=1}^{n}		YOUNGER ASH VS 215/ 50 kPa				
					- 0.5				M	VSt			VS 196/ 40 kPa				
		ountered					ML	At 0.8m: becoming some fine grained sand.	D	VSt to	● ● 		- VS 129/ 25 kPa -				
 Z		Not Encountered			1.0-			fine to medium grained sand.		MD			VS 120/ 18 kPa				
							ML	SILT : low plasticity, pale pink, with trace fine grained sand, trace manganese pockets.	M	H to MD			VS 129/ 25 kPa -				
					1.5		ML	Sandy SILT: non plastic, pale yellow, with fine grained sand.		F to	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		VS 233/ 54 kPa				
							· . 	SILT: low plasticity, orange brown, with minor fine grained sand, trace clay.		MD H	 ⊕ 		- VS 70/ 40 kPa				
-		-			- 2.0			Hand Auger HA3D-234 terminated at 2.0 m Target depth					VS 215/ 23 kPa				
S A V		screwi auger oore	/ing*		etration	ı ¶-non	N nil resistance ging to usal	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	t Cla moistu D dr	soil desc based on assificatio re y oist	n symbol &		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable				
.g.	bit show AD/T blank b TC bit V bit	bit	suffix		■ 10-C leve wate	Oct-12 el on da er inflov er outflo	ate shown w	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S sa Wp pl	aturated astic limit juid limit	t		VL very loose L loose MD medium dense D dense VD very dense				



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3D-235
sheet:	1 of 1
project no.	GENZTAUC13086AP-A(
date started:	16 Mar 2016
date completed:	16 Mar 2016
logged by:	ODS
checked by:	RBT

		lot Spe			<u> </u>			surface elevation: Not Specified		ingle fro	om horizontal: §	90° DCP id.:
		Hand /	-			moto	rial sub	drilling fluid:	h	iole dia	meter : 50 mm	
method & support	ation	/ater	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	(kPa)	
								SILT: low plasticity, brown, with minor fine to medium grained sand.	D	VSt		
					0.5-			SILT: non plastic to low plasticity, orange brown with black specks, with trace fine to medium sand and trace clay.	D to M			VS >183 kPa
N		Not Encountered			- - 1.0			0.7 m: trace sand becomes fine				
					- 1.5 —			Sandy SILT: non plastic to low plasticity, orange brown, with trace clay.	_	MD		 VS 134/28 kPa
					-			SAND: fine to coarse grained, orange brown, with some silt. Sandy SILT: non plastic to low plasticity, pale brown, sand is fine to coarse.		St		 VS 96/39 kPa
<u>v v</u>					-2.0			Hand Auger HA3D-235 terminated at 2.0 m Target depth				
meth AD AS HA W HA	auge auge hand wash hand	er drilling er screwi I auger hbore I auger	ng*	M r C c	etration		nil stance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	s b Cla moistur D dry M mo	soil desc ased on ssificatio re / bist		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable V(very leace
* B T V	bit sh AD/T blank TC b V bit	k bit it	suffix		✓ 10-0 leve wate	Dct-12 wa el on date er inflow er outflow	shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S sa Wp pla	et turated astic limit uid limit		VL very loose L loose MD medium dense D dense VD very dense



hand auger

AD/T

blank bit

TC bit

V bi

bit shown by suffix

HA

e.g. B

no resistance ranging to
 refusal

10-Oct-12 water

vater inflow

water outflow

evel on date shown

wate

T

U##

HP

Ν

N*

Nc

VS

R

HB

hand penetrometer (kPa)

SPT - sample recovered

SPT with solid cone

hammer bouncing

refusal

standard penetration test (SPT)

vane shear; peak/remouded (kPa)

Borehole ID. HA3D-236 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd client: 16 Mar 2016 date started: principal: 16 Mar 2016 date completed: The Lakes Stage 3 GCR logged by: NM project: Stage 3C & Stage 3D location: RBT checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density class ification g samples & field tests (blows/ 100 mm) shear ⊕ remould ⊚ peak additional obs ations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ē depth (water (kPa) 8 8 8 R **TOPSOIL: SILT**: low plasticity, brown, with minor fine grained sand, trace fine grained angular gravel. ML D Н TOPSOIL 11111 ||ML SILT: non plastic to low plasticity, orange D to M 111 YOUNGER ASH 11 1 brown, with some fine grained sand. 111 ||||||VS >240 kPa 111 | | |111 111 VSt 1111 1111 ଢ଼¦ଡ଼¦ 0.5 1111 VS 147/ 40 kPa 111 1111 11 1111 111 1111 ||||Sandy SILT: non plastic, orange brown, with 11 ML Θİ fine to medium grained sand. θı 麴日日 11 VS 111/ 25 kPa 11 Encountered ||||4111 Ъ SILTY SAND: fine to medium grained, SP MD to ||||09-03-2016 ODS orange brown D 1 11 1 31 I I ¥ ż ø 1.0 Ъ 383 I I I VS 103/ 25 kPa Not 111 1 | | ML Sandy SILT: low plasticity, pale pink, with St 11 ||lenses of fine to medium gained pale pink sand. 111 ⊕lo VS 78/ 18 kPa + DCP 111 11 ||||NON CORED ||11 SP SAND: fine to medium grained, orange MD 11 1 brown BOREHOLE: 1.5 11 1 111 I 111 11 111 At 1.6m: becoming white. SOF 111 1 111 11 111 11 111 ||111 ||||||à 11 ML SILT: low plasticity, orange brown, with trace Н fine grained sand. 2.0 Hand Auger HA3D-236 terminated at 2.0 m VS 206/ 40 kPa Target depth 11111 11111 11111 11 11 classification symbol & method AD auger drilling* support samples & field tests consistency / relative density soil description N nil bulk disturbed sample mud VS Μ В very soft AS auger screwing' disturbed sample environmental sample based on Unified soft firm C casing D S F HA W hand auger Classification System Е penetration split spoon sample undisturbed sample ##mm diameter washbore SS St stiff

very stiff

very loose

very dense

medium dense

hard

friable

loose

dense

VSt

н

Fb

VL

MD

VD

D

L

moisture

Wp

wi

dry moist wet D M W

saturated

plastic limit liquid limit



sheet: **Engineering Log - Hand Auger** project no. The Lakes 2012 Itd client: date started: principal: date completed: The Lakes Stage 3 GCR project: logged by: Stage 3C & Stage 3D location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° drill model: Hand Auger drilling fluid: hole diameter : 50 mm

Borehole ID.

HA3D-237

16 Mar 2016

16 Mar 2016

DCP id.:

GENZTAUC13086AP-A(

1 of 1

ODS

RBT

		Hand	-			moto	wiel out	drilling fluid:			meter : s			
arii	<u> </u>	format				mate	erial sub			>				
method & support	1 2 penetration		samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕ remoulde ⊚ peak (kPa)	ed (b 10	DCP lows/ Dmm	
		1.1			-			SILT : low plasticity, brown mottled pink, white and orange, with minor fine grained sand, trace fine to medium grained angular gravel.	D	MD				
					- 0.5			SILTY SAND: fine to coarse grained, brown with mottled pink brown, with trace fine to medium gravel.						FILL -
					-			0.7 m: becoming mottled dark brown SILT: non plastic, orange brown, with some	D to M	VSt				
		Not Encountered			- 1.0-			fine to medium sand.			 @ 			VS >183 kPa
					-			1.25 m: becoming mottled pink						
					1.5-						 	 		VS >183 kPa
					-			SILT: low plasticity, orange brown, with trace fine sand. 1.85 m: becoming mottled pale pink and dark brown						VS >183 kPa
		i I			2.0-			Hand Auger HA3D-237 terminated at 2.0 m Target depth			 			
met AD AS HA W HA	auge hand wast	er drilling er screw d auger hbore d auger		M C per	port mud casing etration	I ╊ no res	istance	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa)	s b	soil desc based on bassificatio		&		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard
* e.g. B T V	bit sl AD/T blan TC b V bit	k bit it	r suffix	wat	■ 10- leve	rangir refusa Oct-12 w el on date er inflow er outflov	ater e shown	N standard penetration test (Nra) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	M mé W wé S sa Wp pla	oist				Fb friable VL very loose L loose MD medium dense D dense VD very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3D-238
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	16 Mar 2016
date completed:	16 Mar 2016
logged by:	NM
checked by:	RBT

oositi	on: No	t Spe	cified					surface elevation: Not Specified	a	angle fro	om horizon	tal: 90°	DCP id.:
	nodel: H		-					drilling fluid:	ł	nole dia	meter : 50	mm	
method & support	benetration		samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	stance material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak	DCP (blows/ 100 mm)	structure and additional observations
and	20 3 3 3 3 3 5 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	water		RL	deb -	gra	TW clas	SILT: low plasticity, brown mottled pink, white and orange, with minor fine grained sand, trace fine to medium grained angular gravel.	D	VSt	(kPa) 03 04 04 04 05 04 04 04 04 04 04 04 04 04 04 04 04 04		FILL
					-		ML	SILT: low plasticity, orange brown mottled brown, with trace fine grained sand, trace pockets of sandy silt.	_		- ⊕ © -		VS 176/ 33 kPa
					0.5		ML	SILT: non plastic, pale orange, with some fine to medium grained sand.		H	 @ 		VS >240 kPa
		itered			-		- DAI	Condu SII T: pop plastia pala brawn mattiad	_		 		VS >240 kPa
Z		Not Encountered			1.0		. ML	Sandy SILT: non plastic, pale brown mottled white and orange, streaked black, with fine to medium grained sand					VS >240 kPa
					1.5						@		VS >240 kPa VS >240 kPa
					-		ML	SILT : low plasticity, orange brown, with trace fine grained sand, trace clay.					
					- 2.0			Hand Auger HA3D-238 terminated at 2.0 m Target depth			(4)		VS >240 kPa
meth AD AS HA W HA	auger auger hand a washb hand a	screwii auger ore		pen	mud casing etration	– no re	N nil esistance ing to ial	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	b Cla moistur D dru M mo	soil desc ased on ssification re y bist			consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable
* e.g. B T V	bit sho AD/T blank t TC bit V bit	oit	suffix		▲ 10-0 leve wate	Dct-12 v I on da er inflov er outflo	e shown /	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	et turated astic limit uid limit	1		VL very loose L loose MD medium dense D dense VD very dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3D-239
sheet:	1 of 1
project no.	GENZTAUC13086AP-A
date started:	16 Mar 2016
date completed:	16 Mar 2016
logged by:	ODS
checked by:	RBT

position: Not Specifie	ed					surface elevation: Not Specified	a	ingle fro	om horizor	ntal: 90°	DCP id.:
drill model: Hand Aug	•					drilling fluid:	h	ole diar	meter : 50	mm	
drilling information	<u>ו</u>			mate		stance					1
penetra	amples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa)	DCP (blows/ 100 mm)	
HA HA N HA I I <						 SILT: low plasticity, brown mottled pink, white and orange, with minor fine grained sand, trace fine to medium grained angular gravel. SILT: non plastic to low plasticity, orange brown with mottled pale pink, with trace clay and trace fine sand. 0.5 m: trace gravel becoming present- are grey, medium to coarse and angular SILT: low plasticity, pink with mottled dark brown, with trace clay and trace to minor marganese. SAND: fine to coarse grained, pale brown, with some silt. 1.0 m: silt becomes trace 1.1 m: becomes brown 1.2 m: silt becomes minor SILT: non plastic to low plasticity, orange brown, with some sand. 	D to M	MD			VS >183 kPa FILL VS >183 kPa VS >183 kPa MATUA SUBGROUP VS >183 kPa
			-			Hand Auger HA3D-239 terminated at 2.0 m Target depth					
method AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger * bit shown by suf e.g. AD/T B blank bit T TC bit V V bit		supp M m C ca pene wate	nud asing etration N ∞ Pr Ieve leve wate		l ater shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	s b Cla moistuu D dny M mo W we S sa Wp pla	re bist	Unified n System		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



Borehole ID. HA3D-240 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 16 Mar 2016 date started: 16 Mar 2016 principal: date completed: The Lakes Stage 3 GCR NM project: logged by: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm material substance drilling information consistency / relative density structure and additional observat DCP material description vane classification go samples & field tests shear ⊕ remould ● peak (blows/ 100 mm) vations method & support Ê penetra moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ê depth (water (kPa) R SILT: low plasticity, brown, with minor fine grained sand, trace fine to medium grained angular gravel. ML D Н FILL 11111 |||||||||||||| | | | | 11111 1.1.1 | | | | |||||| | | || | | | |11111 11 11111 11 i i 🖣 i i i i 11 SILT: low plasticity, orange brown mottled brown and white, with trace fine to medium ML VS >240 kPa 1111 |||||| | | || | | | |11111 111 grained sand. TIT 111 0.5 VS >240 kPa 111 1111 11111 111 |||||||11111 111 11111 111 ||||||11111 At 0.7m: becoming trace fine to medium grained gravel, trace asphalt. ||||11111 ||||||VS >240 kPa | | | |11111 111 ||||| | | | |11111 Encountered 1111 1 + 1| | | |09-03-2016 ODS.GPJ At 0.9m: becoming minor pockets of orange brown low plasticity sandy silt. Asphalt absent. iiii | | | | || | | | | | | | @ | | |11111 ¥ ż 1.0 ||||VS >240 kPa Not 11111 111 11111 ML Sandy SILT: non plastic, pale orange grey, 111 ||GCR HA with fine to medium grained sand. ||||⊕ þ VS 215/ 25 kPa 11 NON CORED + DCP 11111 COF BOREHOLE:

rev:AN Log GLBr IBRARY. 8 ¥ 6 0 Ë

		- 1.5		ML	SILT: low plasticity, orange brown, with minor ine grained sand, trace clay.	M	H or VSt			 	• •			VS >240 kPa
• •		- 20-			At 1.8m: becoming minor fine to medium grained sand.									VS 176/ 25 kPa
		-			Hand Auger HA3D-240 terminated at 2.0 m arget depth					i I	İİ.	i		VS >240 kPa
meth AD AS HA W	nod auger drilling* auger screwing* hand auger washbore	support M mud C casing penetration		I nil	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample		ssificatio soil des based or Classificati	criptio n Unifie	n ed				CO VS S F St	soft firm
HA e.g. B T V	hand auger bit shown by suffix AD/T blank bit TC bit V bit	leve wat	rangir refusa	aí vater e shown	U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	M W S Wp	ture dry moist wet saturated plastic lim liquid limit						VS H Fb U L MI D VE	hard b friable L very loose loose D medium dense dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3D-241
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	16 Mar 2016
date completed:	16 Mar 2016
logged by:	ODS
checked by:	RBT

	on: n: No		cified		uget			surface elevation: Not Specified	a		om horizor		DCP id.:
rill mo	odel: H	, land A	Auger					drilling fluid:		U	meter : 50		
arillir	ng info	ormati	on	-		mate	erial sub						
support	 penetration 	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕ remoulded ⊚ peak (kPa) S 0 0 00 000	DCP (blows/ 100 mm)	structure and additional observations
								SILT: non plastic, dark brown, with trace fine to coarse sand.	D	VSt			TOPSOIL
					-			SILT: low plasticity, orange brown with mottled dark brown and pink, with trace-minor clay, trace fine sand, trace fine to coarse sub-angular gravel and trace manganese.	D to M		 0 1 		MATUA SUBGROUP VS >183 kPa
		Intered			0.5 —						$\begin{array}{c c c c c c c c c c c c c c c c c c c $		VS 120/ 25 kPa
		Not Encountered			-			SAND: fine to coarse grained, brown, with			€ 0 0 		VS 145/ 33 kPa
 					- 1.0-			some silt.					VS >183 kPa
					_			SILT: non plastic, orange brown with mottled pink and grey, with minor sand, trace clay,	_				
					-			trace fine sub-rounded gravel. SILT : low plasticity, pink with black speckles, with some clay.					VS >183 kPa
					- <u>1.5</u>			Hand Auger HA3D-241 terminated at 1.5 m Target depth					VS 136/ 31 kPa
¥					2.0 —								
S A	od auger hand a washb hand a	screwin luger ore luger	ng*	M i C d	etration	no res rangin ◄ refusa		samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	s b Cla moistu D dry	soil desc ased on ssification re y bist	•		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose
g.	bit sho AD/T blank t TC bit V bit		suffix		leve wate	Oct-12 wa I on date er inflow er outflov	shown	Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S sa Wp pla	turated astic limit uid limit	t	1 1 1	L loose MD medium dense D dense VD very dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3D-242						
sheet:	1 of 1						
project no.	GENZTAUC13086AP-AG						
date started:	16 Mar 2016						
date completed:	16 Mar 2016						
logged by:	ODS						
checked by:	RBT						

				checked by:	
position: Not Specified			surface elevation: Not Specified	angle from horizontal: 90°	DCP id.:
drill model: Hand Auger			drilling fluid:	hole diameter : 50 mm	
drilling information		material sub	stance		
method & support & suppore		graphic log classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	C construction con	
HA NA Encountered	0.5- - - - - - - - - - - - - - - - - - -		SILT. SILT: low plasticity, orange brown with mottled pale pink, with minor fine to coarse sand and trace clay. GRAVEL: medium to coarse grained, grey, sub-angular. SILT: non plastic to low plasticity, orange brown, with trace fine sand. Is "greasy".	D VSt I	TOPSOIL FILL VS >183 kPa YOUNGER ASH VS 161/ 48 kPa VS 152/ 33 kPa
	- - - 1.5 -		1.3 m: trace clay becomes present 1.65 m: trace manganese becomes present	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	VS 165/ 45 kPa VS >183 kPa
			Hand Auger HA3D-242 terminated at 2.0 m Target depth		VS 125/ 45 kPa
method AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger * bit shown by suffix e.g. AD/T B blank bit	leve	N nil no resistance ranging to refusal Oct-12 water el on date shown rer inflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa)	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet	



Engineering Log - Hand Auger					Borehole ID. sheet:				HA3D-243						
									1 of 1						
					_		_	J - Hallu Augel				roject no).		GENZTAUC13086AP-A
client	nt: The Lakes 2012 Ito					2 Itc	1				d	ate start	ed:		16 Mar 2016
principal: - project: The Lakes Stage 3 GCR									date completed				d: 16 Mar 2016		
					logged by:					ODS					
location: Stage 3C & Stage 3			3D	D				hecked I	by:	RBT					
positic	on: N	lot S	peci	fied					surface elevation: Not Specified	e	angle fro	om horizor	ntal:	90°	DCP id.:
drill m				-					drilling fluid:	h	nole diar	meter : 50	mm		
drilli	-		atio	n				terial sul	material description		ity	vane	D	CP	structure and
method & support	1 2 penetration			samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕ remoulded ⊚ peak (kPa) B 0 0 0 0	(blo 100	ows/ mm) ∞∞₽	additional observations
		Т				-			SILT: low plasticity, pale brown, with minor fine to medium grained sand, trace fine to medium grained angular gravel	D					
						-			SILT: non plastic to low plasticity, orange brown with mottled orange, with trace clay and trace fine sand.	D to M	-				
			Intered			0.5-		· · · · · · · · · · · · · · · · · · ·	SILTY SAND: fine grained, orange brown.	_					
			Not Encountered			-			SILT: low plasticity, orange brown, with minor-some clay. Is "greasy".	_					VS >183 kPa
						1.0									VS >183 kPa -
		i				-			1.2 to 1.5 m: has black speckles						
						- <u>1.5</u>			Hand Auger HA3D-243 terminated at 1.5 m Target depth						VS >183 kPa -
						- 2.0—									
metho AD AS HA W HA	auge auge hand wash hand bit sh	er scr l aug hbore l aug	ewing er er		pen wat	nud casing etration	no r rang refu	water	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	moistur D dry M mo W we S sa	soil desc pased on assificatio re y oist et turated	Unified n System			consistency / relative density VS very soft VS soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose
e.g. B T V	AD/T blank TC bi V bit	k bit it				- wat	el on da er inflo er outfl		VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing		astic limit uid limit				MD medium dense D dense VD very dense



penetration

wate

T

no resistance ranging to
 refusal

10-Oct-12 water

vater inflow

water outflow

evel on date shown

SS

U##

HP

Ν

N*

Nc

VS

R

HB

split spoon sample

hand penetrometer (kPa)

SPT - sample recovered

SPT with solid cone

hammer bouncing

refusal

undisturbed sample ##mm diameter

standard penetration test (SPT)

vane shear; peak/remouded (kPa)

moisture

Wp

wi

dry moist wet D M W

saturated

plastic limit liquid limit

St

н

Fb

VL

MD

VD

D

1

VSt

stiff

hard

friable

loose

dense

very stiff

very loose

very dense

medium dense

w

HA

e.g. B

washbore

hand auger

AD/T

blank bit

TC bit

V bi

bit shown by suffix

Borehole ID. HA3D-244 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd 16 Mar 2016 client: date started: 16 Mar 2016 principal: date completed: The Lakes Stage 3 GCR NM logged by: project: Stage 3C & Stage 3D RBT location. checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density class ification g (blows/ 100 mm) samples & shear ⊕ remould ⊚ peak additional obs ations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components field tests graphic I symbol Ē depth (water (kPa) 8 8 8 R ML SILT: low plasticity, brown, with fine to D Н TOPSOIL Шİ medium grained sand, trace fine to coarse grained angular gravel. ||||||11111 11111 11 | | | | |1 + 1| | | || | | | |11111 11 | | | |11111 11 i i i 🖣 i i i i i 11 Clayey SILT: low plasticity, orange brown, ML MATUA SUBGROUP 1111 11 | | | |with trace fine grained sand (Hard) VS 240 kPa | | | | |11111 11 TIT 0.5 VS 240 kPa 111 11111 11 |||||||11111 111 111 SILT: low plasticity, pale orange, with minor fine to medium grained sand, minor clay, trace ||||ML |||||VS 240 kPa | | || | | | |11111 black sand. | | | |11111 111 11 1111 Encountered 11111 ||||| | | |Ъ 11111 | | | |||||09-03-2016 ODS | | | | | | | | @ | | |11111 ¥ ż 1.0 SILT: low plasticity, pink, with minor pockets of manganese, trace fine grained sand, trace VS 240 kPa Not ML Μ 111 1111 11111 clay. 11111 11111 111 ||GCR HA ||||சி VS 233/ 25 kPa ÍIII + DCP ||||| | | |11111 11111 |||||NON CORED 11111 111 ||||||| || | | |111 | | | |11111 111 0 COF BOREHOLE: ¢ 15 11111 VS 215/ 40 kPa 11 11111 111 11111 11 ലി 0 VS 215/ 25 kPa 11111 11 | | | | |11111 ||||||||||7 11111 11 | | | | |ž 11111 11 ||||11111 1111 11 2.0 ٤ Hand Auger HA3D-244 terminated at 2.0 m VS 215/ 25 kPa Target depth 11111 111 Ę 11111 ||||||| | | | |11111 111 classification symbol & method AD auger drilling* support consistency / relative density samples & field tests soil description mud N nil bulk disturbed sample VS Μ В very soft AS auger screwing' based on Unified soft firm C casing D disturbed sample S F hand auger НА Classification System Е environmental sample



lient:	gir	1e	erin	ering Log - Hand Auger					s p d	orehole heet: roject no ate starte	ed:	HA3D-245 1 of 1 GENZTAUC13086AP-A 14 Mar 2016 : 14 Mar 2016		
principa				St a	~~ ²	~~	Б			ate comp				
oroject:			e Lakes		-		ĸ				bgged by		NM	
ocation			ge 3C &	\$ 50	age .	3D					hecked b	,	RBT	
osition: rill mode		·						surface elevation: Not Specified drilling fluid:		om horizon meter : 50		DCP id.:		
drilling			-			mat	erial sub	-						
	² penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 03 00 05 00	DCP (blows/ 100 mm)	structure and additional observations	
					-		ML	TOPSOIL: SILT: low plasticity, pale brown, with minor fine to medium grained sand, trace fine to medium grained angular gravel	D	H			TOPSOIL - - VS >240 kPa -	
- i					-				- N	VSt			MATUA SUBGROUP	
					_		ML	SILT: low plasticity, orange brown, with minor clay, trace fine grained sand.	M	VSt			MATUA SUBGROUP	
					0.5						●			
		pe			-			At 0.8m: becoming orange with minor fine grained sand.			⊕ 		- VS 120/ 23 kPa -	
		Not Encountered			- 1.0—						$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		- VS 103/ 18 kPa -	
- i					-								- VS 111/ 25 kPa -	
					- 1.5					н	1111		-	
					-								VS 215/ 40 kPa - -	
					-								-	
	2.0 1 1 1			2.0-			Hand Auger HA3D-245 terminated at 2.0 m Target depth							
NS au NA ha V wa	inger drilling* uger screwing* and auger vashbore and auger inand inand				nud casing etration		N nil sistance ng to al	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	t Cla moistu D dr M m	soil desc based on assificatio		F S F	firm St stiff /St very stiff	
e.g. AD 3 bla	g. AD/T blank bit TC bit				■ 10-0 leve	Dct-12 v el on dat er inflow er outflo	e shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear, peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla			L N C	/L very loose loose ID medium dense	



Engineering Log - Hand Auger client: The Lakes 2012 Itd

client: **The** principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3D-246
sheet:	1 of 1
project no.	GENZTAUC13086AP-A
date started:	14 Mar 2016
date completed:	14 Mar 2016
logged by:	ODS
checked by:	RBT

position: Not Specified drill model: Hand Auger								surface elevation: Not Specified		angle fro	om horizonta	al: 90°	DCP id.:	
	ng info		-			mate	drilling fluid: material substance				meter : 50 n	nm		
method & support	penetration		samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	e poar	DCP (blows/ 100 mm)	structure and additional observations	
dns	<u> </u>	water		RL	del	gra	cla syr	SILT : low plasticity, pale brown, with minor fine to medium grained sand.	D	रु छ VSt			TOPSOIL	
								SAND: fine to coarse grained, brown, with trace fine to coarse sub-angular gravel and trace silt. 0.3 m: becoming pale brown SILTY SAND: fine to coarse grained, brown with mottled pink, with trace fine to coarse		MD			MATUA SUBGROUP	
		Encountered						sub-angular gravel and trace clay. SILT : low plasticity, pink with mottled orange brown, with minor fine to coarse sand, trace clay and trace manganese inclusions.	M				VS >183 kPa	
		Not			-			1.0 m: sand becomes trace and manganese becomes minor			· · · · · · · · · · · · · · · · · · ·		VS 151/20 kPa VS >183 kPa	
					1.5 —			1.4 m: clay becomes minor to some					VS >183 kPa VS >183 kPa	
					- - 			Hand Auger HA3D-246 terminated at 2.0 m		St			VS 82/25 kPa	
					_			Target depth						
AS HA W	 auger drilling* auger screwing* hand auger hand auger hand auger hand auger washbore hand auger mo resistant ranging to water 			⊢ no res	istance	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (KPa) N standard penetration test (SPT) N* SPT - sample recovered	t Cla moistu D dr	soil desc based on assificatio re y oist			consistency / relative density /S very soft S soft = firm St stiff /St very stiff - hard - friable /L very loose			
* bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit			el on date er inflow	shown	N° SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S sa Wp pla	astic limit uid limit			VL Very loose – loose MD medium dense D dense VD very dense				



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3D-247
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	14 Mar 2016
date completed:	14 Mar 2016
logged by:	ODS
checked by:	RBT

			ye sc a								пескеа с	•	RDI
								surface elevation: Not Specified		U	om horizon		° DCP id.:
			-			met-	rial c	5.00			meter : 50	mm	
drilling	-	rmau	on			mate	rial sub			~			
water RL (m) & Seldwes & an entration & Seldwes & a set of the transmission of transmission of				depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 00 0 00 000 00 00 000	DCP (blows 100 mn	n)	
					-	$\left \right\rangle$		SILT: low plasticity, pale brown, with minor fine to medium grained sand.	D	VSt			TOPSOIL
					-			Clayey SILT : low plasticity, orange brown with black specks, with trace fine sand and trace manganese. Is soft and sticky.	M		 ⊕ 		MATUA SUBGROUP VS 169/ 34 kPa
		Not Encountered			0.5					St	⊕ ● ● 		 VS 72/24 kPa
					_			SILT: low plasticity, orange, with minor clay and trace fine sand. Is "greasy".			 ⊕ ⊕ 		 VS 99/ 19 kPa
					1.0					VSt	⊕		VS 117/ 15 kPa
					-						 ● ● 		 VS 115/26 kPa
					-1.5			Hand Auger HA3D-247 terminated at 1.5 m Target depth					VS >183 kPa
					- - 2.0								
AS a HA h W w	i i i	crewir uger ore		M r C c	port nud casing etration		nil istance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	t Cla moistu D dr	soil desc based on bassification re	n symbol &	ببينا	
* bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit			Oct-12 wa I on date er inflow	ater shown	N SIGNATION DEFINITION (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla				VL very loose L loose MD medium dense D dense VD very dense			



									Borehole heet:	ID.	HA3D-248				
=r	ıgl	ne	erin	gl	-0(<u>J</u> -	- Hand Auger).	GENZTAUC13086AI		
lien	t:	The	e Lakes 2012 Itd							c	late start	ed:	16 Mar 2016		
rinc	incipal: -								c	late com	pleted:	16 Mar 2016			
roje	oject: The Lakes Stage					GC	R		le	ogged by	<i>r</i> :	NM			
cat	ion:	Sta	ige 3C a	& St	age	3D			С	hecked b	by:	RBT			
		ot Spec						surface elevation: Not Specified		-	om horizor		DCP id.:		
		Hand A	-			mat	erial sub	drilling fluid:	ŀ	nole dia	meter : 50	mm			
	-		samples &				-	material description		y / nsity	vane	DCP	structure and		
support	¹ 2 penetration	water	field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕ remoulded ⊚ peak (kPa) 05 05 05 05 05	(blows/ 100 mm) ∾ + ∞ ∞ ₽			
					_		ML	SILT: low plasticity, brown, with minor fine grained sand, trace fine to medium grained angular gravel.	D	н			TOPSOIL -		
					-		ML	SILT: low plasticity, pink flecked white, with trace fine grained, trace clay, trace pockets of	-				MATUA SUBGROUP		
					-			manganese.			@ 	9 	VS >240 kPa		
					0.5-								VS >240 kPa -		
					-								- VS >240 kPa		
N –		Not Encountered			-				M				- VS >240 kPa —		
					-			At 1.1m: white specks become absent.	M to W	F	- - ⊕€		- VS 58/ 14 kPa		
					-				S						
					1.5						- ⊕ • • 		VS 138/ 18 kPa		
					-		ML	SILT : low plasticity, orange brown, with trace fine grained sand, trace clay.		St			VS 147/ 25 kPa -		
								Hand Auger HA3D-248 terminated at 2.0 m Target depth				11111	- VS 138/ 25 kPa		
neth D		d support auger drilling* M mud r						samples & field tests		sification soil desc	n symbol &		consistency / relative density		
AS auger screwing* C casing HA hand auger			19* M mud N nil wing* C casing r penetration r ranging to					B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	b Cla moistu D dry	ased on ssificatio			VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable		
bit shown by suffix t.g. AD/T blank bit TO bit here to be a suffix bit shown by suffix bit shown by suffix bit bit shows be a sufficient of the sufficien			Oct-12 v el on dat er inflow er outflo	e shown /	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla		t		VL very loose L loose MD medium dense D dense VD very dense					



A TETRA	A TECH	CH COMPANY									Borehole	ID.		HA3D-249		
En	ai	no	orin	~ I	~	2	La	ad Augor		S	heet:			1 of 1		
	iyi					_	Па	nd Auger		р	roject no	э.		GENZTAUC13086AP-AC		
client	:	The	e Lakes	201	12 Ito	ł				d	ate start	ted:		16 Mar 2016		
princi	ipal:	-								d	ate com	ple	ted:	: 16 Mar 2016		
proje	ct:	The	e Lakes	Sta	ige 3	; GC	R		logged by:					NM		
locati	ion:	Sta	ge 3C 8	& St	age	3D				с	hecked	by:		RBT		
positio	on: No	t Spec	cified					surface elevation: Not Specified	â	angle fro	om horizor	ntal:	90°	DCP id.:		
drill m			-			—		drilling fluid:	ł	nole dia	meter : 50) mn	n			
drillir	ng info ⊂	ormati	on			mat	terial sub ⊊	stance material description		. ∕t	vane	T r	DCP	structure and		
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕remoulded ⊛peak (kPa) B ♀ ♀ ♀	(b 10	lows/ 0 mm	additional observations		
	3 17				0		ML	TOPSOIL: SILT : non plastic, pale brown mottled orange, with minor fine grained sand, trace fine to medium grained angular gravel.	D	н			÷∞∞÷	TOPSOIL		
					-							 		VS >240 kPa		
					-		ML	SILT: low plasticity, pink flecked white, with minor pockets of manganese, trace fine to medium grained sand, trace clay.		VSt				VS 156/ 33 kPa		
		0.5-						At 0.7m: White specks become absent.	W to S	St	● ● I			VS 103/ 24 kPa		
ЧН	Encountered				-	-					●● ●● 			VS 58/ 14 kPa -		
		Not End			1.0-	-				VSt	● ● 			VS 106/ 14 kPa -		
					-	-					$ \begin{array}{c c} & \cdot & \cdot & \cdot \\ & \bullet \\ $			VS 142/ 18 kPa -		
• •						-								VS 111/ 33 kPa - -		
					- - 2.0	-		Hand Auger HA3D-249 terminated at 2.0 m Target depth								
AS HA W HA	auger auger hand a washb hand a bit sho AD/T	uger drilling* uger screwing* and auger and auger t shown by suffix D/T lank bit M mud C casing penetration water ↓ 10-0 leve water						samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	tic Cla moistu D dr M ma W we S sa Wp pla	soil desc ased on ssificatio re y bist	Unified on System			consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense		



Borehole ID. HA3D-250 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd 16 Mar 2016 client: date started: 16 Mar 2016 principal: date completed: project: The Lakes Stage 3 GCR logged by: NM Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP (blows/ 100 mm) structure and additional observations ssification nbol material description Isistency / ative density vane phic log enetratio shear ⊕ remould ⊚ peak samples & field tests pth (m) hod & port isture SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components Ê er

suppo	2 pen	water	RL (n	depth	graph	classi symb	colour, secondary and minor components	moist	consis relativ	(kPa) (kPa)	∞ 2	
				-			SILT: non plastic, pale brown mottled orange, with minor fine grained sand, trace fine to medium grained angular gravel.		VSt		TOPSOIL	
				-			SILT: non plastic, pink with mottled brown and orange brown, with trace clay. trace fine to coarse sand and trace manganese.	t		0		ĸPa
				- 0.5 —			SAND : fine to coarse grained, pale brown, with trace fine to coarse sub-angular gravel and trace silt.	D to M	MD			
				-			0.6 m: becoming mottled dark brown. Trace manganese becomes present					
 		Not Encountered		-								
		ž		-								
				-								
				1.5			1.6 m: silt and gravel become absent					
				-								
V				2.0	****		Hand Auger HA3D-250 terminated at 2.0 m Target depth				11 11 11 11	
et S	auger hand a washb	ore	suppo M m C ca penet	ud		nil	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample	s b	soil descu ased on		consistency VS S F St	/ relative density very soft soft firm stiff
4		auger wn by suffix	water	∎ r r 10-0	rangin refusa	l ater	U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	W we S sa	y bist et turated		VSt H Fb VL L	very stiff hard friable very loose loose
g.	AD/T blank I TC bit V bit			- wate	el on date er inflow er outflov		VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	astic limit uid limit		MD D VD	medium dense dense very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3D-251
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	16 Mar 2016
date completed:	16 Mar 2016
logged by:	ODS
checked by:	RBT

location:	cation: Stage 3C & Stage 3D								С	hecked b	oy:	RBT		
position: Not Specified surface elevation: Not Specified									ingle fro	om horizon	ital: 90°	DCP id.:		
drill model:	Hand A	Auger					drilling fluid:	h	ole dia	meter : 50	mm			
drilling inf	ormati	on			mate		stance					1		
metrod & support 1 2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 03 00 00 00	DCP (blows/ 100 mm)	structure and additional observations		
							SILT: low plasticity, pale brown, with minor fine to medium grained sand.	D	VSt			TOPSOIL		
				-			SILT : low plasticity, orange brown with mottled pink, with trace fine sand and trace fine-coarse angular gravel.	D to M		• • • • • • • • • • • • • • • • • • •				
			0.5—								VS >183 kPa			
HA			-			0.9 to 1.3 m: trace organics and sand becomes					VS >183 kPa			
		1.0— - -			minor					VS >183 kPa				
				- - 1.5			1.25 to 1.4 m: becomes non-plastic and sand becomes some	М		$- \bigcirc \bigcirc \bigcirc$		VS 161/41 kPa		
				- - -			Hand Auger HA3D-251 terminated at 1.5 m Target depth					VS 161/24 kPa		
2.0-														
method AD auger AS auger HA hand W washl	Auger drilling* M mud auger screwing* C casing hand auger hand auger			nud asing etration		g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	b Cla moistur D dry M mo	oil desc ased on ssificatio re / bist			consistency / relative density /S very soft S soft = firm St stiff /St very stiff H hard =b friable		
e.g. AD/T B blank bit			Oct-12 wa el on date er inflow er outflow	shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sat Wp pla	turated Istic limit Jid limit			/L very loose L loose MD medium dense D dense /D very dense				



	CH COMPANY										Borehole sheet:	ID.	HA3D-252		
⊧ng	JI	neer	In	g l	<u>_0(</u>	<u>)</u> -	на	nd Auger		p	project no).		GENZTAUC13086AP-	
lient:		The La	kes	201	12 Ito	1				С	late start	ed:		16 Mar 2016	
orincipal	-				date comp							ed:	16 Mar 2016		
oroject:		The La	kes	Sta	ige 3	GC	R		logged by:					NM	
ocation:		Stage	3C 8	s St	age	3D			checked by: angle from horizontal:					RBT	
osition: I	Not	Specified			_			surface elevation: Not Specified						DCP id.:	
		and Auger						drilling fluid:	ł	nole dia	meter : 50	mm			
drilling in		rmation				mat	erial sul	stance material description		Ę	vane		CP	structure and	
support 5 penetration		samples & field tests (L) (L) (L) (L) (L) (L) (L) (L) (L) (L)		RL (m)		graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components TOPSOIL: SILT: low plasticity, brown, with	moisture condition	consistency / relative density	shear ⊕remoulded ⊚peak (kPa) B 0 0 0 0		ws/ mm)	additional observations	
					-		ML	TOPSOIL: SILT : low plasticity, brown, with minor fine to medium grained sand, trace fine to medium sub-angular to angular gravel.	D	н				TOPSOIL -	
					-		ML	SILT: low plasticity, brown mottled pink, with minor clay, trace fine to medium grained sand.						YOUNGER ASH VS 240 kPa	
					0.5—						 			VS 233/ 54 kPa -	
		-									- VS 240 kPa -				
z		Not Encountered			1.0-		ML	SILT: low plasticity, orange brown, with some fine to medium grained sand, trace clay.	M					- VS 240 kPa -	
					-			1.1 m: becoming fine grained sand.		VSt				- VS 147/ 25 kPa	
					- 1.5		ML	Sandy SILT: non plastic, orange, with fine to medium grained sand.	_	St				- VS 78/ 24 kPa -	
			-		ML	SILT: low plasticity.		VSt	_ 			- VS 111/ 14 kPa -			
					2.0			Hand Auger HA3D-252 terminated at 2.0 m Target depth						VS 176/ 53 kPa	
nethod Dauger drilling* Sauger screwing* A hand auger V washbore IA hand auger Washbore Washbore Washbore Washbore Washbore Washbore Washbore Washbore Washbore Washbore Washbore Washbore Washbore Washbore Washbore				etration	− no re rang refus	N nil esistance ing to sal	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetroin test (SPT) N* SPT	t Cla moistu D dr M m W we	soil desc based on assificatio re y oist et				consistency / relative density consistency / relative density S very soft F firm St stiff VSt very stiff H hard Fb friable VL very loose		
e.g. AD/ 3 blar	bit shown by suffix g. AD/T blank bit TC bit				leve	Oct-12 v el on dai er inflov er outflo	te shown v	Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S sa Wp pla	iturated astic limi uid limit	t			MD medium dense D dense VD very dense	



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3D-253
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	16 Mar 2016
date completed:	16 Mar 2016
logged by:	ODS
checked by:	RBT

ocatio	л.	310	ige 3C a	x 30	aye	50				C	hecke	u by.		RBI
	n: Not	•						surface elevation: Not Specified		•		ontal: 9	0°	DCP id.:
	del: H		0					drilling fluid:	h	nole dia	meter :	50 mm		
arillin	g info	rmati	on			mate		stance		~				
support	 penetration 3 	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remould ⊚peak (kPa) 3 0 0 0	. (blov ^{led} 100 n	vs/ nm)	structure and additional observations
					-			SILT: low plasticity, pale brown, with minor fine to medium grained sand.	D	VSt				TOPSOIL
					-			SILT : low plasticity, brown with mottled pink, with trace clay, trace fine sand and trace fine-coarse angular gravel.	D to M					FILL VS 172/ 42 kPa
		Not Encountered			0.5—			0.5 to 1.5 m: becomes mottled dark brown				 		VS >183 kPa
 Z		Not Enc			-			0.75 to 0.95 m: pockets of pink, low plasticity, clayey silt			⊕ ⊙ 	 		VS 134/ 27 kPa
					1.0									VS >183 kPa VS >183 kPa
					- - - 1.5									N/0 400 1 5
					-			Hand Auger HA3D-253 terminated at 1.5 m Target depth				 		VS >183 kPa
					2.0-									
IS a IA I V v	d auger o auger s hand a washbo hand a	screwin uger ore	ng*	pen	nud asing etration		nil stance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	s D Cla moistu D dry M mo	soil desc ased on ssification re y bist		&	c > % F % > F F	firm fit stiff St very stiff h hard b friable
8.g. /						Oct-12 wa el on date er inflow er outflow	shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla		t		L N D	ID medium dense



Borehole ID. HA3D-255 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd client: 16 Mar 2016 date started: 16 Mar 2016 principal: date completed: The Lakes Stage 3 GCR ODS project: logged by: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm material substance drilling information consistency / relative density DCP material description vane structure and classification go samples & field tests shear ⊕ remould ● peak (blows/ 100 mm) additional obse rvations Ê method & support penetra moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ê depth (water (kPa) R SILT: low plasticity, pale brown, with minor fine to medium grained sand. D VSt TOPSOIL 11111 ||||||11 1 ||||||1 + 1++++**SILT**: non plastic to low plasticity, orange brown, with trace clay and trace fine sand. MATUA SUBGROUP 11 ⊕ 1111 11 VS 119/ 21 kPa 11 1111 |||||11 ||||.... 11 SILTY SAND: fine to coarse grained, orange brown with mottled dark brown and pale D to M L ||1 31 I I I 0.5 brown. ||||||111 111 111 ||||111 0.6 to 0.7 m: pockets of pale orange clayey silt become present Not Encountered ||1 1 1 1 ||||||1111 |||||||||₹ ż | |1 ||||1111 11 1111 ||||1111 09-03-2016 ODS.GPJ 1111 liiii 1.0 1.0 to 1.2 m: pockets of pale orange clayey silt become present 1111 1111 1111 MD 111 1111 ||||1111 ||||||**SAND**: fine to coarse grained, brown with mottled pale brown, with trace silt and trace fine to coarse gravel. 111 | | | | |||||||||||111 ORFD ||||||||NON | | |I 11 || | | COF BOREHOLE: 1.5 Hand Auger HA3D-255 terminated at 1.5 m ł Target depth I 111 ||||||~~|||| 111 ||||||11111 111 ||||||11111 rev:AN Log |||||||||||||||||||11111 ||||| | | |0_9_06_LIBRARY.GLB 11111 |||||||11111 11111 CDF

		-			
Me AD AS HA W HA	thod auger drilling* auger screwing* hand auger washbore hand auger	support M mud N nil C casing penetration resistance ranging to register	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa)	classification symbol & soil description based on Unified Classification System moisture D dry	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard
* e.g. B T V	bit shown by suffix AD/T blank bit TC bit V bit	water 10-Oct-12 water level on date shown water inflow water outflow	N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	M moist W wet S saturated Wp plastic limit WI liquid limit	Fb friable VL very loose L loose MD medium dense D dense VD very dense



TETRA TEC	СНС	COMP	ANY									Boreh		ID.		HA3D-256
Fng	1j	ne	erin	a l	0	a	-	Ha	nd Auger			sheet				
	_			<u> </u>		-	_					projec			—	GENZTAUC13086AP-A
lient:			e Lakes	201	/2 no	a						date s				17 Mar 2016
rincipal:			-	- ,		-	-					date o			ted:	
oroject:			e Lakes		-			R			lo	logge	d by:	:		NM
ocation:			age 3C &	s St	age	3D)				с	check	ked b)у:		RBT
osition: N		•							surface elevation: Not Specified		angle fro					0° DCP id.:
rill model: drilling in			-			Ţ	mate	erial sub	drilling fluid: bstance		hole dia	meiei		<u></u>	<u> </u>	
			samples &						material description		:y / ansity	she	ane near		DCP	
support 1 2 penetration	2 penetra	water	field tests	RL (m)	depth (m)		graphic log	class ification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	⊕rem ⊚p (kF	vpeak	100	0 mm	∞ ₽
								ML	TOPSOIL: SILT : low plasticity, brown, with minor fine grained sand, trace fine grained angular gravel, trace organics.	D	Н					
	 							ML	SILT: low plasticity, brown mottled orange and pink, with minor clay, trace fine grained sand.	-						 VS >240 kPa
			1	'		1	'	ML	SILT: low plasticity, orange brown, with minor clay, trace fine grained sand.		VSt					
					0.5-							⊕ <mark> </mark> 				
z 		Not Encountered							0.6 m: becoming minor fine grained sand.	M		+				 VS 156/25 kPa
					1.0-]]/	<u> </u> '		0.9 m: becoming some fine grained sand.		Н			11		
								ML	Sandy SILT: non plastic, orange, with fine grained sand.)" 		11		ii -
													@ 	• 	 	
	 							ML	SILT: low plasticity, orange, with minor clay, trace fine grained sand (greasy and easily compressible).	W	VSt					
					1.5-				Hand Auger HA3D-256 terminated at 1.5 m Target depth							VS 138/25 kPa
					2.0-	-										
AS auge HA hanc W wash HA hanc	ger so nd au ishboi nd au	ore luger	ing*	Min Cc pene			no res rangin refusa		samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT	b Cla moistur D dry	y oist	cription n Unifie	on ed			consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VI very loose
e.g. AD/1 3 blanl T TC b	A hand auger washbore A hand auger bit shown by suffix					0-Oct-1 evel on vater inf vater ou	n date nflow	te shown v	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S sat Wp pla	aturated astic limit juid limit	it				VL very loose L loose MD medium dense D dense VD very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3D-257
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	11 Mar 2016
date completed:	11 Mar 2016
logged by:	NM
checked by:	RBT

location:	318	ige 3C d	\$ 50	age .	3D				С	hecked by:		RBT
position: No	ot Spe	cified					surface elevation: Not Specified	a	angle fro	om horizontal: 9	90°	DCP id.:
drill model:	Hand A	Auger					drilling fluid:	ł	nole dia	meter : 50 mm		
drilling inf	ormati	on			mate	rial sub	stance					1
support support penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane DC shear (blo ⊕ remoulded ⊛ peak 100 (kPa) S ♀ S S S S S S	ws/ mm)	structure and additional observations
				-		ML	SILT: non plastic, pale brown, with minor fine grained sand.	D	Η			FILL
				- 0.5		ML	SILT: low plasticity, orange brown, with minor fine grained sand, trace organics. 0.5 m: becoming some fine to medium grained	М				VS 215/ 37 kPa VS 215/ 37 kPa
	tered			_		ML	sand mottled dark brown. Sandy SILT: non plastic, brown mottled pale yellow, with fine to coarse grained sand, trace	-	VSt	- 1 1 1 1 1 1 - 1 1 1 1 1 1 1 - 1 1 1 1 1 1 1		YOUNGER ASH
z z 				-			black sand.			□		VS 156/ 24 kPa
				1.0			1.0 m: becoming pale yellow.					VS 170/ 33 kPa
				-			1.2 m: becoming grey.					VS 174/ 36 kPa
				- <u>1.5</u> - -			Hand Auger HA3D-257 terminated at 1.5 m Target depth					VS 176/ 40 kPa
				- 2.0—								
AS auger HA hand W washl HA hand	r drilling r screwi auger bore auger	ng*	pen	mud casing etration	− no resi ranging refusal	g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	b Cla moistur D dr	soil desc ased on ssification re y bist		0	firm St stiff /St very stiff
e.g. AD/T B blank	AD/T blank bit TC bit					ter shown	NC SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S sa Wp pla	turated astic limit uid limit	t		Doose ND medium dense



TETRA			ANY								orehole	ID.	HA3D-258
En	ıgi	ne	ering	gL	_00	- [Ha	nd Auger			heet: roject no	`	1 of 1 GENZTAUC13086AP
client	<u> </u>		e Lakes					•			ate start		17 Mar 2016
princi											ate com		17 Mar 2016
proje	-		e Lakes	Sta	ne 3	GC	R				bgged by		NM
ocati			ge 3C a		-		•						RBT
	-	JIA ot Spec	-	x 30	aye	50		autoos algustion. Not Specified			hecked I	,	DCP id.:
		land A						surface elevation: Not Specified drilling fluid:		U	meter : 0 r		
		ormati	-			mate	erial sub	stance					
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕ remoulded ⊚ peak (kPa)	DCP (blows/ 100 mm)	structure and additional observations
- 0	9 0 7	3		~	Ō	5	ML	TOPSOIL: SILT: low plasticity, brown, with	M	H N	50 ⁻²⁰	04006	TOPSOIL
					-		ML	minor fine grained sand, trace fine grained angular gravel. SILT: low plasticity, orange brown mottled pink and orange, with trace pockets of	~				YOUNGER ASH
					-			manganese, trace clay, trace fine grained sand.					VS >240 kPa -
		ountered			0.5		. SP	SAND : fine to medium grained, pale grey, with some silt.	D	MD			VS >240 kPa
N N		Not Encountered			-			0.8 m: becoming trace silt.					-
					1.0								-
					-		ML	Sandy SILT: low plasticity, grey, with fine to medium grained sand.	M	VSt			-
¥					- <u>1.5</u> - -	<u>- </u>		Hand Auger HA3D-258 terminated at 1.5 m Target depth					VS 138/ 40 kPa - -
mat	 		T		2.0-			annolog 8 ficial desta	clas	sificatior	 		
AD AS HA W HA	S auger screwing* A hand auger / washbore A hand auger Water Water					I		samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	t Cla moistu D dr M m W wa	soil desc pased on assificatio re y oist et	ription		F firm St stiff /St very stiff H hard Fb friable /L very loose
e.g. B T	AD/T blank l TC bit V bit	bit	÷		leve	el on date er inflow er outflov	e shown	Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pl	iturated astic limit uid limit		1	loose MD medium dense D dense /D very dense



e.g. B

AD/T

blank bit

TC bit

V bi

evel on date shown

vater inflow

water outflow

VS

R

HB

refusal

hammer bouncing

vane shear; peak/remouded (kPa)

Borehole ID. HA3D-259 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 17 Mar 2016 date started: principal: 17 Mar 2016 date completed: The Lakes Stage 3 GCR ODS project: logged by: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density class ification g samples & field tests shear ⊕ remould ● peak (blows/ 100 mm) additional obs ations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic l symbol Ē depth (water (kPa) 8 8 8 R SILT: low plasticity, pale brown, with minor D VSt TOPSOIL 11111 fine to medium grained sand. |||||||11111 11111 11 ||||||1 + 1++++11111 Silty CLAY: low plasticity, pink brown. М MATUA SUBGROUP 11 | | **|**9 11111 |||VS >183 kPa | | | | |11111 1111 ||| | | | || | | |11111 11 | | | |11111 0.5 θ 11111 VS 120/ 26 kPa 111 111 ||| | | | |11111 SILT: low plasticity, orange brown, with some Not Encountered ||clay and trace fine sand. ||||||||11111 ||||ŀø 11111 € ₹ ż | |||||||1 VS 142/ 31 kPa ||||||||11111 11 ||11111 1111 ||||| | | |GPJ. 11111 ||||||09-03-2016 ODS | | | | | |**0** 1111 ||||1.0 11111 VS >183 kPa 1.0 to 1.5 m: clay becomes minor |||||||11111 11111 111 |||||||11111 11111 0 VS 163/ 48 kPa 11 ||||11111 11111 ||||11111 ||||||||||||||| | | |11111 11111 NC | | || | | |1111 BOREHOLE: 1.5 Þ Hand Auger HA3D-259 terminated at 1.5 m VS 169/ 59 kPa 11 Target depth 11111 111 ||||||11 1 1 1 1 11111 SOF 1 1 1 1 11111 11 ||||||11111 g 1111 'ev:AN ||||| | | | |11111 ||||| | | |11111 GLB 11111 ||||||-IBRARY. 11111 11 1 + 111111 11111 ||||||||||90 2.0 11111 | | | | |11111 111 |||||||Ę 11111 ||||||11111 111 method AD auger drilling* classification symbol & consistency / relative density support samples & field tests soil description N nil bulk disturbed sample mud VS Μ В very soft AS auger screwing' disturbed sample environmental sample based on Unified soft firm C casing D S F hand auger HA Classification System Е W penetration washbore SS split spoon sample St stiff hand auger HA very stiff undisturbed sample ##mm diameter VSt no resistance ranging to refusal U## moisture HP hand penetrometer (kPa) hard н dry moist wet D M W standard penetration test (SPT) Fb Ν friable wate N* SPT - sample recovered VL very loose bit shown by suffix 10-Oct-12 water saturated T SPT with solid cone Nc loose

L

MD

VD

D

medium dense

dense

very dense

plastic limit liquid limit

Wp

wi



Borehole ID. HA3D-260A sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 17 Mar 2016 date started: principal: 17 Mar 2016 date completed: The Lakes Stage 3 GCR NM logged by: project: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density class ification ğ samples & field tests (blows/ 100 mm) shear ⊕ remould ⊚ peak additional obs ations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ē depth (water (kPa) 8 8 8 R ML TOPSOIL: SILT: low plasticity, brown, with D VSt TOPSOIL 11111 minor organic silt, trace fine grained sand. |||||||11111 MATUA SUBGROUP MI **SILT**: low plasticity, orange brown mottled pink and white, with minor clay. М 11 ||||||11111 1 + 1++++11111 ||||||11111 11 11111 11 ||||||0 | 0 11111 0.3 m: becoming pale pink with trace fine W to S VS 176/ 28 kPa 1111 ||||||||grained sand, minor pockets of manganese. ||||||11111 11 |||||11111 0.5 φ¦¦ ⊕ 11111 VS 103/ 14 kPa 111 ||| | | | |11111 Not Encountered ||11111 ||1111 11111 |||||||||11111 ₹ ż | |111 1111 1 €¦∲¦¦ ||||11111 VS 103/ 17 kPa 11 ||11111 1111 ||||111 0.9 m: becoming minor fine to medium grained 11111 | | | |sand 1111 þ 1.0 ₽ 11111 VS 166/ 18 kPa 1111 11111 11111 111 1111 11111 11111 0 θI VS 147/ 14 kPa 11 ||||11111 11111 ||||||St 11111 111 | | | | |||||||||||11111 11111 111 | | | |1111 1.5 Hand Auger HA3D-260A terminated at 1.5 m VS 62/ 14 kPa 11 Target depth 11111 111 ||||||11 1 1 1 1 11111 11111 11 ||||||11111 11111 11 ||||||11111 | | |11111 |||||||11111 11 11111 11111 ||||||||||90 2.0 11111 | | | | |11111 111 |||||||Ę 11111 ||||||11111 111 method AD auger drilling* classification symbol & consistency / relative density support samples & field tests soil description N nil bulk disturbed sample mud VS Μ В very soft auger screwing' disturbed sample environmental sample based on Unified soft firm AS C casing D S F HA W hand auger Classification System Е penetration washbore SS split spoon sample St stiff hand auger no resistance ranging to refusal HA very stiff undisturbed sample ##mm diameter VSt U## moisture HP hand penetrometer (kPa) hard н dry moist wet D M W standard penetration test (SPT) Fb Ν friable wate N* SPT - sample recovered VL very loose bit shown by suffix 10-Oct-12 water saturated T SPT with solid cone Nc loose L e.g. B evel on date shown AD/T plastic limit liquid limit VS vane shear; peak/remouded (kPa) Wp MD medium dense blank bit vater inflow ۱۸/i R refusal D dense TC bit water outflow HB hammer bouncing VD very dense

GPJ 09-03-2016 ODS NC BOREHOLE: SOF 8 'ev:AN GLB -IBRARY.

V bi



	A TECH (•••				Borehole sheet:	; ID.		HA3D-260B
En	g	ne	erin	g ı	<u>_O(</u>	<u>]</u> -	Ha	nd Auger			project no	10.		GENZTAUC13086AP-A
lient		Th	e Lakes	; 201	12 Itc	ī				d	date star	ted:		17 Mar 2016
orinci	ipal:	-								ď	date com	nplet	ted:	17 Mar 2016
orojec	ct:	Th	e Lakes	s Sta	ige 3	GC	R			k	ogged by	oy:		NM
ocatio			age 3C &		-		-				checked			RBT
	on: Not		-		<u>*3</u> -			surface elevation: Not Specified			om horizo	-	90°	
	odel: H	•						drilling fluid:		-	ameter : 50			
lrillir	ng info	ormati	ion			mat	terial sub					_		
s t	penetration		samples & field tests		Ê	c log	ication	material description SOIL TYPE: plasticity or particle characteristic,	e lie	ency / density	vane shear ⊕remoulded ⊚peak		DCP blows/ 0 mm)	
support	1 2 penet	water		RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	(kPa) 06 02 02 02	2 4	+ 0 0 2	2
							ML	TOPSOIL: SILT : low plasticity, brown, with trace fine grained sand, trace fine grained angular gravel.	D	Н				TOPSOIL
					1		ML	SILT: low plasticity, orange brown mottled pink, with minor clay, trace fine grained sand.	-			11		MATUA SUBGROUP
					1			0.3 m: 100mm layer of sandy silt, non plastic, pink flecked white with fine to medium grained				911		VS 240 kPa
					1			sand, trace pockets of manganese. 0.4 m: becoming pale pink with minor pockets on manganese, trace clay.	М	VSt	liiii			
		ered			0.5						⊕¦ ∲ ¦ ¦ 			VS 103/ 14 kPa
z		Not Encountered						0.7 m: becoming pink flecked white.			+ + + + + + + + + + + + + + + + + + +			
								0.9 m: 100mm layer of pale pink fine to medium grained sand.	D	-				
					1.0-			1.0 m: becoming pink with trace pockets of manganese (compressible).	S	St				
								1.2 m: becoming minor fine to medium grained sand.			[VS 103/ 14 kPa -
					1									
					-		ML-MH	trace fine grained sand.						
								Hand Auger HA3D-260B terminated at 1.5 m Target depth						
					2.0-									
AS HA W	od auger o	drilling* screwir auger core		M n C c	pport mud casing netration	1 ¶− nore	N nil resistance ging to isal	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard openetroine test (SPT)	s b Cla moistu D dry	soil desc based on assificatio ure lry		&		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard
e.g. B T	bit show AD/T blank b TC bit V bit		suffix	wate	■ 10-0 leve wate	- Oct-12 v	water ate shown w	N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla	noist vet aturated Ilastic limit quid limit	it			Fb friable VL very loose L loose MD medium dense D dense VD very dense



A TETRA TE	ECH (COMP	ANY							E	Borehole	ID.		HA3D-261A
Enr	nir	nc	orin	~ I	0	а .	Ha	nd Auger		S	sheet:			1 of 1
<u> </u>				<u> </u>			<u>' 1 ia</u>	nu Augei		р	project no).		GENZTAUC13086AP-AG
client:		The	e Lakes	201	2 Itc	1				d	date start	ed:		17 Mar 2016
principa	al:	-								d	date com	plete	ed:	17 Mar 2016
project:	.:	The	e Lakes	; Sta	ge 3	} G(CR			lo	ogged by	/:		NM
locatior	n:	Sta	nge 3C 8	& St	age	3D				С	checked b	by:		RBT
position:	: Not	t Sper	cified					surface elevation: Not Specified	а	angle fro	om horizor	ntal: 9	90°	DCP id.:
drill mod			-					drilling fluid:	h	iole dia	meter : 50	mm		
drilling		rmati	on			ma	aterial sub	ostance material description		₹	vane	DC	'nD	structure and
	² penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕remoulded ⊚peak (kPa) B 0 0 00 00	00 (blov 100 m	ws/ mm)	additional observations
	ŤT					ĪT	ML	TOPSOIL: SILT : low plasticity, brown, with trace organic silt, trace fine grained sand.	D	St			П	TOPSOIL
					-		ML	SILT: low plasticity, orange brown, with minor clay, trace fine grained sand (compressible).	S					MATUA SUBGROUP
		ntered						0.6 m: becoming minor fine grained sand, minor pockets of manganese.			⊕ [•]			VS 83/ 15 kPa
∀_ Z 		Not Encountered							W		$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			- VS 91/ 14 kPa - VS 99/ 14 kPa
					-	-		1.2 m: pockets of manganese become trace.	S	VSt	+ + • + • + + + +			- VS 76/ 14 kPa - -
					- 1.5 - - - 2.0			Hand Auger HA3D-261A terminated at 1.5 m Target depth						VS 109/ 40 kPa
method AD au AS au HA ha W wa HA ha * bit e.g. AI B bit T TC	luger d luger s and au vashbo	ore iuger wn by s	ng*	pene wate	mud casing etration • ↔ ∞ • • • • • • • • • • • • • • • • • • •	n ran ran refu	date shown ow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	s b Cla moistur D dŋ M mo W we S sai Wp pla	soil desc based on assificatio re y oist	n symbol & cription h Unified on System			F firm St stiff /St very stiff /A hard Fb friable /L very loose _ loose /ID medium dense



EIRA	A TECH	COM	PANY								E	orehole	ID.	HA3D-261B
Ξn	nai	n	orir	na	1 /	ጉጥ	1 _	На	nd Auger		S	heet:		1 of 1
_1	iyi			-		_	_	i ia			р	roject no).	GENZTAUC13086AF
lient	t:	Th	e Lake	es 20)12	ltd					d	ate start	ed:	11 Mar 2016
rinci	ipal:	-									d	ate com	pleted:	11 Mar 2016
roje	ct:	Th	e Lake	s St	age	e 3	GC	R			lo	ogged by	<i>r</i> :	NM
cati	ion:	St	age 3C	: & S	tag	je 3	3D				с	hecked l	by:	RBT
ositic	on: No	ot Spe	cified						surface elevation: Not Specified	á	angle fro	om horizor	ntal: 90°	DCP id.:
			Auger						drilling fluid:	ł	nole dia	meter : 50	mm	
Irillin	ng inf	orma	tion			_	mat	erial sub			2		DOD	- trust un and
support	1 2 penetration	water	samples field test	s & RL (m)	19-19-19-19-19-19-19-19-19-19-19-19-19-1	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	DCP (blows/ 100 mm) ∾ + ∞ ∞ ₽	
						-		ML	TOPSOIL: SILT : non plastic, pale brown, minor fine grained sand.	D	St to VSt			TOPSOIL - -
						-		ML	SILT : low plasticity, orange, with minor fie grained sand, minor clay (greasy).			♥♥		MATUA SUBGROUP VS 79/ 28 kPa
					0.	.5		ML	SILT: low plasticity, pale pink, with minor clay, minor pockets of manganese, trace fine grained sand.	M	VSt	●		VS 129/ 25 kPa -
 		Not Encountered				-			graneu sanu.			⊕ • ⊕ • 		- VS 103/ 18 kPa -
					1.	.0 0.								VS 138/ 28 kPa
						-					St	 ⊕		
					1.	- .5—		· · · · · · · · · · · · · · · · · · ·	Sandy SILT: non plastic, orange brown, with fine to coarse grained sand.		Н			
*					2.	- - .0 -		-	Hand Auger HA3D-261B terminated at 1.7 m Target depth					
3	auger auger hand washt hand	/T				tion	− no re rangi refus	vater e shown v	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	s Cla moistu D dr M m W we S sa Wp pla	soil desc based on assificatio re y oist	Unified n System		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



TETRA TECH	H COMF	PANY								Boreho		D.		HA3D-262
Eng	ine	erin	a l	_0(3 -	Ha	nd Auger			sheet:				
-		e Lakes								project				GENZTAUC13086AP-/
lient:		e Lakes	201	2 110	1					date sta				17 Mar 2016
principal:		_		_					d	date co	omp	lete	ed:	17 Mar 2016
oroject:		e Lakes		-		R			lc	ogged	by:	•		NM
ocation:	Sta	age 3C a	& St	age :	3D				с	checke	ed b	y:		RBT
osition: N							surface elevation: Not Specified		angle fro					DCP id.:
rill model: drilling int		-			mat	terial sub	drilling fluid:	r	hole diar	meter :	: 50 r	nm	—	
				—			material description	Τ	sity	vane	e		CP	structure and
support support 2 penetration		samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shea ⊕ remoul ● peal (kPa 05 00 00	ar ^{ulded} ak	(blo 100	ows/) mm) ∞ ∞ ₽	additional observations
	Î				IIII	ML	TOPSOIL: SILT: low plasticity, brown, with minor fine grained sand, minor organic silt.	D	Н					TOPSOIL
						ML	SILT: low plasticity, orange brown mottled pink and white, with trace clay, trace fine grained sand, trace pockets of manganese.							
				0.5-			0.4 m: becoming orange brown with manganese pockets absent.		VSt					VS >240 kPa -
Z	Not Encountered						0.65 m: becoming pink flecked white with minor pockets of manganese.	S		 ⊕ ⊕				- - VS 103/ 14 kPa
				1.0-			0.9 m: becoming mottled orange brown with minor fine to medium grained sand.	D			 • • 			-
							1.1 m: becoming pale pink.	S			 _ 			1
	i i						1.4 m: becoming grey.	M						4
							Hand Auger HA3D-262 terminated at 1.5 m Target depth							
				2.0-				clas	sificatior					_
AS auge HA hand N wash HA hand bit sh	er drilling er screwi d auger hbore d auger hown by	ing*	pene	mud casing netration	no re rangii refus		samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	b Cla moistur D dry M mo W we	soil desc based on assificatio ure ry boist	cription In Unified In Syster	i		F S H F V	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose
e.g. AD/T B blank F TC bi V V bit	ık bit pit			wate	el on dat ter inflow ter outflo		VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	astic limit quid limit	it				MD medium dense D dense VD very dense



TETRA	A TECH	COMP	ANY							E	Borehole	ID.	HA3D-263
En	nai	no	orin	а I	~	N _	Цэ	nd Auger		S	heet:		1 of 1
	iyi					-	1 Ia	nd Auger		р	roject no).	GENZTAUC13086AP
client	t:	The	e Lakes	; 20 1	12 Itc	1				d	late starte	ed:	17 Mar 2016
orinci	ipal:	-								d	late com	pleted:	17 Mar 2016
orojeo	ct:	The	e Lakes	s Sta	ige 3	GC	R			lo	ogged by	r:	ODS
ocati	ion:	Sta	ge 3C	& St	age	3D				с	hecked b	ov:	RBT
	on: No		-		<u> </u>			surface elevation: Not Specified	6		om horizon	•	DCP id.:
	odel: H					_		drilling fluid:		-	meter : 50		
drillir	ng info	rmati	on		1	ma	terial sul	ostance		1			
support	1 2 penetration 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊛peak (kPa) 02 000 03 00000000000000000000000000000	DCP (blows/ 100 mm)	
					-			SILT: low plasticity, pale brown, with minor fine to medium grained sand.	D	VSt			TOPSOIL
					-			SILT: non plastic, orange brown, with pockets of pink clayey silt, trace clay and trace fine sand.	M				MATUA SUBGROUP VS >183 kPa
					0.5-			0.4 m: trace manganese becomes present			 		- VS >183 kPa
 		Not Encountered			-			SILT: low plasticity, pink brown, with trace clay and trace manganese.	_				VS >183 kPa
					- 1.0—			SILT : low plasticity, pink to pale brown with mottled orange, with minor manganese, trace fine sand and trace-minor clay.					VS 119/ 41 kPa
					-						 	11111	- VS >183 kPa
					-1.5			Hand Auger HA3D-263 terminated at 1.5 m					
					-			Target depth					-
					2.0-								
AS HA V	auger of auger s hand a washbo hand a	screwir uger ore		M C of pen	port mud casing etration	⊨ nor	N nil esistance ging to sal	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa)	t Cla moistu D dr	soil desc based on issification re			consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard
 bit shown by suffix e.g. AD/T B blank bit T C bit V V bit 					■ 10- leve wat	Oct-12	water ite shown w	N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	M mé W wé S sa Wp pla	oist	t		Fb friable VL very loose L loose MD medium dense D dense VD very dense



HA3D-264 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: date started: 17 Mar 2016 .

Borehole ID.

CDF_0_9_06_LIBRARY.GLB rev.aN Log COF BOREHOLE: NON CORED + DCP GCR HA - 09-03-2016 ODS.GPJ <<DrawingFille>> 11/04/2016 12:11

			e Lanes								ale start		17 Wai 2010
orir	icipal:	-								C	late com	pleted:	17 Mar 2016
oro	ject:	Th	e Lakes	Sta	ige 3	GC	R			le	ogged by	<u>-</u>	NM
006	ation:	Sta	age 3C a	& St	age	3D				c	hecked I	oy:	RBT
osi	tion: No	ot Spe	cified					surface elevation: Not Specified	6	angle fro	om horizor	ital: 90°	DCP id.:
	model: I		-					drilling fluid:	ł	nole dia	meter : 50	mm	
dri	lling info	ormat	ion	1		mat	erial sub			<u> </u>			
method &	2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) B 0 0 0 00	DCP (blows/ 100 mm)	
							ML	TOPSOIL: SILT: low plasticity, brown, with minor organic silt, trace fine to medium grained	D	VSt		1111	TOPSOIL
					-		ML	sand. SILT: low plasticity, orange brown, with minor	-				MATUA SUBGROUP
					-			fine grained sand, trace clay.	М				
					-						⊕ ● 		VS 138/ 33 kPa
		pç			0.5-								VS 166/ 33 kPa
HA	2 2 1 1 1 1	Not Encountered			-			0.7 m: becoming some fine to medium grained sand, trace streaks of manganese.			 		VS 120/ 25 kPa
					1.0-			0.9 m: becoming minor fine grained sand, manganese absent.					VS 120/ 25 kPa
					-					St	 ⊕ ⊕ 		VS 86/ 25 kPa
•	<u> </u> 				-			Hand Auger HA3D-264 terminated at 1.5 m Target depth			 		VS 70/ 18 kPa
					-								
					2.0-								
AD AS HA W	thod auger auger hand a washt	screwi auger ore		M C (port mud casing etration		N nil	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample	s t	soil deso based on			consistency / relative density VS very soft S soft F firm St stiff
HA hand auger * bit shown by suffix e.g. AD/T B blank bit T TO N ∞ water 11 water water water					er ▼ 10- leve wat	rang refus Oct-12 v	vater te shown v	U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla	y oist	1		VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



Borehole ID. HA3D-265 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 11 Mar 2016 date started: 11 Mar 2016 principal: date completed: The Lakes Stage 3 GCR NM logged by: project: Stage 3C & Stage 3D RBT location. checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density classification g (blows/ 100 mm) samples & shear ⊕ remould ⊚ peak additional obs vations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components field tests graphic I symbol Ē depth (water (kPa) 8 8 8 R ML SILT: low plasticity, pale brown, with minor D VSt MATUA SUBGROUP 11111 fine to medium grained sand. ||||||11111 11111 11 ||||||1 + 1|**o** | 11111 ₽ VS 138/ 33 kPa 11 11111 |||||11 11111 ML SILT: low plasticity, orange, with trace fine М St 1111 ||| | | | |grained sand, minor clay (greasy) | | | |11111 11 |||||11111 11111 ⊕⊝¦¦¦ 0.5 11111 VS 62/ 25 kPa 111 |||||||||11111 Not Encountered ||11111 ||| | | | |11111 SILT: low plasticity, pale orange, with trace fine grained sand, trace clay (non greasy). VSt | | |ML |||||11111 ₹ ż | |111 11111 1 ¢ | |•| ||||11111 VS 176/ 41 kPa 11 11111 1111 ||||111 GPJ. 11111 ||||||09-03-2016 ODS 1111 ||||0 ¢ 1.0 11111 VS 176/ 47 kPa 111 11111 11111 ML SILT: non plastic to low plasticity, pale pink ||||||111 11111 and orange, with some fine to medium grained sand, trace manganese pockets. 11111 0 டு VS 129/25 kPa 11 ||||11111 111 11111 1111 111 ||||||||||| | | |11111 11111 NC 111 ||||1111 <u>ا</u> BOREHOLE: 1.5 Hand Auger HA3D-265 terminated at 1.5 m VS 129/ 33 kPa 11 Target depth 11111 111 ||||||11 1 1 1 1 11111 SOF 11111 11 ||||||11111 g ||||||11111 'ev:AN ||||||||||11111 ||||| | | |11111 GLBr 11111 ||||||-IBRARY. 11111 11 1 + 111111 11111 ||||||||||90 2.0 11111 | | | | |11111 111 |||||||Ę 11111 ||||||11111 111 classification symbol & method AD auger drilling* support consistency / relative density samples & field tests soil description N nil bulk disturbed sample VS Μ mud В very soft AS auger screwing' based on Unified soft firm C casing D disturbed sample S F hand auger НА Classification System Е environmental sample penetration W washbore SS split spoon sample St stiff hand auger no resistance ranging to refusal HA very stiff undisturbed sample ##mm diameter VSt U## moisture

HP

Ν

N*

Nc

VS

R

HB

wate

T

10-Oct-12 water

vater inflow

water outflow

evel on date shown

bit shown by suffix

AD/T

blank bit

TC bit

V bi

e.g. B

hand penetrometer (kPa)

SPT - sample recovered

SPT with solid cone

hammer bouncing

refusal

standard penetration test (SPT)

vane shear; peak/remouded (kPa)

hard

friable

loose

dense

very loose

very dense

medium dense

н

Fb

VL

MD

VD

D

L

dry moist wet D M W

Wp

۱۸/i

saturated

plastic limit liquid limit



Borehole ID. HA3D-266 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd client: 17 Mar 2016 date started: principal: 17 Mar 2016 date completed: The Lakes Stage 3 GCR NM project: logged by: Stage 3C & Stage 3D location: RBT checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density classification g samples & field tests shear ⊕ remould ● peak (blows/ 100 mm) additional obs vations Ē method & support penetra moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic l symbol Ē depth (water (kPa) 8 8 8 R ML TOPSOIL: SILT: low plasticity, brown, with Μ VSt TOPSOIL 11111 minor organic silt, trace fine grained sand. 1111 1111 1111 1 + 1||||||1111 ||11 111 o∲ioji SP SAND: fine to medium grained, orange MATUA SUBGROUP ł ||3 | | | | brown VS 138/ 40 kPa D MD 0.5 ||||||l 111 111 111 1 | | | 111 + Not Encountered ||111 | | | | |111 111 | | |S | | | | ||||||₹ ż | |1111 ||||1111 11 11 | | | |Ъ SUC ||1.0 1111 11 11 111 111 11 1 111 111 111 111 11 11 **SILT**: low plasticity, orange brown, with minor fine grained sand, trace clay. Н MI М | |Ì NC 111 111 BOREHOLE: 1.5 Hand Auger HA3D-266 terminated at 1.5 m VS 215/ 25 kPa 11 Target depth 111 1111 SOF 1 1 1 1 1111 11 ||||||1111 8 SELLI ev:AN 11 ||||||||||GLB **IBRARY** 11 ¥111 11 1111 ||||81111 90 2.0 11111 111 11111 Ę 11111 11111 111 11 consistency / relative density VS Verv 20⁴ method AD auger drilling* classification symbol & support samples & field tests soil description N nil bulk disturbed sample very soft soft firm mud В Μ AS auger screwing' disturbed sample environmental sample based on Unified C casing D S F HA W hand auger Classification System Е penetration washbore SS split spoon sample St stiff hand auger HA very stiff undisturbed sample ##mm diameter VSt no resistance ranging to refusal U## moisture HP hand penetrometer (kPa) hard н dry moist wet saturated D M W standard penetration test (SPT) Fb Ν friable wate N* SPT - sample recovered VL very loose bit shown by suffix 10-Oct-12 water T SPT with solid cone Nc loose L e.g. B evel on date shown AD/T plastic limit liquid limit VS vane shear; peak/remouded (kPa) Wp MD medium dense blank bit vater inflow wi

R

HB

water outflow

TC bit

V bi

refusal

hammer bouncing

D

VD

dense

very dense



TETRA TECH	1 COMP	'ANY								Borehole	ID.		HA3D-267
Enai	ine	erin	a l	LO() -	- Har	nd Auger			sheet:			
			<u> </u>							project no		—	GENZTAUC13086AP-
lient:		e Lakes	201	2 //a	1			date started:					11 Mar 2016
rincipal:									d	late com	plete	əd:	11 Mar 2016
roject:	The	e Lakes	; Sta	ige 3	GC	CR			lc	ogged by	/:		NM
ocation:	Sta	age 3C a	& St	age :	3D				С	hecked b	oy:	_	RBT
osition: No	•						surface elevation: Not Specified		•	om horizon			DCP id.:
rill model: I		-				ouk	drilling fluid:	h	iole diar	meter : 50	mm		
drilling inf ਨ			<u> </u>			aterial subs	stance material description	—	"ity	vane	Dr	CP	structure and
support support		samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕remoulded ●peak (kPa) 05 00 000	(blo 100	lows/) mm)	additional observations
						ML	SILT: non plastic, pale brown, with minor fine grained sand, minor fine to medium grained angular gravel.	D	Н				TOPSOIL -
						ML-MH	SILT : low to medium plasticity, orange brown, with trace clay, trace fine grained sand, trace black sand.	M	VSt				MATUA SUBGROUP VS >240 kPa
				0.5-		ML	SILT: low plasticity, pale pink mottled orange, with minor fine grained sand, trace clay, trace pockets of manganese.						VS 120/ 40 kPa
z 	Not E							M to W	/ St				VS 54/ 25 kPa -
	 			1.0			1.0 m: becoming minor fine to medium grained sand.		VSt				VS 120/ 24 kPa -
						ML	Sandy SILT: low plasticity, pale pink mottled orange, with fine to medium grained sand, trace pockets of manganese.	_				111	- VS 129/ 25 kPa -
				-			Hand Auger HA3D-267 terminated at 1.5 m Target depth						VS 129/ 33 kPa -
nethod				- 2.0 -			samples & field tests			n symbol &			consistency / relative density
AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger * bit shown by suffix M mud C casing penetration water water 10 ✓ 110		mud casing netration 	no r rang refu	date shown	B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa)	b Cla moistur D dry M mo W we S sa Wp pla	re y oist	u Unified on System		F S F F S V F F V L	VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense		



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3D-268
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	17 Mar 2016
date completed:	17 Mar 2016
logged by:	NM
checked by:	RBT

position: Not Specified drill model: Hand Auger								surface elevation: Not Specified drilling fluid:		•	om horizont meter : 50 r		DCP id.:
drilling information						ma	aterial su	bstance					
method & support	¹ 2 penetration		samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	(kPa)	DCP (blows/ 100 mm)	structure and additional observations
E HY		·			- - - - - - - - - - - - - - - - - - -		ML ML ML ML	SILT: low plasticity, brown, with minor organic silt. SILT: low plasticity, pink mottled orange brown and white, with minor clay, minor pockets of manganese. Sandy SILT: low plasticity, pink flecked with, with fine to medium grained sand, minor lenses of pink low plasticity silt. SILT: low plasticity, pink flecked with, minor fine grained sand.	M	VSt	$\begin{array}{c} & & & \\ & & & & \\ & & & \\ & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & \\$		TOPSOIL VS >240 kPa MATUA SUBGROUP VS 196/ 54 kPa VS 166/ 25 kPa VS 121/ 25 kPa VS 140/ 25 kPa
<u> </u>					- 1.5 - - - 2.0			Hand Auger HA3D-268 terminated at 1.5 m Target depth					VS 129/ 27 kPa
meth AD AS HA W HA * e.g. B T V	auge auge hand wash hand bit s AD/	er drilling er screw d auger hbore d auger d auger thown by T hk bit	ng*	pen wat	etration etration er er leve wate	no rar ref Oct-12		samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	b Cla moistur D dr M mo W we S sa Wp pla	soil desc based on ussification re y bist	symbol & cription Unified un System	 	consistency / relative density VS very soft S soft - firm St stiff VSt very siff H hard Fb friable VL very loose L loose MD medium dense O dense /D very dense



Borehole ID. HA3D-269 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 17 Mar 2016 date started: principal: 17 Mar 2016 date completed: The Lakes Stage 3 GCR logged by: ODS project: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density class ification g (blows/ 100 mm) samples & shear ⊕ remould ⊚ peak additional obs /ations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components field tests graphic l symbol Ē depth (water (kPa) 8 8 8 R SILT: low plasticity, pale brown, with minor fine to medium grained sand. D VSt TOPSOIL 11111 |||||||11111 11111 11 ||||||1 + 1++++11111 SILT: non plastic, orange brown, with pockets of pink clayey silt, trace clay and trace fine sand. D to M MATUA SUBGROUP 11 | | |<mark>|</mark>|| 11111 |||VS >183 kPa | | | | |11111 1111 ||| | | ||||||11111 11 ||||11111 ¦ø 0.5 ₽ï VS 160/ 16 kPa 111 111 |||||||||11111 SILT: low plasticity, pink to pale brown with mottled orange, with minor manganese, trace Encountered ||1111 |||||||||11111 fine sand and trace-minor clay, ||||11111 • ∳ ₹ ż | |||||||1 VS 152/ 55 kPa ę |||||||||11111 11 11111 1111 ||||| | | |GPJ. | | | | |11111 ||||09-03-2016 ODS 1111 ||||0 1.0 h۳. 11111 VS 136/ 19 kPa SILT: low plasticity, orange, with minor clay and trace fine sand. ||11111 11111 111 1111 11111 | **(** | 11111 ⊕ SILT: low plasticity, pink brown, with minor clay and trace fine sand. VS 151/33 kPa М ||||11111 11111 111 1.3 m: trace manganese becomes present 1111 111 ||||||||||||||||11111 11111 NC | | |||||1111 6 BOREHOLE: 1.5 Hand Auger HA3D-269 terminated at 1.5 m VS 133/ 43 kPa 11 Target depth 11111 111 ||||||11 1 1 1 1 11111 SOF 1 1 1 1 11 ||||||11111 g 1111 'ev:AN 11 | | | | |11111 ||||| | | |GLBr 11111 |||||||-IBRARY. 11111 11 11 11111 11111 ||||||||||90 2.0 11111 | | | | |11111 111 |||||||Ę 11111 ||||||11111 111 method AD auger drilling* classification symbol & support consistency / relative density samples & field tests soil description N nil bulk disturbed sample VS Μ mud В very soft AS auger screwing' disturbed sample environmental sample based on Unified soft firm C casing D S F hand auger HA Classification System Е penetration w split spoon sample undisturbed sample ##mm diameter washbore SS St stiff hand auger HA very stiff VSt no resistance ranging to refusal U## moisture HP hand penetrometer (kPa) hard н

standard penetration test (SPT)

vane shear; peak/remouded (kPa)

SPT - sample recovered

SPT with solid cone

hammer bouncing

refusal

Ν

N*

Nc

VS

R

HB

wate

T

10-Oct-12 water

vater inflow

water outflow

evel on date shown

bit shown by suffix

AD/T

blank bit

TC bit

V bi

e.g. B

dry moist wet D M W

Wp

۱۸/i

saturated

plastic limit liquid limit

Fb

VL

MD

VD

D

L

friable

loose

dense

very loose

very dense

medium dense



TETRA TECH	HCOMF	'ANY							Borehole	ID.		HA3D-270	
Ena	Engineering Log - Hand Auger									sheet:			
		e Lakes			_					project no			GENZTAUC13086AP-
lient:		e Lanes	201	2 110	1					late starte			17 Mar 2016
rincipal:		_		_					d	late comp	plete	:d:	17 Mar 2016
roject:		e Lakes		-		R			lc	ogged by	<i>r</i> :		NM
ocation:	Sta	age 3C a	& St	age 3	3D				C	hecked b	oy:		RBT
osition: N							surface elevation: Not Specified		-	om horizon		€0°	DCP id.:
rill model: drilling in		-			ma	terial sub	drilling fluid:		iole diar	meter : 50	mm		
			T			_	material description	—	sity	vane	DC		structure and
support support 2 penetration		samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕remoulded ⊚peak (kPa) 03 00 05 03	(blov 100 n	ows/ mm) ∞∞₽	additional observations
						ML	SILT: low plasticity, brown, with minor fine grained sand, trace organic silt, trace fine angular gravel.	D	Н				TOPSOIL -
						ML	SILT: low plasticity, brown mottled pink and orange, with trace clay.	-		 @	 		MATUA SUBGROUP
							0.4 m: becoming trace pockets of manganese.						VS >240 kPa -
				0.5		ML	SILT: low to medium plasticity, orange brown,	M	VSt	' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	 		VS >240 kPa -
z	i						with some clay, minor fine grained sand.0.9 m: becoming low plasticity, trace clay.			· · · · · · · · · · · · · · · · · · ·			- VS 186/ 40 kPa
				1.0				M to W		- -⊕ - -			VS 156/ 25 kPa -
													VS 86/ 14 kPa -
				- 1.5 - -			Hand Auger HA3D-270 terminated at 1.5 m Target depth						VS 99/ 24 kPa - -
				- 2.0									
AS auge HA hand W wash HA hand	er drilling er screwi d auger hbore d auger	ing*	M r C c pene	casing etration	no refus		samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT- sample recovered	s b Cla moistu D dry	soil desc based on assification ure ry boist	n symbol & cription		C V S F S V H F	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose
* bit sh e.g. AD/T B blank T TC bi V V bit	ık bit pit	suffix		■ 10-C level wate	Oct-12 v el on dat er inflow er outflo	ate shown w	N SPT - Sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S sa Wp pla	aturated astic limit quid limit			L	VL very losse L loose MD medium dense D dense VD very dense



TETRA TECH	COMPANY							P	Borehole II	iD.	HA3D-271
Enai	inoori		· ~	~	Цa	nd Allank		s	sheet:		1 of 1
Eliyi					Παι	nd Auger		р	project no.	·	GENZTAUC13086AP-A
client:	The Lak	es 20′	12 Itd	Ī	-		-	d	date starte	ed:	14 Mar 2016
principal:	-							d	date comp	pleted:	14 Mar 2016
project:	The Lak	es Sta	age 3	GC	R			lc	ogged by:	:	NM
ocation:	Stage 30		-					с	checked by	by:	RBT
	lot Specified					surface elevation: Not Specified	Ę		om horizonta	•	DCP id.:
	Hand Auger				<u> </u>	drilling fluid:	h	iole diar	ameter : 50 n	mm	
drilling inf		<u> </u>		mate	terial sub			<u>5</u>			Survey and
support support penetration		es & ests (E) RF	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	(kPa)	DCP (blows/ 100 mm)	<i>.</i>
>>	∞ 3 	<u> </u>	с		ອີດີ ML	SILT: non plastic, pale brown, with minor fine grained sand, trace fine to medium angular gravel.	E 8	H			FILL
					ML	SILT: low plasticity, orange brown, with trace fine grained sand, trace clay.					MATUA SUBGROUP VS >240 kPa
			0.5 —			At 0.6m: becoming minor fine grained sand.			 		
z 	Ž 					At 0.7m: becoming minor fine to medium grained sand. At 0.9m: becoming some fine to medium	М	VSt	€ 0 		- VS 111/ 33 kPa
			1.0-		. ML	Sandy SILT: non plastic, orange brown, with		H to	●		-
						fine to medium grained sand, trace clay.		VSt			- VS >240 kPa -
			1.5 - - - - 2.0-			Hand Auger HA3D-271 terminated at 1.5 m Target depth					VS 86/ 25 kPa
AS auger HA hand W washt HA hand	auger drilling* M mud auger screwing* hand auger washbore hand auger bit shown by suffix H = 10 bit shown by suffix			no re: rangii rangi refusa	water ite shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear, peak/remouded (kPa)	s ba Clas moistur D dry M mo W we S sat Wp pla	soil desc based on assification ure ry boist	n symbol & cription i Unified on System	F F F F F C C C C C C C C C C C C C C C	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3D-272
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	04 Apr 2016
date completed:	04 Apr 2016
logged by:	ODS
checked by:	RBT

position: Not Specified drill model: Hand Auger		surface elevation: Not Specified drilling fluid:	angle from horizontal: hole diameter : 50 mm	90° DCP id.:		
drilling information	material subs	tance				
samples & sample	RL (m) depth (m) graphic log classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	bear (blu speak (blu) (blu speak (blu) (blu (blu)) (blu) (blu) (blu)) (blu) (blu)) (blu) (blu)) (blu) (blu)) (blu) (blu))	CP structure and additional observations		
Not Encountered 1 1 1 1 1 Not Encountered 1 1 1 1 1		Sandy SILT: non plastic, orange brown with mottled grey and dark brown, sand is fine to coarse. 0.7 m: becoming orange brown (no mottling) 0.7 m: becoming orange brown (no mottling) SAND: fine to medium grained, pale brown, with trace fine gravel. Hand Auger HA3D-272 terminated at 1.5 m	M St	w ∞ ♥ III FILL III VS 99/ 70 kPa III VS 99/ 70 kPa III VS 103/ 58 kPa III VS 103/ 58 kPa III VS 78/ 58 kPa III VS 78/ 58 kPa III VS 103/ 58 kPa III VS 103/ 58 kPa III VS 103/ 58 kPa III VS 103/ 58 kPa III VS 103/ 58 kPa III VS 103/ 58 kPa III VS 103/ 58 kPa III VS 103/ 58 kPa IIII VS 103/ 58 kPa		
I I I	2.0 - 2.	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SB bulk disturbed sample U## undisturbed sample U## undisturbed sample U# undisturbed sample N standard penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear, peak/remouded (kPa) R refusal				



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location.

Borehole ID.	HA3D-274
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	04 Apr 2016
date completed:	04 Apr 2016
logged by:	ODS
checked by:	RBT

ocation: Sta	age 3C a	& Stag	e 3	D				С	hecked by:	RBT
position: Not Spe	ecified					surface elevation: Not Specified	а	ngle fro	om horizontal: 90°	DCP id.:
drill model: Hand	Auger					drilling fluid:	h	ole dia	meter : 50 mm	
drilling informat	tion			mate		stance				
method & support 2 penetration 3 water	samples & field tests	RL (m)	aeprn (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) B D CP (blows/ 100 mm) (kPa) B C P (blows/ 100 mm)	
N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N		<u> </u>	5		3) 3)	SILTY SAND: fine to coarse grained, pale brown with mottled orange brown. SILT: non plastic to low plasticity, orange brown with mottled grey and brown, with trace fine to coarse sand. SAND: fine to medium grained, yellow brown with mottled grey and brown, with some silt. SILT: non plastic, orange brown with mottled pale brown, with minor fine to coarse sand. SILT: non plastic, orange brown with mottled pale brown, with minor fine to coarse sand. SILT: non plastic, orange brown with mottled pale brown, with minor fine to coarse sand. SILT: low plasticity, orange brown, with trace fine sand. Hand Auger HA3D-274 terminated at 1.5 m Target depth	M	SP VSt	$\begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	FILL VS 233/ 46 kPa VS 176/ 43 kPa VS 231/ 54 kPa VS 136/ 38 kPa VS 103/ 31 kPa
	īng*	support M mud C casin penetrat	ng tion	N ronoresiste erefusal cct-12 was on date inflow outflow	g to ter shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear, peak/remouded (kPa) R refusal	s ba Clas moistur D dry M mo W we S sat	oil desc ased on ssificatio re vist t turated ustic limit	I I	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3D-276
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	04 Apr 2016
date completed:	04 Apr 2016
logged by:	ODS
checked by:	RBT

			ige SC i								neckeu	-							
•		ot Spec						surface elevation: Not Specified		•	om horizor		90°	DCP id.:					
drill model: Hand Auger drilling fluid: drilling information material substance								h	iole dial	meter : 50	mm								
ariiii	-	ormati	on			mate				>		_							
method & support	1 2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa)	(blo 100	CP ows/ mm)						
					- - - 0.5 -			Sandy SILT: non plastic, orange brown with mottled grey to dark brown, sand is fine to coarse. SILTY SAND: fine to coarse grained, orange brown with mottled grey to dark brown.	D to M	VSt									
N			Not Encountered							- - 1.0			SILT: non plastic, orange brown with mottled brown and pink brown, with some fine to coarse sand. 0.85 to 0.9 m: trace manganese is present 0.95 m: sand becomes trace	M					VS >240 kPa VS 160/ 46 kPa
					-			1.2 to 1.5 m: pockets of pink clayey silt (low plasticity)						VS 170/ 44 kPa					
					1.5-			Hand Auger HA3D-276 terminated at 1.5 m				11		VS 178/ 40 kPa					
¥ ¥					- - 2.0-			Target depth		161									
method AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger		ıg*	M n C c pen wat	etration		ater	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT sample recovered Nc SPT with solid cone	s b Cla moistur D dry M mc W we S sai	soil desc ased on ssificatio re / bist et turated	Unified on System			consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose						
e.g. B T V	AD/T blank TC bit V bit					er inflow er outflow		VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing		astic limit uid limit			1	MD medium dense D dense VD very dense					



Client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3D-278
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	04 Apr 2016
date completed:	04 Apr 2016
logged by:	ODS
checked by:	RBT

		lot Spe	rified		- <u>J</u> -			surface elevation: Not Specified	a		om horizontal:	90°	DCP id.:
		Hand A						drilling fluid:		-	meter : 50 mm	50	Dor Id
drilli	ing in	formati	on			mate	rial sub	stance					
method & support	1 2 penetration		samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕ remoulded ⊚ peak (blo 100 (kPa)	CP bws/ mm)	structure and additional observations
		Not Encountered			- - - - - - - - - - - - - - - - - - -	5		SILT: non plastic, orange brown with mottled grey and brown, with trace fine to coarse sand and trace fine to medium gravel.	D to M	se VSt St			FILL VS >240 kPa VS 220/ 24 kPa VS 103/ 70 kPa VS 70/ 58 kPa
					- - 2.0			Hand Auger HA3D-278 terminated at 1.5 m Target depth					VS 93/ 54 kPa
e.g. AD/T B blank bit							iter shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	s ba Clas moistur D dry M moo W we S sat Wp pla	oil desc ased on ssificatio	Unified in System	I S S S S S S S S S S S S S S S S S S S	F firm St stiff /St very stiff H hard Fb friable /L very loose L loose MD medium dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3D-280
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	04 Apr 2016
date completed:	04 Apr 2016
logged by:	ODS
checked by:	RBT

	10 10			-							200	
position: No drill model: I							surface elevation: Not Specified		•	om horizontal: § meter : 50 mm	90°	DCP id.:
drilling inf	-				drilling fluid: material substance							
method & support 2 penetration	sa fie	mples & eld tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane DC shear ⊕remoulded ⊚peak 100 1 (kPa) 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ws/ mm)	structure and additional observations
				0.5			Sandy SILT: non plastic, orange brown with mottled brown and orange, sand is fine to coarse. Trace fine to medium gravel.	м	VSt			VS >240 kPa VS >240 kPa VS >240 kPa VS >240 kPa
method AD support AD auger drilling* M AS auger screwing* M HA hand auger C W washbore penetration HA hand auger water * bit shown by suffix e.g. B blank bit T T T C bit water						shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	s b Cla moistuu D dr M moi W we S sa Wp pla	soil desc ased on ssificatio re y bist	r iption Unified in System		consistency / relative density /S very soft /S soft = firm St stiff /St very stiff H hard Fb friable /L very loose loose MD medium dense O dense /D very dense



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

Borehole ID.	HA3D-282
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	04 Apr 2016
date completed:	04 Apr 2016
logged by:	ODS
checked by:	RBT

location	n: Sla	ige 3C	& 31	age .	30				С	hecked by	y:	RBT
position:	Not Spe	cified					surface elevation: Not Specified	â	angle fro	om horizont	al: 90°	DCP id.:
drill mode	el: Hand A	Auger					drilling fluid:	ł	nole dia	meter : 50 r	nm	
drilling	informati	on			mate		ostance					
	² penetration ³ water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	(kPa)	DCP (blows/ 100 mm)	structure and additional observations
				-			SILTY SAND: fine to coarse grained, orange brown with mottled grey.	M	VSt			FILL
	Encountered			0.5			fine to coarse sand.			 @ 		VS >240 kPa VS >240 kPa
	Vot			- - 1.0			SAND: fine to coarse grained, grey.					
				-			SILT: non plastic, orange brown with mottled grey and dark brown, with minor fine to coarse sand. Hand Auger HA3D-282 terminated at 1.4 m					VS >240 kPa
				1.5 — - -			Target depth					
				2.0-								
AS au HA ha W wa HA ha	uger drilling uger screwin and auger ashbore and auger	ng*	pene	nud casing etration	− no resi ranging refusal	g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet				consistency / relative density /S very soft S soft F firm St stiff /St very stiff I hard Fb friable /L very loose
e.g. AD/T B blank bit						N* SPT - sample recovered I on date shown Nc SPT with solid cone r inflow VS vane shear; peak/remouded (kPa) r outflow R refusal r outflow HB hammer bouncing			astic limit uid limit			I very loose loose MD medium dense D dense /D very dense



A TETRA TECH COMPANY										Borehole ID.			HA3D-284																				
Engineering Log							a - Hand Auger					heet:			1 of 1																		
		-		e Lakes			-					roject n			GENZTAUC13086AP-/																		
clie				e Lakes	201	12 110	1					ate star			14 Mar 2016																		
principal: -								_				ate com		ted:	14 Mar 2016																		
pro	ojec	et:		e Lakes		-		R			lc	bgged by	y:		NM																		
loc	atio	on:	Sta	age 3C	& St	age	3D				С	hecked	by:		RBT																		
· ·		n: No	•						surface elevation: Not Specified		-	om horizo			DCP id.:																		
		del: H		-			mat	erial sul	drilling fluid:			meter : 50	5 1111	1																			
		ion		samples &			5	ion	material description		// isity	vane		CP	structure and																		
method &	support	2 penetration	water	field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕ remoulded ⊚ peak (kPa) B 00 00 00 B 00 B 00	10	lows/ 0 mm) , _{∞ ∞}																			
						-		ML	TOPSOIL: SILT : non plastic, pale brown, with minor fine to medium grained sand, trace fine to medium grained angular gravel.	D	H			ayated 	TOPSOIL excavated																		
						-		ML	SILT: low plasticity, orange brown, with minor fine grained sand, trace clay.	D to M					MATUA SUBGROUP																		
						-								m m 0(VS >240 kPa -																		
			Intered			0.5-			At 0.6m: becoming some fine to medium grained sand.				۹ii																				
	 z		Not Encountered			-	-					●			VS 156/ 25 kPa																		
						1.0-		ML	Sandy SILT: non plastic, yellow brown, with fine to medium grained sand.		H to MD		•		VS >240 kPa																		
						-		SP	SAND: fine to medium grained, grey.	W	MD																						
						-		•			H				-																		
						-		ML	SILT: low plasticity, orange brown, with minor clay, trace fine grained sand.						-																		
						-	-		Hand Auger HA3D-284 terminated at 1.5 m Target depth						VS >240 kPa -																		
						-	-								-																		
						2.0-	-								-																		
me	tho	d	drillie c	*		port		<u> </u>	samples & field tests		sification soil desc	n symbol 8			consistency / relative density																		
AD AS HA W HA		auger of auger s hand a washbo hand a	screwi uger ore			mud casing etration	n ¶− nore	N nil esistance ing to sal	B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa)	b Cla moistu D dr	ased on ssificatio				VS very soft S soft F firm St stiff VSt very stiff H hard																		
e.g. AD/T B blank bit T T bit						/ suffix			suffix			suffix			Iffix			t by suffix ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓			/ suffix			by suffix			N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	M mo W we S sa Wp pla	bist	ated ic limit			Fb friable VL very loose L loose MD medium dense D dense VD very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location.

Borehole ID.	HA3D-286
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	14 Mar 2016
date completed:	14 Mar 2016
logged by:	ODS
checked by:	RBT

location:	Sta	ge 3C ð	s St	age	3D				C	hecked I	oy:	RBT	
position: No	ot Spec	cified					surface elevation: Not Specified	а	ingle fro	om horizor	ntal: 90°	D° DCP id.:	
drill model:	Hand A	luger					drilling fluid:	h	iole dia	meter : 50	mm		
drilling inf	ormati	on			mate		stance					1	
method & support 2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕ remoulded ⊛ peak (kPa) B € £ 000	DCP (blows/ 100 mm)	structure and additional observations	
				-			SILT: non plastic, dark brown, with trace fine sand.	D	VSt			TOPSOIL	
				-			SILT: non plastic, brown with mottled grey, with some fine sand.	D to M		¶ 		FILL VS >183 kPa	
	p			0.5			SILT: non plastic to low plasticity, brown with mottled orange brown and dark brown, with trace fine sand and trace clay.					VS >183 kPa	
				-			0.7 to 0.85 m: becomes mottled pink					VS >183 kPa	
				1.0			SILT: low plasticity, orange, with minor clay and trace fine sand. Is "greasy".	M				MATUA SUBGROUP VS 151/ 34 kPa	
				- - -1.5-								VS 124/22 kPa	
				-			Hand Auger HA3D-286 terminated at 1.5 m Target depth					VS 140/ 26 kPa	
				2.0-									
AS auger HA hand W washl	drilling* screwir auger oore auger		Min Co pen	etration	I	nil istance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	s b Cla moistur D dry M mo	soil desc ased on ssification re bist	•		consistency / relative density /S very soft S soft = firm St stiff /St very stiff H hard =b friable	
* bit sh e.g. AD/T B blank T TC bit V V bit		suffix	wate	■ 10- leve	Oct-12 wa el on date er inflow er outflow	shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	M moist W wet S saturated Wp plastic limit WI liquid limit			1 1 1	/L very loose - loose MD medium dense D dense /D very dense	



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3D-288
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	14 Mar 2016
date completed:	14 Mar 2016
logged by:	ODS
checked by:	RBT

ocation: Stage 3C	& Stage :	50		checked by:	RBT
oosition: Not Specified			surface elevation: Not Specified	angle from horizontal: 90°	DCP id.:
drill model: Hand Auger			drilling fluid:	hole diameter : 50 mm	
drilling information		material sub	stance		
samples & samples & field tests	RL (m) depth (m)	graphic log classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	Condition condit)
M M <td><u> </u></td> <td></td> <td>SILT: non plastic, dark brown, with trace fine sand. SILT: non plastic, brown with mottled orange-brown and grey, with minor fine sand and trace clay. Sandy SILT: non plastic, brown, sand is fine to coarse. SILT: low plasticity, orange, with minor clay and trace fine sand. Is "greasy". Hand Auger HA3D-288 terminated at 1.5 m Target depth</td> <td>D VSt 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</td> <td>TOPSOIL FILL VS >183 kPa VS >183 kPa MATUA SUBGROUP VS >183 kPa VS >183 kPa</td>	<u> </u>		SILT: non plastic, dark brown, with trace fine sand. SILT: non plastic, brown with mottled orange-brown and grey, with minor fine sand and trace clay. Sandy SILT: non plastic, brown, sand is fine to coarse. SILT: low plasticity, orange, with minor clay and trace fine sand. Is "greasy". Hand Auger HA3D-288 terminated at 1.5 m Target depth	D VSt 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	TOPSOIL FILL VS >183 kPa VS >183 kPa MATUA SUBGROUP VS >183 kPa VS >183 kPa
	leve	N nil ► no resistance ranging to ◄ refusal Oct-12 water el on date shown er inflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal		



TETRA TECH COMPANY									В	Borehole	ID.	HA3D-290	
Enai	ne	erin	a I	-0(<u>d</u> -		nd Auger			heet:			
		e Lakes								project no		GENZTAUC13086AP-A	
client:		Lakes	201	2 110	1					late start		14 Mar 2016	
principal:			-							late com	•		
project:		e Lakes		-		R			lo	ogged by	/:	NM	
ocation:	Sta	ge 3C &	≩ Sta	age	3D				cl	hecked I	oy:	RBT	
osition: N							surface elevation: Not Specified		•	om horizor meter : 50		DCP id.:	
drill model: drilling inf		-			ma	aterial sub	drilling fluid: pstance						
r ntion		samples &			D _D	tion	material description		:y / ensity	vane	DCP (blows/	structure and additional observations	
metnod & support 2 penetration	° water	field tests	RL (m)	depth (m)	graphic log		SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕ remoulded ⊚ peak (kPa) 00 00 00 00 00 00 00 00 00 0	100 mm	1) P	
				-		ML	SILT: low plasticity, pale brown, with minor fine to medium grained sand, trace fine to medium angular gravel.	D	Н			- VS 215/40 kPa	
		1		0.5-		ML	SILT : low to medium plasticity, brown, with minor fine grained sand, minor clay.	M			 	MATUA SUBGROUP	
	Not Encountered			-			At 0.6m: becoming orange brown.		VSt	 			
				-		ML	SILT: low plasticity, orange brown, with minor fine grained sand.		H	- ⊕ © - ⊕ © 			
		1		1.0-								 VS 215/ 34 kPa 	
				-							JIIII	 VS 215/ 34 kPa 	
				- 1.5 - - - -	-		Hand Auger HA3D-290 terminated at 1.5 m Target depth					 VS 233/33 kPa 	
method AD auger AS auger HA hand W wash HA hand	r drilling* r screwin; auger bore auger	ng*	pene	etration	n no rang rang refu:	N nil resistance ging to usal water ate shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	b Cla moistur D dry M mc W we	soil desci based on assification re y oist	 	· · · · · · · · · · · · · · · · · · ·		



TETRA TECH COMPANY										В	orehole	ID.		HA3D-292		
Fnc	air	ne	orin	u I	0	a -	Ha	nd Auger		S	heet:			1 of 1		
<u> </u>	<u></u>									р	roject no).		GENZTAUC13086AP-A		
client:		The	e Lakes	201	2 Ito	1				d	ate start	ed:		14 Mar 2016		
principa	al:	-								d	ate com	plete	d:	14 Mar 2016		
project:	:	The	e Lakes	Sta	ge 3	GC	R			lc	ogged by	/:		NM		
location	า:	Sta	ge 3C &	≩ St	age	3D				C	hecked b	by:	_	RBT		
position:		•						surface elevation: Not Specified	a	angle fro	om horizor	ntal: 9	0°	DCP id.:		
drill mode			0			1	terial aut	drilling fluid:	ł	nole diar	meter : 50	mm				
drilling		mau		<u> </u>			iterial sub	material description		sity	vane	DC	P	structure and		
method & support	² penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕ remoulded ⊚ peak (kPa) 03 00 05 00	(blow 100 n ∾ + ∞	ws/ nm) ∞ ₽	additional observations		
							ML	SILT: low plasticity, pale brown, with minor fine to medium grained sand, trace fine to medium grained angular gravel (friable).	D	H						
			1				ML	SILT: low plasticity, orange brown, with minor	_					VS >240 kPa MATUA SUBGROUP		
					0.5 —			fine grained sand, minor clay.		Vet				- VS >240 kPa -		
		Not Encountered			-			At 0.6m: becoming pale orange with fine to medium grained sand, trace manganese.	M	VSt	□			- VS 156/ 33 kPa -		
					1.0		ML	SILT : low plasticity, pale orange brown, with minor clay, trace fine to medium grained sand, trace manganese.	M to W		⊕ ⊕ ● 			VS 176/ 25 kPa -		
								At 1.3m: becoming orange brown with manganese absent.		VSt	⊕ @ 			VS 94/ 14 kPa -		
								Hand Auger HA3D-292 terminated at 1.5 m Target depth						VS 176/ 25 kPa - -		
					2.0-											
AS au HA ha N wa HA ha	uger d uger s and au ashbo and au	ore	ng*		etration	ì ¶− nore	N nil resistance ging to usat	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	b Cla moistur D dr M mo W we	soil desc pased on issificatio re y pist et	•		C V S F S V H F	firm St stiff /St very stiff		
e.g. AD 3 bla	D/T ank bi C bit		uiix	► -	leve wate		ate shown w	Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	turated astic limit uid limit			D	MD medium dense		



Borehole ID. HA3D-296 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 29 Mar 2016 date started: 29 Mar 2016 principal: date completed: The Lakes Stage 3 GCR ODS project: logged by: Stage 3C & Stage 3D location: RBT checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm material substance drilling information consistency / relative density DCP material description vane structure and classification go samples & field tests shear ⊕ remould ● peak (blows/ 100 mm) additional obs vations Ê method & support penetra moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ê depth (water (kPa) RL SILT: low plasticity, pale brown, with minor fine grained sand, trace fine grained angular ML D VSt TOPSOIL Шİ gravel. ||||||11111 11 1 | | | | |||||| | | || | | | |11111 11 | | | |11111 11 **SILT**: non plastic, brown with mottled pink brown, with minor fine to coarse sand. MATUA SUBGROUP i i 🖣 i i i i 11 VS >240 kPa 1111 |||||| | | |11111 | | | | |||| | | |111 0.5 111 0.5 m: trace manganese becomes present VS >240 kPa 1111 11111 |||||||||11111 Not Encountered ||| | | | |11111 ||||• 11111 ₹ ż Æ |||||||||VS 103/ 17 kPa ||||| | | |11111 11 11111 11111 ||||| | | |09-03-2016 ODS.GPJ SILT: low plasticity, orange brown with mottled dark brown, with minor clay and trace fine sand. Is "sticky". 11111 | | | |⊕¦ | | | 11111 ||||1.0 11111 VS 94/ 15 kPa St 11111 | | | | |11111 11111 111 |||||||||||||||||11111 111 ||||||11111 ||||| | | | | | 11111 VSt VS 106/ 25 kPa ORFD | | | |11111 111 ||||| | | |11111 NON 11111 | | |||||COF BOREHOLE: 1.5 Hand Auger HA3D-296 terminated at 1.5 m VS 145/ 33 kPa Target depth 11111 111 ||||||11111 111 ||||||8 |||||||||ev:AN |||||| | | | |11111 ||||||||||GLB | | |11111 ||||||LIBRARY 11111 90 Ë

	-			
method AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger	support M mud N nil C casing penetration resistance ranging to refused	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	classification symbol & soil description based on Unified Classification System moisture D dry M moist	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable
* bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	water I0-Oct-12 water level on date shown water inflow water outflow	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W wet S saturated Wp plastic limit WI liquid limit	VL very loose L loose MD medium dense D dense VD very dense



TETRA TECH	H COMF	'ANY	Y						E	Borehole	ID.	HA3D-298		
Ena	inc	orin	~ I		A _	Цэ	nd Augor		S	sheet:		1 of 1		
Liig			-		-	<u> </u>	nd Auger		p	project no).	GENZTAUC13086AP-		
client:	The	e Lakes	201	2 Itc	1				d	date start	.ed:	14 Mar 2016		
principal:	-								d	date com	pleted:	14 Mar 2016		
project:	The	e Lakes	Sta	ige 3	; GC	;R			lc	ogged by	y:	NM		
location:	Sta	che che che che che che che che che che					checked I	by:	RBT					
position: N							surface elevation: Not Specified	ŧ	angle fro	om horizor	ntal: 90°	DCP id.:		
drill model:		-			1 <u></u>	iterial sub	drilling fluid:		nole diar	imeter : 50	mm			
drilling inf			<u> </u>				ostance material description		sity	vane	DCP	structure and		
method & support 2 2 penetration		samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕remoulded ⊚peak (kPa) S		additional observations		
						ML	TOPSOIL: SILT : low plasticity, pale brown, with minor fine grained sand, trace fine grained angular gravel.	D	H					
				4		ML	SILT: low plasticity, pink flecked white, with minor clay, trace manganese.	M	VSt		● ● 	MATUA SUBGROUP VS >240 kPa		
	sred			0.5				W	St	● ●		VS 101/ 14 kPa		
Z							At 0.8m: becoming some fine to medium grained sand. AT 0.9m: sand becomes absent.		VSt	● ●		- VS 86/ 14 kPa -		
				1.0						$ = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 0 & 0 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1$		VS 111/ 25 kPa		
							At 1.1m: becoming some fine to medium grained sand.		St	 ⊕ ⊚ 		VS 86/ 14 kPa		
				7		· SP	SAND: fine to medium grained, orange brown.	1						
				1		ML	SILT: low plasticity, pink, with minor clay, trace manganese.	1	VSt					
				1.5 - - - 2.0			Hand Auger HA3D-298 terminated at 1.5 m Target depth							
method			supr	port			samples & field tests			n symbol &				
AD auge AS auge HA hand W wash HA hand	er drilling' er screwir d auger hbore d auger hown by s	ing*	M n C c pene wate	mud casing netration	n no re rangi a refus	water	Bainples of heric tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	b Cla moistur D dry M mo W we	ire ry ioist		 	VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose		
e.g. AD/T B blank T TC bi V V bit	k bit bit			wate	vel on dat ater inflow ater outflo		VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing		lastic limit quid limit		N	MD medium dense D dense VD very dense		



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3D-300
sheet:	1 of 1
project no.	GENZTAUC13086AP-A
date started:	14 Mar 2016
date completed:	14 Mar 2016
logged by:	ODS
checked by:	RBT

	ion:		ige sc		age .						пескеа ру:	RBI
		ot Spec						surface elevation: Not Specified		-	om horizontal: 9	0° DCP id.:
		Hand A	-			moto	rial aub	drilling fluid:	r	nole dia	meter : 50 mm	
uriii	-	formati				mate	rial sub			≥		D structure and
method & support	2 penetration	3 water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane DCi shear (blow ⊕remoulded ⊚peak (kPa) B 0 0 0 0 0 0 0 0 0 0	vs/ additional observations າm) ສະຊະ
								SILT: non plastic, dark brown, with trace fine sand.	D	VL MD		Topsoil
		ountered			- 0.5			SAND: fine to medium grained, yellow brown, with trace silt. SAND: fine to coarse grained, pale yellow brown.				
		 			-	****		SILT: low plasticity, brown, with trace-minor clay. 0.9 to 1.5 m: clay becomes trace and trace fine sand becomes present	D to M	VSt		
					1.0			1.0 m: becoming orange brown				VS >183 kPa VS >183 kPa
					- - 1.5 - -			Hand Auger HA3D-300 terminated at 1.5 m Target depth				
					- - 2.0							
meth AD AS HA W HA	auge auge hand wash hand	r drilling r screwir auger bore auger	ıg*	pene wate	nud casing etration			samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	b Cla moistur D dr M mo W we	soil desc ased on ssificatio re y bist et	n symbol &	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose
e.g. B T V	AD/T blank TC bi V bit	c bit it			leve	er inflow er outflow	shown	Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	turated astic limit uid limit		L loose MD medium dense D dense VD very dense



Borehole ID. HA3D-302 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 14 Mar 2016 date started: 14 Mar 2016 principal: date completed: The Lakes Stage 3 GCR logged by: NM project: Stage 3C & Stage 3D RBT location. checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density class ification ğ (blows/ 100 mm) samples & shear ⊕ remould ⊚ peak additional obs ations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components field tests graphic I symbol Ē depth (water (kPa) 8 8 8 R ML TOPSOIL: SILT: non plastic to low plasticity, D Н TOPSOIL brown mottled orange and black, with minor fine grained sand, trace fine to medium angular 11111 | | | | || | | | |11111 gravel. 11 ||||||11111 1 + 1| | | |||||||11111 11 | | | |11111 |||11 ML-MH Clayey SILT: low to medium plasticity, VSt MATUA SUBGROUP ||| | | |orange brown, with trace fine grained sand. VS >240 kPa 11111 ||||||11 | | | |11111 ¢ | | ¢ 0.5 iiiii VS 196/ 40 kPa 111 |||||||||||||||11111 Encountered |||||||11111 ||||||||SILT: low plasticity, orange brown, with minor fine grained sand, minor clay. ||||ML Μ |||||11111 ₹ ż | |111 11111 1 ę įφ¦ ⊕ ||||11111 VS 147/ 25 kPa 11 ||||11111 1111 ||||111 GPJ. 11111 ||||||09-03-2016 ODS 1111 ||||0 € 1.0 11111 VS 138/ 33 kPa 111 11111 11111 ML SILT: low plasticity, pink, with minor clay, W 111 |||||||11111 trace manganese pockets. • | | 11111 ¢ VS 103/ 2 kPa 11 ||||| | | |11111 11111 ||||||11111 111 ||||||| |||||||11111 11111 NC 111 ||||1111 BOREHOLE: 1.5 Hand Auger HA3D-302 terminated at 1.5 m VS 111/ 14 kPa 11 Target depth 11111 111 ||||||11 1 1 1 1 11111 SOF 11111 11 ||||||11111 g ||||||11111 'ev:AN ||||||||||11111 ||||| | | |11111 GLBr 11111 ||||||-IBRARY. 11111 11 11111 11111 ||||||||||90 2.0 11111 | | | | |11111 111 |||||||Ę 11111 ||||||11111 111 classification symbol & method AD auger drilling* support consistency / relative density samples & field tests soil description N nil bulk disturbed sample VS Μ mud В very soft AS auger screwing' based on Unified soft firm C casing D disturbed sample S F hand auger НА Classification System Е environmental sample penetration W washbore SS split spoon sample St stiff hand auger no resistance ranging to refusal HA very stiff undisturbed sample ##mm diameter VSt U## moisture HP hand penetrometer (kPa) hard н dry moist wet D M W standard penetration test (SPT) Fb Ν friable wate

N*

Nc

VS

R

HB

10-Oct-12 water

vater inflow

water outflow

evel on date shown

T

bit shown by suffix

AD/T

blank bit

TC bit

V bi

e.g. B

SPT - sample recovered

vane shear; peak/remouded (kPa)

SPT with solid cone

hammer bouncing

refusal

VL

MD

VD

D

L

saturated

Wp

۱۸/i

plastic limit liquid limit

very loose

very dense

medium dense

loose

dense



Borehole ID. HA3D-303 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd client: 14 Mar 2016 date started: 14 Mar 2016 principal: date completed: The Lakes Stage 3 GCR ODS project: logged by: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP (blows/ 100 mm) classification symbol consistency / relative density structure and additional observat material description vane samples & field tests graphic log shear ⊕ remould ● peak rvations method & support penetrat Ē moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components Ê depth (water (kPa) RL SILT: non plastic, dark brown, with trace fine D VSt TOPSOIL Шİ to coarse sand. | | | | || | | | |11111 11 1 ||||||11111 ||||++++||||||11 11 SILTY SAND: fine grained, brown. MD FILL |||||||||3313 | | 111 1111 111 | | |**0** 0.5 VSt YOUNGER ASH SILT: low plasticity, orange brown, with trace D to M | | | | |111 fine sand and trace clay. VS >183 kPa 11/04/2016 |||||||||Not Encountered ||||0 1 111 <<DrawingFile>> | | |VS >183 kPa ₽ ż | |1 |||~~~|||| 11 | | | |11111 ||||| | | |11111 -03-2016 ODS.GPJ 11111 |||||1111 ||||⊕⊙ 1.0 VS 81/28 kPa 11 ||||||. 11111 SILT: low plasticity, orange brown, with minor 11111 111 clay. 11 ⊕l⊙l VS 76/ 21 kPa 11111

é

	2.0-	Hand Auger HA3D-303 terminated at 1.5 m Target depth		II VS 120/ 19 kPa II - III -
method AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud N nil C casing penetration ranging to water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet S saturated Wp plastic limit WI liquid limit	consistency / relative densityVSvery softSsoftFfirmStstiffVStvery stiffHhardFbfriableVLvery looseLlooseMDmedium denseDdenseVDvery dense



TETRA T	(ECH	COMP	ANY							E	Borehole	ID.		HA3D-305		
En	ai	no	orin	u I	0	а .	Ha	nd Auger		S	sheet:			1 of 1		
<u> </u>	<u>y</u>			<u> </u>						p	project no	<u>э.</u>		<u>GENZTAUC13086AP</u> -AG 14 Mar 2016		
client:		The	e Lakes	; 201	2 Itc	1				d	date start	ted:				
princip	al:	-								d	date com	ıplet	ted:	14 Mar 2016		
project	t:	The	e Lakes	; Sta	ige 3	; G(CR		logged by:					NM		
locatio	on:	Sta	nge 3C &	& St	age	3D				с	checked l	by:		RBT		
position:			-		<u> </u>			surface elevation: Not Specified			om horizor	-		DCP id.:		
drill mod	del: H	and A	luger					drilling fluid:	ł	nole dia	meter : 50) mr	n			
drilling	-	rmati	on			ma	aterial sul				 			 		
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 00 00 00	(bl 100	DCP blows/ 10 mm)			
	3 7	>		<u> </u>	-		ML	TOPSOIL: SILT : low plasticity, brown, with minor fine to medium grained sand, trace fine grained angular gravel.	D	H	1 1 1 1			TOPSOIL -		
					-		ML	SILT: low plasticity, orange brown, with minor clay, trace fine grained sand (greasy).	M	VSt		© 		YOUNGER ASH VS 240 kPa		
HA		Not Encountered			0.5							' 		VS 196/ 38 kPa		
					- 1.0	- - -				н				-		
					-	 				VSt	- 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1) 		VS 215/ 25 kPa - -		
								Hand Auger HA3D-305 terminated at 1.5 m Target depth						VS 138/ 40 kPa		
method	 1 1	drilling*	*	supj				samples & field tests		sification	n symbol &			consistency / relative density		
AS an HA ha W w HA ha * bi	auger s hand au washbo hand au	screwin auger ore	ng*	pene	etration	n no r ranç refu	N nil resistance nging to usal 2 water late shown	B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (KPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	b Cla moistur D dry M mo W we S sa	based on assificatio rre ry noist et aturated	n Unified on System			VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose		
B bl T T	olank bi FC bit / bit	it			- wat	ater inflo	w	VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing		lastic limit quid limit			1	MD medium dense D dense VD very dense		



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

location: Stage 3C & Stage 3D

Borehole ID.	HA3D-307
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	14 Mar 2016
date completed:	14 Mar 2016
logged by:	ODS
checked by:	RBT

position: Not Specified			surface elevation: Not Specified	angle from horizontal: 90	° DCP id.:
drill model: Hand Auger			drilling fluid:	hole diameter : 50 mm	
drilling information		material sub			
method & support water γ water staten staten water water station	RL (m) depth (m)	graphic log classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	main the second	n) additional observations
	-		SILT: non plastic, dark brown, with trace fine to coarse sand.	D VSt 1111	TOPSOIL
- HA	- 0.5		trace-minor fine sand and trace clay.	D to M	VS >183 kPa VS >183 kPa
HA-HARING CONTRACTOR C	- - 1.0		SILT: low plasticity, orange to orange-brown, with trace clay. Is "greasy".	M	VS 133/ 16 kPa VS >183 kPa
	-		1.3 m: clay becomes minor		 VS 107/ 33 kPa
	- 1.5		Hand Auger HA3D-307 terminated at 1.5 m Target depth		VS 97/19 kPa
	2.0				
method AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger	support M mud C casing penetration water	N nil no resistance ranging to refusal Oct-12 water	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet S estimated	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose
e.g. AD/T B blank bit T TC bit V V bit	leve wat	el on date shown er inflow er outflow	Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S saturated Wp plastic limit WI liquid limit	L loose MD medium dense D dense VD very dense



A TETRA	TETRA TECH COMPANY									В	orehole	ID.		HA3D-309		
En	ind	ne	orin	n I	0	а_	Ha	nd Auger		S	heet:			1 of 1		
	'y'						i ia			р	roject no).	GENZTAUC13086AP-A			
client		Th	e Lakes	201	2 Ito	1				d	ate start	ed:		14 Mar 2016		
principal: - project: The Lakes Stage									date completed: logged by:					14 Mar 2016		
						GC	R							NM		
location: Stage 3C & Stage					age	3D				с	hecked I	by:		RBT		
positio	n: No	ot Spe	cified					surface elevation: Not Specified	â	angle fro	om horizor	ntal:	90°	DCP id.:		
drill mo			-				avial avi	drilling fluid:	ł	nole dia	meter : 50	mm				
drillir	-	Jinau					erial sub	material description		sity	vane	D	СР	structure and		
method & support	 penetration 	water	samples & field tests (L) (L) (L) (L) (L) (L) (L) (L) (L) (L)		depth (m)	graphic log	classification symbol	SOIL TYPE : plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear ⊕ remoulded ⊚ peak (kPa) B 00 00 00	100	ows/ mm) _{∞ ∞} 은			
A A					-	-	ML	TOPSOIL: SILT : non plastic, brown, with minor fine grained sand, trace fine to medium grained angular gravel.	D	H				-		
					-		ML	Sandy SILT: non plastic, orange brown, with fine to medium grained sand.	_							
		ed			0.5-											
		Not Encountered			-		· · ·							- VS >240 kPa		
					1.0-	-	ML	SILT: low plasticity, orange brown, with minor clay, trace fine grained sand. From 1.1 to 1.5m: Easily compressible soil.	M M to W	VSt St				VS 129/ 38 kPa		
					-					01	 ⊕ 			VS 70/ 19 kPa		
					- <u>1.5</u> - -			Hand Auger HA3D-309 terminated at 1.5 m Target depth						VS 78/ 25 kPa -		
					- 2.0									-		
method AD support AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger					nud casing etratior	I ¶− nore	N nil esistance ing to sal	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	classification symbol & soil description based on Unified Classification System moisture D dry M moist					consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable		
В Т	.g. AD/T blank bit TC bit					Oct-12 v el on da er inflov er outflo	te shown v	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp pla	aturated astic limit uid limit				VL very loose L loose MD medium dense D dense VD very dense		



client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

location: Stage 3C & Stage 3D

Borehole ID.	HA3D-311
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	14 Mar 2016
date completed:	14 Mar 2016
logged by:	ODS
checked by:	RBT

positi	on: No	ot Spec	cified		<u> </u>			surface elevation: Not Specified	é		om horizon	tal: 90°	DCP id.:
	nodel: H		-			mate	rial sub	drilling fluid:	ł	nole diar	meter : 50	mm	
method & support	minethood a support water RL (m) RL (m)					graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕ remoulded ⊚ peak (kPa) ⊛ 00 00 00 00	DCP (blows/ 100 mm)	
	0 0				-		0.0	SILT: non plastic, dark brown, with trace fine to coarse sand.	D	VSt			TOPSOIL
					- 0.5—			SILT: non plastic, brown, with some fine sand.			· · · · · · · · · · · · · · · · · · ·		FILL VS >183 kPa
		Not Encountered			-			SAND: fine to medium grained, orange brown, with trace silt. SAND: fine to coarse grained, pale brown, with trace sub-rounded fine gravel.					
					- 1.0								
					-			SILT: low plasticity, brown, with trace clay.	D to M				YOUNGER ASH VS 120/ 16 kPa
					1.5 -			Hand Auger HA3D-311 terminated at 1.5 m Target depth					VS 169/ 41 kPa
					2.0-								
method support AD auger drilling* AS auger screwing* IA hand auger N washbore HA hand auger					mud casing	no res	nil istance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetrometer test (SPT)	t Cla moistu D dr	soil desc based on issificatio re			consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Eb friable
e.g. AD/T B blank bit				er		ater shown	N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing		bist et turated astic limit uid limit			Fb friable VL very loose L loose MD medium dense D dense VD very dense	



Borehole ID. HA3D-313 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: date started: 23 Mar 2016 principal: -23 Mar 2016 date completed: project: The Lakes Stage 3 GCR logged by: NM Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP (blows/ 100 mm) material description ency / density vane shear ⊕remoulde structure and additional observations ication stration c log samples & field tests a ⊗ F Ê ъ SOIL TYPE: plasticity or particle characteristic

support		2 penetra	water	field tests	RL (m)	depth (m	graphic I	classifica symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture conditior	consisten relative de	⊕ remoulded ⊚ peak (kPa) 0 0 0 0 00 0 0 00	1`00 mm) ء ∞ ∞ ₽ ⊳	
						-		ML	TOPSOIL: SILT : non plastic, dark brown, with some organic silt.	М	Н			TOPSOIL
						-		ML	SILT: low plasticity, orange brown, with minor fine grained sand, minor clay.			 		MATUA SUBGROUP VS >240 kPa
						0.5-					VSt			VS 172/ 47 kPa
- N			Not Encountered			-			0.6 m: becoming trace clay.					
			2			-					н	● ● 		VS 156/ 28 kPa
						- 1.0			1.1 m: becoming some fine grained sand with trace pockets of manganese (slightly greasy).	M to W		⊕ 		VS 233/ 47 kPa VS >240 kPa
						-			1.3 m: becoming some fine to medium grained sand.1.4 m: 200mm layer of some manganese		VSt			
						1.5-			pockets. Hand Auger HA3D-313 terminated at 1.5 m Target depth					VS 123/ 47 kPa
						-								
						- 2.0-								
						-								
AD AS HA W	a ha w	uger d uger s and au /ashbo	crewii Iger re		Mi Co pen	port mud casing etration		N nil	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample	s b	oil desc ased on			consistency / relative density VS very soft S soft F firm St stiff
HA * e.g. B T V	bi A bl	it show D/T lank bi C bit	iger 'n by	suffix	wate	∎ Ieve wat	ran refu Oct-12	ate shown w	U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla	y bist	t		VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location.

Borehole ID.	HA3D-315
sheet:	1 of 1
project no.	GENZTAUC13086AP-A
date started:	29 Mar 2016
date completed:	29 Mar 2016
logged by:	ODS
checked by:	RBT

location:	ge 3C 8	& St	age	3D				c	hecked l	RBT		
	surface elevation: Not Specified surface elevation: Not Specified								-	om horizor	DCP id.:	
drill model:		-					drilling fluid:	h	iole dia	meter : 50	mm	
drilling inf	ormati	on	1		mate	erial sub	stance			1	1	
metnoa & support 1 2 penetration			RL (m) depth (m)		graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) B 0 0 00	DCP (blows 100 mn	n)
	Not Encountered		~				SILT: non plastic, dark brown, with some organic silt. SAND: fine to coarse grained, yellow brown, with minor silt and trace fine-medium gravel. SILT: non plastic to low plasticity, pale brown, with trace fine-coarse sand. SAND: fine to coarse grained, pale brown, trace fine gravel and trace silt. SILT: son plastic to low plasticity, pale brown, trace fine gravel and trace silt. SILTY SAND: fine grained, pale brown. SILT: non plastic to low plasticity, pale brown, with minor fine sand. SAND: fine to coarse grained, pale brown, with minor fine sand. SAND: fine to coarse grained, yellow brown, with trace fine gravel.	E 3 D D to M 	MD VSt MD			MATUA SUBGROUP
AS auger	drilling*		supj M r C c		N	nil	Hand Auger HA3D-315 terminated at 1.5 m Target depth samples & field tests B bulk disturbed sample D disturbed sample	s b	oil deso ased on	 		I I I VS >240 kPa I I
e.g. AD/T B blank bit						il ater shown	E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Classification System moisture D dry M moist W wet S saturated Wp plastic limit W wid limit				F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



Borehole ID. HA3D-317 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd client: 23 Mar 2016 date started: 23 Mar 2016 principal: date completed: The Lakes Stage 3 GCR ODS project: logged by: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance consistency / relative density DCP material description vane structure and classification go samples & field tests shear ⊕ remould ● peak (blows/ 100 mm) additional obs rvations method & support Ê penetrat moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic lo symbol Ê depth (water (kPa) RL SILT: low plasticity, dark brown, with trace fine sand and trace clay. D MD TOPSOIL iiiii 11 1 + 111 SAND: fine to coarse grained, yellow brown, FILL ||with minor silt 11 I 31 I I I 0.5 *** 111 1 1 1 1 11 11 ||SILT: low plasticity, pink brown, with trace fine sand and trace clay. D to M VSt Not Encountered ||θI | 🕁 VS 153/ 22 kPa 111 ||||₹ ż | || | | |1 Sandy SILT: non plastic, pale grey, sand is | | |**9** ||||fine grained. VS >183 kPa 11 31111 ||ելլլ 09-03-2016 ODS.GPJ SAND: fine to coarse grained, pale brown, with trace silt. 1.0 YOUNGER ASH **SILT**: low plasticity, brown, with some clay and trace fine sand. 11111 ||||||110 11111 VS >183 kPa 111 ||||||11111 111 11111 11 11111 ŀo + DCP VS >183 kPa 11111 11 CRED 11111 11 ||||| |111 11111 NON 11111 111 ||||COF BOREHOLE: 1.5 Hand Auger HA3D-317 terminated at 1.5 m VS >183 kPa 11 Target depth 11111 111 ||||||11111 111 ||||||11111 111 ||||||IBRARY.GLB rev:AN Log ||||||||||||||||||||11111 ||||11111 90 60 CDF

	2.0-			
method AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger	support M mud N nil C casing penetration resistance ranging to refused	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	classification symbol & soil description based on Unified Classification System moisture D dry M moist	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable
* bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	water Ievel on date shown water inflow water outflow	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W wet S saturated Wp plastic limit WI liquid limit	VL very loose L loose MD medium dense D dense VD very dense



HA3D-319 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd 23 Mar 2016 client: date started: 23 Mar 2016 principal: date completed:

Borehole ID.

CDF 0 9 06 LIBRARY.GLB rev.aN Log COF BOREHOLE: NON CORED + DCP GCR HA - 09-03-2016 ODS.GPJ <<DrawingFile>> 11/04/2016 12:12

proje				e Lakes		-		R			logged by: checked by:			ODS RBT		
loca positi				ge 3C &	א טנ	aye	50		surface elevation: Not Specified	а		om horizoi	,	DCP id.:		
		el: Ha	-						drilling fluid:		-	meter : 50				
drill	ing	infor	matio	on		1	mate	erial sub	ostance							
method & support		penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕ remoulded ⊚ peak (kPa) 26 00 000	DCP (blows/ 100 mm			
			2						SILT: low plasticity, dark brown, with trace fine sand and trace clay.	D to M	L to MD			TOPSOIL		
									SILT: low plasticity, orange brown, with trace clay and trace fine sand.			□ ⊕ ⊕ 		MATUA SUBGROUP VS 147/ 26 kPa		
			red			0.5-			SAND: fine to coarse grained, orange brown, with minor silt. 0.6 m: silt becomes some							
			Not Encountered			1.0										
									SAND: fine grained, pale brown, with minor silt. 1.4 m: silt becomes some							
<u>* *</u>						1.5 - - - - - - - - - -	-		Hand Auger HA3D-319 terminated at 1.5 m Target depth							
meth AD AS HA W HA	au au ha wa	ger dr ger so ind au ashbor ind au	crewin ger re		M i C o pen	port mud casing etration	n	nil sistance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa)	s ba Clas moistur D dry	oil deso ased on ssificatio	n symbol & cription a Unified on System		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard		
* e.g. B T V	AD bla	ank bit) bit		suffix	wat	■ 10- lev wa	-Oct-12 wa rel on date ter inflow ter outflow	ater e shown	N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	M mo W we S sat Wp pla	oist	t		Fb friable VL very loose L loose MD medium dense D dense VD very dense		



Engineering Log - Hand Auger client: The Lakes 2012 Itd

principal: -

project: The Lakes Stage 3 GCR

location: Stage 3C & Stage 3D

Borehole ID.	HA3D-321
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	23 Mar 2016
date completed:	23 Mar 2016
logged by:	NM
checked by:	RBT

positi	ion: No	ot Spe	cified					surface elevation: Not Specified	e	angle fro	om horizon	ital: 90°	DCP id.:
	nodel: I		-			mat	erial sub	drilling fluid:	h	nole dia	meter : 50	mm	
method & support	с Б	/ater	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕ remoulded ⊚ peak (kPa) 32 00 000	DCP (blows/ 100 mm)	structure and additional observations
					-	5	ML	TOPSOIL: SILT : non plastic, dark brown, with minor organic silt.	D	St		1	TOPSOIL
					=		ML	SILT : non plastic, orange brown, with some fine to coarse grained sand, trace clay.	M	Н	⊕ •		YOUNGER ASH VS >86/ 14 kPa
					0.5—			becoming low plasticity, mottled white with minor clay, trace fine grained sand.					VS >240 kPa
H H H		Not E			-			becoming yellow grey with fine sand.					UTP
					1.0-		SP	SAND: fine to medium grained, yellow grey.	D to M				MATUA SUBGROUP
					-			clay, trace fine grained sand.					VS >240 kPa
<u>* *</u>					-1.5 -			Hand Auger HA3D-321 terminated at 1.5 m Target depth			 		VS >240 kPa
					_			_,					
meth AD AS HA W HA	nod support auger drilling* M mud auger screwing* C casing hand auger penetrati hand auger Image: Comparison				nud casing etration		N nil sistance ng to al	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	s b Cla moistur D dry	soil desc based on issification re			consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb firable
* e.g. B T V	bit sho AD/T blank TC bit V bit		suffix	wate	✓ 10-0 leve wate	Dct-12 v el on dat er inflow er outflo	e shown /	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	M moist W wet S saturated Wp plastic limit WI liquid limit				VL very loose L loose MD medium dense D dense VD very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3D-323
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	23 Mar 2016
date completed:	23 Mar 2016
logged by:	ODS
checked by:	RBT

location:	Stage 3	, a 30	age .	3D				С	hecked by	:	RBT
position: N	ot Specified					surface elevation: Not Specified	á	angle fro	om horizonta	l: 90°	DCP id.:
drill model:	Hand Auger					drilling fluid:	ł	nole dia	meter : 50 m	m	
drilling inf	ormation			mate	rial sub	stance					1
method & support ¹ 2 penetration	sample field te	st s BL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	⊕ remoulded ⊚ peak 1 (kPa)	DCP (blows/ 00 mm)	structure and additional observations
						SILT: low plasticity, dark brown, with trace fine sand and trace clay.	M	VSt		 	TOPSOIL
			- 0.5—			SILT: non plastic to low plasticity, brown with mottled pink and dark brown, with minor fine to coarse sand and trace clay.					YOUNGER ASH VS >183 kPa VS >183 kPa
H H H H H H H H H H H H H H H H H H H	Not Encountered		-			SILT: low plasticity, orange brown, with trace clay and trace fine sand.					VS 165/ 45 kPa
			- 1.0 —			SILTY SAND: fine grained, orange brown. SILT: low plasticity, brown, with minor clay and trace fine sand.	_				VS 156/ 25 kPa
			-			1.2 m: becoming orange brown		St	□ ⊕ ⊖ 		VS 65/ 13 kPa
			- <u>1.5</u> - -			Hand Auger HA3D-323 terminated at 1.5 m Target depth			I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I		VS 50/ 19 kPa
			- 2.0—								
AS auge HA hand W wash HA hand	auger own by suffix	pene wate	nud casing etration c m er er lo-c leve		ater	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample S split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone Vs vane shear, peak/remouded (kPa)	t Cla moistu D dr M ma W we S sa Wp pla	soil desc based on assificatio re y oist	n symbol & ription Unified n System	F S	consistency / relative density /S very soft S soft S soft S soft St stiff /St very stiff - hard -b friable /L very loose - loose MD medium dense



Borehole ID. HA3D-325 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd client: 23 Mar 2016 date started: principal: 23 Mar 2016 date completed: The Lakes Stage 3 GCR logged by: NM project: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density classification g shear ⊕ remould ● peak (blows/ 100 mm) samples & additional obs ations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components field tests graphic I symbol Ē depth (water (kPa) 8 8 8 R ML SILT: non plastic, dark brown, with minor Μ H to VSt TOPSOIL 11111 organic silt, minor fine grained sand. | | | | ||||||||1111 ||||||1111 1 + 1||||||1111 1111 ||||||11 S | | | | 0 Ð ML SILT: low plasticity, orange brown mottled dark brown and black, with trace fine grained MATUA SUBGROUP ||1 VS 176/ 33 kPa 11 sand. |||||||1111 1111 ∳ 0.5 1111 VS 215/ 54 kPa 111 1111 111 | | | | |SM SAND: fine to coarse grained, orange brown. D to M MD Not Encountered ||| | | | |||||111 潮口口 | | |🏽 I I I I ₹ ż | |1111 1111 ||||0.8 m: becoming pale yellow with minor silt. 11 ||| | | |GPJ ods 1.0 SILT: non plastic, grey, with fine to coarse grained sand and pockets of pure fine to VS 70/ 25 kPa St to VSt ML Μ ||||||coarse grained sand. 111 1111 111 | | | 1111 Ф VS 147/ 33 kPa 1.2 m: becoming yellow grey with sand pockets 11 absent. 11 1111 11 | |al I I I SW MD SAND: fine to coarse grained, grey. NC 111 | | | |BOREHOLE: 1.5 Hand Auger HA3D-325 terminated at 1.5 m 11 Target depth 111 ||||||1 1 1 1 SOF 1 | | | 11 |||||8 ||||11111 ev:AN 11 | | | | |11111 | | |11111 |||||GLB 11111 -IBRARY. 11 11111 11 11111 ||||11111 90 2.0 11111 11111 111 Ę 11111 ||||||11111 11 classification symbol & Method AD auger drilling* support consistency / relative density samples & field tests soil description N nil bulk disturbed sample mud VS Μ В very soft AS auger screwing' disturbed sample environmental sample based on Unified soft firm C casing D S F hand auger HA Classification System Е W penetration washbore SS split spoon sample St stiff hand auger no resistance ranging to refusal HA very stiff undisturbed sample ##mm diameter VSt U## moisture

HP

Ν

N*

Nc

VS

R

HB

wate

T

10-Oct-12 water

vater inflow

water outflow

evel on date shown

bit shown by suffix

AD/T

blank bit

TC bit

V bi

e.g. B

hand penetrometer (kPa)

SPT - sample recovered

SPT with solid cone

hammer bouncing

refusal

standard penetration test (SPT)

vane shear; peak/remouded (kPa)

hard

friable

loose

dense

very loose

very dense

medium dense

н

Fb

VL

MD

VD

D

L

dry moist wet D M W

Wp

۱۸/i

saturated

plastic limit liquid limit



Borehole ID. HA3D-327 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 29 Mar 2016 date started: 29 Mar 2016 principal: date completed: The Lakes Stage 3 GCR ODS project: logged by: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm material substance drilling information consistency / relative density DCP material description vane structure and classification samples & field tests go shear ⊕ remould ● peak (blows/ 100 mm) additional obs rvations method & support Ê penetrat moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic lo symbol Ê depth (water (kPa) RL SILT: non plastic, dark brown, with minor D VSt TOPSOIL Шİ organic silt, minor fine grained sand. | | | | |||||||11111 11111 11 1 ||||||||||++++11111 **SILT**: low plasticity, orange brown, with minor clay and trace fine sand. MATUA SUBGROUP Μ St 11 ¦ 🖗 ⊕¦ 11111 11 VS 160/ 24 kPa 11111 1111 |||||| | | |11111 |||||111 | | | |111 11111 ⊕¦∮¦¦ 0.5 VS 83/ 14 kPa |||||||||11111 0.6 m: becoming "sticky" Not Encountered 111 11111 ||1111 11111 |||||||||11111 ₹ ż |||11111 ⊕|⊙| | | |||VS 76/ 14 kPa 11 | | | |11111 11111 ||||| | | |09-03-2016 ODS.GPJ 11111 | | | |⊕**0**¦!!! 11111 1.0 VS 61/ 14 kPa 11111 |||||||11111 111 1111 GCR HA ||||||||||11111 1.2 m: becoming orange and "greasy" 111 11111 ⊕¦ + DCP ||||VSt VS 120/ 24 kPa |||11111 CRED 11111 ||||| | | |||||| | | |11111 NON 11111 | | || | | |COF BOREHOLE: 1.5 b Hand Auger HA3D-327 terminated at 1.5 m VS 116/ 25 kPa Target depth 11111 11111 111 11111 111 ||||||Log |||||||||rev:AN I | | |11111 ||||GLBr 11111 **BRARY.** g

CDF_0_9_06_LIB		2.0-			
met AD AS HA W	hod auger drilling* auger screwing* hand auger washbore	support M mud N nil C casing penetration	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample	classification symbol & soil description based on Unified Classification System	consistency / relative density VS very soft S soft F firm St stiff
HA *	hand auger bit shown by suffix	water ↓ ↓ 10-Oct-12 water	U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	moisture D dry M moist W wet S saturated	VSt very stiff H hard Fb friable VL very loose
e.g. B T V	AD/T blank bit TC bit V bit	Ievel on date shown water inflow water outflow	Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	Wp plastic limit WI liquid limit	L loose MD medium dense D dense VD very dense



AD/T blank bit TC bit V bit

TETRA TECH	H COMPANY					Borehole ID).	HA3D-328			
Enai	inoorin		а Ц	and Augor		sheet:		1 of 1			
Eng				and Auger		project no.		GENZTAUC13086AP-			
client:	The Lake	s 2012 lt	d			date started	1:	29 Mar 2016			
rincipal:	-					date comple	eted:	29 Mar 2016			
oroject:	The Lake	s Stage	3 GCR			logged by:		ODS			
ocation: Stage 3C & Stage			3D			checked by	:	RBT			
osition: N	ot Specified			surface elevation: Not Specified	an	gle from horizonta	ıl: 90°	DCP id.:			
Irill model:	Hand Auger		-	drilling fluid:	ho	le diameter : 50 m	ım				
drilling inf	formation		material s			>					
support support 2 penetration	samples & field tests	RL (m) depth (m)	graphic log classification	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	(kPa) (kPa) (kPa)	DCP (blows/ 00 mm)	structure and additional observations			
			-	SILT: non plastic, dark brown, with minor organic silt, minor fine grained sand.		VSt	 	TOPSOIL			
				SILT: low plasticity, orange brown, with trace clay and trace fine sand.	M	 @ 		MATUA SUBGROUP VS >240 kPa			
	iered	0.5				 @ 		VS >240 kPa -			
Z 	Not Encountered			0.65 m: becoming orange and is "greasy"				- VS 190/ 40 kPa			
		1.0				$\oplus_{ \ \ }^{ \ } \oplus_{ \ \ }^{ \ } \oplus_{ \ \ }^{ \ } $		VS 170/ 25 kPa -			
			-					- - VS 176/ 33 kPa -			
		1.5	-	Hand Auger HA3D-328 terminated at 1.5 m Target depth				VS 196/ 40 kPa -			
		2.0									
AS auge HA hand W wash HA hand	auger own by suffix	le	N nil no resistance ranging to Get 12 water vel on date show ater inflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear, peak/remouded (kPa) R refusal	soi bas Class Class D dry M mois W wet S satu Wp plast	ication symbol & I description sed on Unified ification System	F F F F L	consistency / relative density consistency / relative density S very soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense			

dense very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location.

Borehole ID.	HA3D-330
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	23 Mar 2016
date completed:	23 Mar 2016
logged by:	ODS
checked by:	RBT

location:	Sta	ige 3C 8	s St	age	3D				С	hecked b	y:	RBT
position: No	ot Spec	cified					surface elevation: Not Specified	a	ingle fro	m horizon	tal: 90°	DCP id.:
drill model: I	Hand A	Auger					drilling fluid:	h	ole diar	meter : 50	mm	
drilling inf	ormati	on			mate		stance					
method & support 2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa) 02 00 000	DCP (blows/ 100 mm)	structure and additional observations
				-			SILT: low plasticity, dark brown, with trace fine sand and trace clay.	M	St			TOPSOIL
							Silty CLAY: low plasticity, orange brown, with trace fine sand. Is "sticky".	_				MATUA SUBGROUP
	Encounte			-								
				- - 1.0-			Clayey SILT : low plasticity, orange, with trace fine sand.					
				-						- - 		VS 70/ 9 kPa VS 74/ 16 kPa
				-1.5			SILT: low plasticity, pink with mottled dark brown, with minor clay, trace fine to coarse sand and trace manganese. Is "sticky".					
				-			Hand Auger HA3D-330 terminated at 1.5 m Target depth					VS 81/ 19 kPa
				2.0-								
AS auger HA hand W washt	D auger drilling* M muc S auger screwing* C casi IA hand auger V washbore penetra IA hand auger				I	nil istance g to	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	s D Cla moistur D dry M mo	soil desc ased on ssificatio re / bist			consistency / relative density /S very soft S soft = firm St stiff /St very stiff H hard -D friable
e.g. AD/T B blank bit				Leve	Oct-12 wa el on date er inflow er outflow	shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear, peak/remouded (kPa) R refusal HB hammer bouncing	W we S sa Wp pla	et turated astic limit uid limit		1	/L very loose Loose MD medium dense D dense /D very dense



TETRA TECH	I COMP	ANY							E	Borehole	ID.	HA3D-332
Enai	no	orin	n I	0	- r	Нэ	nd Auger		S	heet:		1 of 1
Liigi			_		-	Ia	liu Augei		p	roject no		GENZTAUC13086AP-
client:	Th	e Lakes	201	12 Ita	1				C	late starte	ed:	29 Mar 2016
orincipal:	-								С	late com	oleted:	29 Mar 2016
project:	Th	e Lakes	Sta	ige 3	GC	R			le	ogged by	:	ODS
ocation:	Sta	ige 3C &	st	age :	3D				с	hecked b	by:	RBT
oosition: N	ot Spe	cified					surface elevation: Not Specified	a	angle fro	om horizon	tal: 90°	DCP id.:
drill model:	Hand A	Auger					drilling fluid:	ł	nole dia	meter : 50	mm	
drilling inf	ormati	on			mate	erial sub	stance		1			
method & support 2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	vane shear ⊕ remoulded ⊚ peak (kPa) 3 000 000	DCP (blows/ 100 mm)	structure and additional observations
				-			SILT: non plastic to low plasticity, dark brown, with trace fine sand and trace clay.	D	VSt			TOPSOIL _
	ltered			- 0.5 <i>-</i> -			SILT: non plastic to low plasticity, orange brown, with trace fine to coarse sand.	M		· · · · · · · · · · · · · · · · · · ·		MATUA SUBGROUP VS >240 kPa - - VS 196/ 33 kPa -
	Not Encountered			-			Clayey SILT: low plasticity, orange brown,		St	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●		- VS 120/ 25 kPa _ -
				1.0-			with trace fine sand.		01			VS 62/ 14 kPa -
				-								- VS 67/ 14 kPa _ -
				1.5-	CA/VX2		Hand Auger HA3D-332 terminated at 1.5 m Target depth					VS 64/ 25 kPa

шĽ			15 11									
CDF_0_9_06_LIBRARY.GLB rev.AN Log COF BOREHOLE:			2.0-		Hand Auger Target dept	HA3D-332 terminated at 1.5 m					VS 64/ 25	kPa
	HA hand au W washbo HA hand au	crewing* iger iger iger /n by suffix	C casing penetration	water ate shown	samples B D E SS U## HP N N N N C VS R HB	s & field tests bulk disturbed sample disturbed sample environmental sample split spoon sample undisturbed sample ##mm diameter hand penetrometer (kPa) standard penetration test (SPT) SPT - sample recovered SPT with solid cone vane shear; peak/remouded (kPa) refusal hammer bouncing	soil base	limit	n ed	 F F F L L	/S 5 5 5 5 5 5 7 5 7 7 7 7 7 7 7 7 7 7 7	relative density very soft soft firm stiff hard friable very loose loose medium dense dense very dense



Borehole ID. HA3D-334 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd client: 23 Mar 2016 date started: 23 Mar 2016 principal: date completed: The Lakes Stage 3 GCR NM project: logged by: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance consistency / relative density DCP structure and material description vane classification go samples & field tests shear ⊕ remould ⊚ peak (blows/ 100 mm) additional obs rvations method & support Ê penetrat SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components moisture condition graphic I symbol Ê depth (water (kPa) RL ML TOPSOIL: SILT: non plastic, dark brown, with M to W VS TOPSOIL 11111 some organic silt (very soft). ||||||11 1 |||||||||||1111 11 I 11 麹日 |||||| | |翻口 ÊÊII 111 MATUA SUBGROUP **SILT**: low plasticity, orange brown, with minor clay, trace fine grained sand. H to VSt MI Μ |||||VS >240 kPa 0.5 Miiii VS 176/ 43 kPa ||111 Not Encountered ||||381 I I I ||||X | | | | | ₹ ż | |1111 1 φiiφ <u>a</u>111 ||||0.8 m: becoming orange with minor fine VS 196/ 40 kPa 11 11 grained sand (greasy). ||||09-03-2016 ODS.GPJ Н 1111 ||||||1111 ∳ þ 1.0 VS 215/ 51 kPa 1111 11 1111 al | | | 111 1111 1111 AH AOC 111 ∉ 6 VS 215/ 40 kPa 11 I + DCP 111 11 CRED ||||||||NON | | |11 COF BOREHOLE: 1.5 Hand Auger HA3D-334 terminated at 1.5 m VS >240 kPa Target depth 111 ||||||111 111 1111 1111 rev:AN Log |||||||||1111 ||||||||1111 ||||GLBr 11 BRARY. é

	2.0-			
method AD auger drilling* AS auger screwing* HA hand auger W washbore	support M mud N nil C casing penetration	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample	classification symbol & soil description based on Unified Classification System	consistency / relative density VS very soft S soft F firm St stiff
HA hand auger * bit shown by suffix e.g. AD/T B blank bit T TC bit	water I	U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal	moisture D dry M moist W wet S saturated Wp plastic limit WI liquid limit	VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense



hand auger

AD/T

blank bit

TC bit

V bi

bit shown by suffix

HA

e.g. B no resistance ranging to
 refusal

10-Oct-12 water

vater inflow

water outflow

evel on date shown

wate

T

U##

HP

Ν

N*

Nc

VS

R

HB

Borehole ID. HA3D-337 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-A(project no. The Lakes 2012 Itd client: 23 Mar 2016 date started: principal: 23 Mar 2016 date completed: The Lakes Stage 3 GCR ODS project: logged by: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density classification g samples & field tests shear ⊕ remould ● peak (blows/ 100 mm) additional obs ations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ē depth (water (kPa) 8 8 8 R SILT: non plastic to low plasticity, dark brown, D VSt TOPSOIL 11111 with trace fine sand. ||||||11 1111 1 + 1||||||11 YOUNGER ASH SILT: low plasticity, brown, with trace fine to ⊕ •|| coarse sand VS 110/ 28 kPa ||11 11 1 SAND: fine to coarse grained, pale brown. ||111 111 0.5 ||||||111 11 11 ||11 Not Encountered ||1 . . . ||381 I I ||||₹ ż | |1 ||||SILT: low plasticity, brown, with trace clay. D to M 11 0 VS >183 kPa ||GPJ 11111 1111 09-03-2016 ODS 11111 1.0 ¦o 11111 VS >183 kPa 1111 11111 1.1 m: trace sand becomes present 111 |||||||11111 111 | | | | |11111 11 11111 . ||||VS 178/ 18 kPa 11111 11 11111 111 ||||111 11111 11111 NC 111 111 1111 BOREHOLE: 1.5 Hand Auger HA3D-337 terminated at 1.5 m VS 160/ 28 kPa 11 Target depth 11111 111 ||||||11 1 1 1 1 11111 SOF 1 1 1 1 11111 11 1 1 1 1 11111 8 11111 'ev:AN 11 11111 1 1 1 1 ||||GLB 11111 111 -IBRARY. 11111 11 ||11111 11111 ||||90 2.0 11111 11111 111 | | | | |Ę 11111 ||||||11111 111 consistency / relative density VS Verv 20⁴ classification symbol & Method AD auger drilling* support samples & field tests soil description N nil bulk disturbed sample very soft soft firm mud Μ В AS auger screwing' disturbed sample environmental sample based on Unified C casing D S F HA W hand auger Classification System Е penetration washbore SS split spoon sample St stiff

undisturbed sample ##mm diameter

standard penetration test (SPT)

vane shear; peak/remouded (kPa)

hand penetrometer (kPa)

SPT - sample recovered

SPT with solid cone

hammer bouncing

refusal

moisture

Wp

wi

D dry M moist W wet

saturated

plastic limit liquid limit very stiff

very loose

very dense

medium dense

hard

friable

loose

dense

VSt

н

Fb

VL

MD

VD

D

L



Borehole ID. HA3D-340 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 23 Mar 2016 date started: principal: 23 Mar 2016 date completed: The Lakes Stage 3 GCR logged by: NM project: Stage 3C & Stage 3D location: RBT checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP material description vane structure and consistency / relative density classification g samples & field tests (blows/ 100 mm) shear ⊕ remould ⊚ peak additional obs ations Ē method & support moisture condition penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components graphic I symbol Ē depth (water (kPa) 8 8 8 R ML TOPSOIL: SILT: low plasticity, dark brown, D Н TOPSOIL 11111 with minor organic silt, trace fine grained sand. | | | | |11111 11111 11 | | | | |1 + 1| | | |ML SILT: low plasticity, orange brown, with minor | | | | |YOUNGER ASH clay, trace fine grained sand. | | | |11111 11 VS >240 kPa 1111 ||| | | | || | | | |11111 TIT 11111 0.5 VS >240 kPa 111 1111 111 | | | | |11111 0.6 m: becoming some clay. Not Encountered ||1 1 1 1 11111 111 | | | | || | |Μ ||||||11111 ₹ ż | |1111 ||||||||||VS >240 kPa 11 11111 1111 ||| | | |GPJ 0.9 m: becoming some fine grained sand, 11111 | | | | |09-03-2016 ODS minor to trace clay. 11111 1.0 VS >240 kPa | | | | |1111 11111 111 | | | | |. . . 111 11111 M to W VS >240 kPa 1.2 m: becoming minor clay, trace fine grained 11 | | | | |sand ||||| | | |11111 | | | |11111 11 VSt 11111 11 | | | || |||||||11111 11111 NC 111 111 1111 BOREHOLE: 1.5 Hand Auger HA3D-340 terminated at 1.5 m VS 176/ 40 kPa 11 Target depth 11111 111 11 1 1 1 1 11111 SOF 1 1 1 1 11111 11 ||||||11111 8 11111 'ev:AN 11 | | | | |11111 ||||GLB 11111 -IBRARY. 11111 11 11111 11111 ||||||||||90 2.0 11111 | | | | |11111 111 |||||||Ę 11111 ||||||11111 11 classification symbol & method AD auger drilling* consistency / relative density support samples & field tests soil description N nil bulk disturbed sample mud VS Μ В very soft AS auger screwing' based on Unified soft firm C casing D disturbed sample S F HA W hand auger Classification System Е environmental sample penetration washbore SS split spoon sample St stiff hand auger no resistance ranging to refusal HA very stiff undisturbed sample ##mm diameter VSt U## moisture

HP

Ν

N*

Nc

VS

R

HB

wate

T

10-Oct-12 water

vater inflow

water outflow

evel on date shown

bit shown by suffix

AD/T

blank bit

TC bit

V bi

e.g. B

hand penetrometer (kPa)

SPT - sample recovered

SPT with solid cone

hammer bouncing

refusal

standard penetration test (SPT)

vane shear; peak/remouded (kPa)

hard

friable

loose

dense

very loose

very dense

medium dense

н

Fb

VL

MD

VD

D

L

dry moist wet D M W

Wp

wi

saturated

plastic limit liquid limit



HA3D-342 1 of 1 sheet: **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 23 Mar 2016 date started: 23 Mar 2016 principal: date completed: project: The Lakes Stage 3 GCR logged by: ODS RBT Stage 3C & Stage 3D location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance DCP (blows/ 100 mm) classification symbol material description consistency / relative density structure and additional observations vane samples & field tests shear ⊕ remould ● peak graphic log method & support penetrati Ē moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components Ê depth (water (kPa) R SILT: non plastic, dark brown, with trace fine D to M VSt TOPSOIL to coarse sand. |||||||11111 111 | | | | |11111 111 |||||||||1111 | | |VS 236/ 75 kPa 111 MATUA SUBGROUP SILTY SAND: fine grained, pale brown. ||||| | | |11111

Borehole ID.

N		SILT: non plastic to low plasticity, brown, with trace clay.	$- \left(\begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	II VS >240 kPa - II -
• 1 1 1 1 1	1.5	Hand Auger HA3D-342 terminated at 1.5 m Target depth		II VS >240 kPa II
hethod D auger drilling* S auger screwing* A hand auger / washbore A hand auger bit shown by suffix .g. AD/T blank bit TC bit V bit	support M mud N nil C casing penetration ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet S saturated Wp plastic limit WI liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3D-344
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	29 Mar 2016
date completed:	29 Mar 2016
logged by:	ODS
checked by:	RBT

location:	Slage	e 3C 8	× 31	age .	30				С	hecked by:		RBT	
position: No	ot Specifie	d					surface elevation: Not Specified	a	angle fro	om horizontal:	90°	DCP id.:	
drill model: H	Hand Aug	er			drilling fluid:			h	nole dia	meter : 50 mn	n		
drilling info	ormation				mate	rial sub	stance						
method & support 2 penetration 3	fie ate	mples & eld tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	shear (b ⊕ remoulded ⊚ peak 10 (kPa)	DCP blows/ 0 mm)	structure and additional observations	
							SILT: non plastic, dark brown, with trace fine to coarse sand.	D	VSt			TOPSOIL	
				- 0.5—			SILT: low plasticity, orange brown, with trace clay and trace fine sand.	M		@ 		YOUNGER ASH VS >240 kPa	
AH	Not Encountered			-						⊕ ⊕ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓		VS 106/ 17 kPa	
				- 1.0 <i>-</i> -								VS 147/ 40 kPa	
				-								VS 156/ 31 kPa	
				- 1.5 - -			Hand Auger HA3D-344 terminated at 1.5 m Target depth					VS 153/ 33 kPa	
				2.0									
AS auger HA hand a W washt HA hand a	D auger drilling* M mud S auger screwing* A hand auger washbore A hand auger Penetratio		nud casing etration	no res rangin ◄ refusa		samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	s b Cla moistu D dry	soil desc ased on ssification re y bist	n symbol & ription	0 > 9 F 9 > H F	firm St stiff /St very stiff		
e.g. AD/T B blank	.g. AD/1 blank bit TC bit			leve	Oct-12 wa I on date er inflow er outflow	shown	NC SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	S sa Wp pla	turated astic limit uid limit			Ioose MD medium dense	



Borehole ID. HA3D-346 sheet: 1 of 1 **Engineering Log - Hand Auger** GENZTAUC13086AP-AG project no. The Lakes 2012 Itd client: 23 Mar 2016 date started: principal: 23 Mar 2016 date completed: The Lakes Stage 3 GCR ODS project: logged by: Stage 3C & Stage 3D RBT location: checked by: position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hand Auger drilling fluid: hole diameter : 50 mm drilling information material substance consistency / relative density DCP material description vane structure and class ification g samples & field tests shear ⊕ remould ● peak (blows/ 100 mm) additional obs ations Ē method & support penetra SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components moisture conditior graphic I symbol Ē depth (water (kPa) 8 8 8 R SILT: non plastic, dark brown, with trace fine D to M VSt TOPSOIL Шİ to coarse sand. | | | | |11111 11111 11 ||||||1 + 1| | | |SILT: low plasticity, brown, with trace fine MATUA SUBGROUP € þ sand 11111 11 VS 213/ 31 kPa ||||11111 1111 ||||||||||||||11111 11 | | | |11111 0.5 ⊕¦ 1111 VS 225/ 23 kPa 111 111 |||||||11111 0.6 m: sand becomes minor Not Encountered ||11111 111 1111 11111 | | |++++11111 ₹ ż | |||||11111 Í ⊕∣ ||||11111 VS 180/ 23 kPa 11 ||11111 1111 ||||||||GPJ | | | |11111 09-03-2016 ODS 1111 11 1.0 ⊕⊙ St 11 11111 VS 79/ 34 kPa |||||||11111 11111 Sandy SILT: non plastic, brown, with trace ||11111 111 manganese. 111 11111 VSt VS 129/ 37 kPa 11 11 ||||| | | |11111 11111 11 SAND: fine to coarse grained, pale brown, 11111 11 ||||||with minor silt | |||||||11111 11111 NC 111 | | | |BOREHOLE: 1.5 Hand Auger HA3D-346 terminated at 1.5 m 11 11111 Target depth 11111 111 ||||||11 1 1 1 1 11111 SOF 1 1 1 1 11111 11 ||||||11111 8 11111 'ev:AN 11 | | | | |11111 ||||GLB 11111 |||||||-IBRARY. 11111 11 11111 11111 ||||||||||90 2.0 11111 | | | | |11111 111 |||||||Ę 11111 ||||||11111 111 method AD auger drilling* classification symbol & consistency / relative density support samples & field tests soil description N nil bulk disturbed sample mud VS Μ В very soft AS auger screwing' disturbed sample environmental sample based on Unified soft firm C casing D S F HA W hand auger Classification System Е penetration split spoon sample undisturbed sample ##mm diameter washbore SS St stiff hand auger HA very stiff VSt no resistance ranging to refusal U## moisture HP hand penetrometer (kPa) hard н dry moist wet D M W standard penetration test (SPT) Fb Ν friable wate N* SPT - sample recovered VL very loose bit shown by suffix 10-Oct-12 water saturated T SPT with solid cone Nc loose L e.g. B evel on date shown AD/T plastic limit liquid limit VS vane shear; peak/remouded (kPa) Wp MD medium dense blank bit vater inflow wi

R

HB

water outflow

TC bit

V bi

refusal

hammer bouncing

D

VD

dense

very dense



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location:

Borehole ID.	HA3D-348
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	29 Mar 2016
date completed:	29 Mar 2016
logged by:	ODS
checked by:	RBT

positi	on:	Not	Spec			<u> </u>			surface elevation: Not Specified			ngle fro	om horizon	tal: 90°	DCP id.:
				Auger			mate	rial cub	drilling fluid:		11		meter : 50		
method & support 2 penetration 3		water	samples & field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic colour, secondary and minor components		moisture condition	consistency / relative density	Vane shear ⊕remoulded ⊚peak (kPa) ₂₅ 00 25 00 200 2	DCP (blows/ 100 mm)		
			Not Encountered			- - - - - - - - - - - - - - - - - - -			SILT: non plastic, dark brown, with trace fin to coarse sand. SILT: non plastic to low plasticity, brown with mottled orange brown, with trace fine to coa sand. SILT: low plasticity, orange brown, with trace clay and trace fine sand.	th arse	D to M	VSt	$ \begin{array}{c} \begin{array}{c} \begin{array}{c} \\ \\ \end{array}\end{array} \\ \begin{array}{c} \\ \\ \end{array}\end{array} \\ \begin{array}{c} \\ \\ \end{array}\end{array} \\ \begin{array}{c} \\ \\ \end{array}\end{array} \\ \begin{array}{c} \\ \\ \end{array}\end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array}\end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array}\end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array}\end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} $		TOPSOIL FILL VS >240 kPa YOUNGER ASH VS >240 kPa VS >240 kPa VS >240 kPa
		 				1.5			Hand Auger HA3D-348 terminated at 1.5 n	n				 	VS 131/23 kPa
						- - 2.0			Target depth						
method AD auger drilling* As auger screwing* HA hand auger support M mud C casing W washbore HA hand auger penetration * bit shown by suffix e.g. AD/T B blank bit T T W V bit vater		no res rangin refusa Oct-12 wa el on date er inflow	ater shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diamet HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing)	s ba Class moistur D dry M mo W we S sat Wp pla	oil desc ased on ssificatio	Unified on System		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense					



The Lakes 2012 Itd client:

principal: -

project: The Lakes Stage 3 GCR

Stage 3C & Stage 3D location.

Borehole ID.	HA3D-351
sheet:	1 of 1
project no.	GENZTAUC13086AP-AG
date started:	23 Mar 2016
date completed:	23 Mar 2016
logged by:	ODS
checked by:	RBT

ocation: Stage 3C & Stage	3D	checked by:	RBT
position: Not Specified	surface elevation: Not Specified	angle from horizontal: 90°	DCP id.:
drill model: Hand Auger	hole diameter : 50 mm		
drilling information	material substance	· · · · · ·	
method & support support a support a support a standard for the standard f	Do by iteration material description SOIL TYPE: plasticity or particle characteristic, iteration SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	Active and a constraint of the second	
E B	Site Site Site	E<8	TOPSOIL MATUA SUBGROUP VS 186/ 31 kPa VS 149/ 28 kPa VS 153/ 25 kPa VS 109/ 25 kPa VS 182/ 25 kPa
IIII IIII IIIII IIIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	N nil Samples & field tests B bulk disturbed sample D disturbed sample E environmental sample	soil description based on Unified Classification System moisture D dry M moist W wet S saturated	

Appendix E – Fill Test Summary Tables



GENZTAUC13086AF THE LAKES (2012) LIMITED THE LAKES STAGE 3 CONSTRUCTION

	FILL			B EARTHWORKS	PERIOD	
		Sum	mary of earthfill t	est data Result	I	
Test Number	Date	Test RL (m)	Air Voids (%)	Shear Vane (kPa)	Scala (blows per 100mm)	Pass/Fail
151		20.7	9.3	204	-	Pass
152	1	53.0	2.6	177	-	Pass
153	-	48.8	0.1	217+	-	Pass
154	1	53.8	4.8	217+	-	Pass
155	1	53.6	1.5	217+	-	Pass
156		51.6	2.1	217+	-	Pass
157	19/11/2007	48.8	4.5	208	-	Pass
158		46.4	0.0	217+	-	Pass
<u>159</u> 160	-	40.5 43.2	0.0	197 216	-	Pass Pass
161	-	43.2	0.8	217+	-	Pass
162	-	48.5	0.7	231+	-	Pass
163		51.3	1.5	217+	-	Pass
164		46.2	0.3	225	-	Pass
165		43.1	0.0	231+	-	Pass
204	4	41.4	1.4	231+	-	Pass
205 206	4	43.5 45.6	2.1 0.1	217+ 231+	-	Pass Pass
206	4	45.6	8.8	231+	-	Pass Pass
207	1	47.9	0.0	231+	-	Pass
209	1	51.1	2.1	217+	- 1	Pass
210]	51.0	3.4	228+	-	Pass
211	28/11/2007	53.8	7.3	217+	-	Pass
212	20/11/2007	52.6	6	231+	-	Pass
213	_	53.9	2.5	217+	-	Pass
214	4	55.4	4.6	231+	-	Pass
215 216	-	54.2	2 6.6	217+	-	Pass
216	-	<u>48.2</u> 52.1	4.1	231+ 217+	-	Pass Pass
218	-	44.8	3.4	231+	-	Pass
219	-	50.8	5.8	217+		Pass
295	07/40/0007	40.3	2.0	232+	-	Pass
296	27/12/2007	38.0	0.0	243+	-	Pass
297		38.1	0.0	243+	-	Pass
298		36.5	0.0	222+	-	Pass
299	4	36.6	4.1	243+	-	Pass
<u> </u>	-	<u>35.8</u> 37.3	0.0	218+	-	Pass
301	-	40.1	0.0	243+ 235+	-	Pass Pass
303	-	36.8	0.0	243+	-	Pass
304	-	35.7	0.0	223+	-	Pass
305	-	36.3	0.0	243+	-	Pass
306		41.1	0.0	243+	-	Pass
307		41.2	0.0	243+	-	Pass
308	4	43.4	0.0	221+	-	Pass
309	4	43.2	0.0	221+	-	Pass
<u>310</u> 311	28/12/2007	43.6	1.5	243+	-	Pass
311 312	-	45.6 47.0	0.0 4.0	243+ 243+	-	Pass Pass
313	4	47.4	0.0	239+	-	Pass
314	1	44.9	2.0	205+	-	Pass
315]	43.5	3.5	233+	-	Pass
316		43.1	6.2	243+	-	Pass
317	4	42.7	12.0	237+	-	Pass
318	4	41.4	1.1	243+	-	Pass
319	4	40.3	2.9	243+	-	Pass
<u>320</u> 321	-	40.1 40.7	3.2 4.8	219+ 207	-	Pass Pass
321	4	40.7	<u>4.8</u> 0.0	207	-	Pass
323	1	40.5	4.3	243+	-	Pass
324	1	41.9	5.2	243+	-	Pass
325	7/01/2008	33.4	4.8	214+	-	Pass
373		54.3	5.1	220+	-	Pass
374	4	55.9	3.4	243+	-	Pass
375	4	55.6	0.4	194	-	Pass
376	4	56.9	0.0	222+	-	Pass
377	4	55.7	0.0	243+	-	Pass
<u> </u>	4	<u> </u>	5.7	243+	-	Pass
379 380	-	55.4	0.0 2.4	202+ 243+	-	Pass Pass
381	-1	52.3	3.3	243+	-	Pass

				Result		
Test Number	Date	Test RL (m)	Air Voids (%)	Shear Vane (kPa)	Scala (blows per 100mm)	Pass/Fail
382		53.1	1.9	243+	-	Pass
383	_	52.2	0.0	243+	-	Pass
384	4	53.1	1.5	243+	-	Pass
385	-	53.4	0.6	180	-	Pass
386	-	50.6	12.0	243+ 170	-	Pass
<u>387</u> 388	-	51.5 49.4	4.9 6.6	243+	-	Pass Pass
389	-	50.4	1.1	243+	-	Pass
390	-	48.4	5.2	243+		Pass
391	8/01/2008	49.3	8.2	243+	-	Pass
392		50.3	5.7	243+	-	Pass
393	1	51.1	0.0	205+	-	Pass
394		45.9	0.1	243+	-	Pass
395		46.7	0.0	243+	-	Pass
396		46.0	2.3	243+	-	Pass
397		46.4	0.0	243+	-	Pass
398	4	46.2	2.2	243+	-	Pass
399	_	46.7	2.2	243+	-	Pass
400	-	47.4	8.9	243+	-	Pass
401	-	47.8	4.5	243+	-	Pass
402	-	48.2	0.0	243+	-	Pass
<u>403</u> 404	1	47.9 43.6	13.0 0.0	243+ 243+		Fail on air voids Pass
404 405	1	43.0	0.0	243+	-	Pass
405	1	39.8	1.7	243+	-	Pass
400	1	40.4	0.0	243+	-	Pass
408	1	42.1	4.9	243+	-	Pass
409	1	42.7	0.0	243+	-	Pass
808		51.5	5.4	231+	-	Pass
809		50.6	0.0	231+	-	Pass
810		49.8	11.0	231+	-	Pass
811		49.9	0.0	224+	-	Pass
812	20/02/2008	48.8	5.9	231+	-	Pass
813		45.4	9.3	231+	-	Pass
814		44.8	1.3	231+	-	Pass
815		44.3	7.4	231+	-	Pass
816		42.0	3.2	197	-	Pass
<u>825</u> 826	29/2/09	35.4	9.5 15.0	<u>180</u> 219	-	Pass
827	29/2/09	<u>34.8</u> 35.5	16.0	183	-	Fail - to be retested Fail - to be retested
843		39.6	0.0	200	-	Pass
844	-	40.8	0.0	250+	-	Pass
845	-	41.0	3.2	250+	-	Pass
846	-	37.9	5.2	175	-	Pass
847	1	38.3	0.0	195	-	Pass
848	11/03/2008	37.4	1.3	250+	-	Pass
849		56.9	0.0	250+	-	Pass
850		56.6	0.0	250+	-	Pass
851		54.6	8.3	250+	-	Pass
852		54.2	0.0	250+	-	Pass
853		50.5	0.0	250+	-	Pass
854	4	55.7	2.7	250+	-	Pass
855	-	55.4	6.7	218+	-	Pass
856	4	55.4	0.3	250+	-	Pass
<u>857</u> 858	4	53.2 52.7	1.1	250+ 207	-	Pass
858	4	52.7	0.2 0.0	207	-	Pass Pass
860	1	48.5	3.8	250+	-	Pass
861	1	46.5	0.0	216	-	Pass
862	1	45.8	0.0	227+	-	Pass
863	40/00/0000	48.2	0.0	243+	-	Pass
864	12/03/2008	49.2	5.5	231+	-	Pass
865]	47.2	0.0	250+	-	Pass
866]	49.9	7.2	222		Pass
867	_	42.5	0.0	250+	-	Pass
868	4	42.2	3.8	250+	-	Pass
869	4	42.7	2.6	250+	-	Pass
870	4	52.7	4.8	250+	-	Pass
871	4	52.9	0.0	250+	-	Pass
872	4	52.3	0.0	250+	-	Pass
873		52.3	4.4	250+	-	Pass
938	4	39.6	7.1	214+	-	Pass
000	4	<u>41.8</u> 41.7	7.2 7.8	214+	-	Pass
939		. // /	1 / 8	214+	-	Pass
940	-					Derr
940 941	-	38.6	0.1	204+	-	Pass
940	20/03/2008				-	Pass Pass Pass

Test Number	Date	Test RL (m)	Air Voids (%)	Shear Vane (kPa)	Scala (blows per 100mm)	Pass/Fail
945		44.2	0.0	214+	-	Pass
946		49.9	0.0	214+	-	Pass
947		48.1	0.0	214+	-	Pass
956		17.6	0.2	203+	-	Pass
957		18.4	5.8	214+	-	Pass
958		18.9	4.5	214+	-	Pass
959		19.4	4.7	187+	-	Pass
960		19.9	1.4	214+	-	Pass
961		20.4	1.8	207+	-	Pass
962		20.2	5.5	167	-	Pass
963	4/04/2008	20.5	8.7	201+	-	Pass
964	4/04/2000	14.1	2.1	214+	-	Pass
965		14.6	1.7	214+	-	Pass
966		14.1	1.2	214+	-	Pass
967		14.6	1.7	214+	-	Pass
968		14.5	4.9	214+	-	Pass
969		14.0	8.9	214+	-	Pass
970		13.9	3.5	214	-	Pass
971		13.4	6.5	190+	-	Pass
1086		15.9	2.2	218+	-	Pass
1087	_	16.6	2.5	218+	-	Pass
1088	_	17.3	2.3	218+	-	Pass
1089	4	16.2	4.5	198+	-	Pass
1090	_	16.6	3.4	191+	-	Pass
1091	4	17.0	4.9	183+	-	Pass
1092	_	13.7	4.1	188	-	Pass
1093	_	13.8	2.3	179	-	Pass
1094	_	13.0	1.6	218+	-	Pass
1095	_	12.8	0	175	-	Pass
1096	_	13.1	6.5	218+	-	Pass
1097	_	14.9	10	218+	-	Pass
1098	-	20.6	8.2	173	-	Pass
1099	10/04/2008	21.9	1.7	180	-	Pass
1100	4	39.2	0.5	218+	-	Pass
1101	4	37.7	3.4	218+	-	Pass
1102	4	38.5	0	170	-	Pass
1103	4	38.5	1.4	206+	-	Pass
1104	4	43.3	0	198+	-	Pass
1105	4	42.7	7	200+	-	Pass
1106	4	42.3	4.1	218+	-	Pass
1107	4	41.4	8.9	203+	-	Pass
1108	4	43.7	3.9	211+	-	Pass
1109	4	41.2	0	218+	-	Pass
1110	4	42.0	6.7	218+	-	Pass
1111	4	43.0	1.8	218+	-	Pass
<u>1112</u> 1113	4	41.4 38.9	3.2 4.3	218+ 218+	-	Pass Pass

Notes

Shear strength for NDM tests calculated from average of 4 vane tests at each test location. UTP = unable to penetrate. 1

A target Soilds Density of 2.4 t/m³ was assumed for pumice sand fill, 2.6 t/m³ for silt/ash fill and 2.5 t/m³ for blended fills.
UTP = Unable to Penetrate



GENZTAUC13086AF THE LAKES (2012) LIMITED THE LAKES SUBDIVISION STAGE 3 ZONE 1

FILL TEST RESULTS FROM 2013 - 2015 EARTHWORKS PERIOD Summary of earthfill test data										
Result										
Test Number	Date	Test RL (m)	Air Voids (%)	Shear Vane (kPa)	Scala (blows per 100mm)	Pass/Fail				
1		45.61	8.2	176	-	Pass				
2	1	46.95	0.0	UTP	-	Pass				
3	1	46.53	0.0	164	-	Pass				
4	1	47.53	3.1	UTP	-	Pass				
5	1	58.44	0.8	127	-	Fail - area reworked				
6	1	58.83	2.2	209	-	Pass				
7	18/10/2013	58.91	0.4	UTP	-	Pass				
8	1	58.38	2.7	236+	-	Pass				
9	1	59.09	1.9	UTP	-	Pass				
10]	58.77	3.8	236+	-	Pass				
11		58.51	4.3	176	-	Pass				
12		58.71	3.5	86	-	Fail - to be retested				
13		58.08	3.7	UTP	-	Pass				
14		46.97	0.7	183	-	Pass				
15		47.13	0.0	142	-	Pass				
16]	45.61	0.6	159	-	Pass				
17	4	47.47	0.0	175	-	Pass				
18	4	47.76	3.5	UTP	-	Pass				
19	22/10/2013	47.81	0.0	191	-	Pass				
<u>20</u> 21		47.98 47.99	0.0	203 200	-	Pass Pass				
21	1	47.99	0.0	128	-	Fail - area reworked				
23	1	46.99	0.0	184	-	Pass				
24	1	47.11	0.3	200	-	Pass				
25]	47.72	0.0	179	-	Pass				
26		47.22	6.5	173	-	Pass				
29	4	28.83	1.6	UTP	-	Pass				
30	4	59.33	2.6	236+	-	Pass				
31	4	58.46	1.6	149	-	Pass				
32 33	4	59.00 58.32	0.0	<u>180</u> 171	-	Pass Pass				
34	-	58.81	0.0	220	-	Pass				
35	1	58.22	0.8	138	-	Marginal Pass				
36	1	58.67	0.3	UTP	-	Pass				
37]	58.01	0.0	236+	-	Pass				
38]	58.50	0.0	236+	-	Pass				
39	1	57.76	0.0	195	-	Pass				
40	20/40/2042	58.28	5.6	UTP	-	Pass				
<u>41</u> 42	30/10/2013	58.18 58.24	0.0 4.9	97 UTP	-	Fail - to be retested				
42	-	58.24	0.5	205	-	Pass Pass				
44	4	58.53	0.0	197	-	Pass				
45	1	58.86	6.3	236+	-	Pass				
46	1	59.58	3.0	138	-	Marginal Pass				
47]	59.43	1.3	9999	-	Pass				
48	4	59.23	5.8	236+	-	Pass				
49	4	31.39	3.2	236+	-	Pass				
50	4	31.77	6.2	164	-	Pass				
51 52	4	<u>32.42</u> 31.71	2.7 0.0	159 175	-	Pass Pass				
<u> </u>	4	31.71	0.0	175	-	Pass Pass				
<u> </u>	1	44.70	0.5	185	-	Pass				
55	1	45.35	5.2	164	-	Pass				
56]	46.85	1.3	UTP	-	Pass				
57	1	47.21	0	UTP	-	Pass				
58	4	48.40	0.2	UTP	-	Pass				
59	4	49.14	0	236+	-	Pass				
60	4	47.93	1.0	201	-	Pass				
61 62	4	48.64 49.78	0.0 3.5	236+ 236+	-	Pass Pass				
<u> </u>	1	<u>49.78</u> 50.26	3.5 0.7	236+ UTP	-	Pass				
64	22/11/2013	51.63	0.0	UTP	-	Pass				
65	1	50.53	6.0	111	-	Fail - to be retested				
66	1	52.63	1.7	186	-	Pass				
67]	55.64	0.0	UTP	-	Pass				
68]	56.21	0.8	UTP	-	Pass				
69	4	54.38	0.7	164	-	Pass				
70	4	52.72	7.2	UTP	-	Pass				
71	1	32.63 33.34	2.9 1.6	194 215	-	Pass Pass				

Test Number	Date	Test RL (m)	Air Voids (%)	Shear Vane (kPa)	Scala (blows per 100mm)	Pass/Fail
73		33.25	0.6	UTP	-	Pass
74		47.37	4.0	UTP	-	Pass
75		48.13	1.6	UTP	-	Pass
76		49.88	4.1	UTP	-	Pass
77		47.40	0.9	174	-	Pass
78	ļ	48.14	0.0	186	-	Pass
79	10/01/2014	48.86	0.0	210+	-	Pass
80		48.12	3.5	UTP	-	Pass
81		48.85	0.0	UTP	-	Pass
82]	50.03	0.0	188	-	Pass
83]	47.98	0.9	191	-	Pass
84		48.71	4.5	68	-	Fail - retested 84R
84R	18/02/2014	48.67	0.0	UTP	-	Retest of 84 - Pass
85		49.45	0.0	197	-	Pass
86		48.85	6.6	119	-	Fail on SV (see note 4
87		49.63	3.1	UTP	-	Pass
88		49.62	3.1	UTP	-	Pass
89]	50.39	0.0	UTP	-	Pass
90	1	51.11	0.0	UTP	-	Pass
91	1	52.06	0.0	182	-	Pass
92	10/01/2014	50.88	0.0	UTP	-	Pass
93		51.67	3.1	UTP	-	Pass
94		52.27	6.1	UTP	-	Pass
95]	52.85	0.0	195	-	Pass
96	1	51.37	0.0	UTP	-	Pass
97	1	52.24	0.0	UTP	-	Pass
98	t	52.91	0	210+	-	Pass
99	1	53.47	0	210+	-	Pass
100		52.16	0	UTP	-	Pass
101	1	53.05	1	236+	-	Pass
102		53.96	5.6	198	-	Pass
102	1	53.14	0	UTP	-	Pass
104	4	53.83	0	UTP	-	Pass
105	+	54.50	0	UTP		Pass
106	+	55.34	4.1	UTP	-	Pass
107	+	54.03	0.5	UTP	-	Pass
108	ł	54.79	1.8	UTP	-	Pass
109	+	55.57	3.9	236+	-	Pass
110	15/01/2014	55.58	1.4	UTP		Pass
110	+	40.23	2.3	UTP	-	Pass
112	+	40.23	0		-	
112	-	40.65		236+ UTP		Pass
	-		5.6		-	Pass
114	+	41.54	0	236+	-	Pass
115	ł	39.42	1.7		-	Pass
116	ł	40.22	6.4	UTP	-	Pass
117	1	34.04	2.6	219	-	Pass
118	-	34.58	0	159	-	Pass
119		35.27	3.4	236+	-	Pass
120	-	55.96	3.3	180	-	Pass
121	ł	56.39	2.2	75	-	Fail - to be retested
122	ł	56.91	0.4	172	-	Pass
123	ļ	55.81	0	210+	-	Pass
124	ļ	56.46	0	185	-	Pass
125	ļ	56.17	0.8	UTP	-	Pass
126	17/02/2014	56.68	0	170	-	Pass
127		53.83	15	197	-	Pass
128	ļ	54.42	3.5	UTP	-	Pass
129	ļ	54.88	1.8	199	-	Pass
130	ļ	55.70	6.7	113	-	Fail - to be retested
131	ļ	53.10	6.5	UTP	-	Pass
132	ļ	53.56	3.6	UTP	-	Pass
133		54.22	3.4	UTP	-	Pass
134	1	50.39	0	219	-	Pass
135	ļ	50.93	0	174	-	Pass
136	ļ	51.36	2	UTP	-	Pass
137	l	51.93	3.7	UTP	-	Pass
138	Ι	50.75	2.7	UTP	-	Pass
139]	49.36	0	UTP	-	Pass
140	18/02/2014	50.48	0	UTP	-	Pass
141	1	49.58	0	225+	-	Pass
142	t	50.11	0	225+	-	Pass
143	t	50.82	11.9	186	-	Pass
144	t	50.15	0.1	225+	-	Pass
145	t	50.67	1.1	UTP	-	Pass
145	ł	51.20	19.4	UTP	-	Pass
140		45.22	5.7	UTP	-	Pass
1/7	-		i 0.7		-	г d55
<u>147</u> 148	+	44.75	5.9	UTP	-	Pass

Test Number	Date	Test RL (m)	Air Voids (%)	Shear Vane (kPa)	Scala (blows per 100mm)	Pass/Fail
150		43.07	3.9	UTP	-	Pass
151		44.89	3.7	UTP	-	Pass
152		44.35	1.7	UTP	-	Pass
153		44.84	0	UTP	-	Pass
154		44.19	3.4	UTP	-	Pass
155		42.79	0	UTP	-	Pass
156	10/03/2014	43.92	2.2	UTP	-	Pass
157		42.10	0	131	-	Fail - to be retested
158		43.66	5.8	UTP	-	Pass
159		42.73	6	UTP	-	Pass
160		41.94	2.2	UTP	-	Pass
161		41.21	5.6	UTP	-	Pass
162		42.51	3.5	UTP	-	Pass
163		38.95	5.2	UTP	-	Pass
164		38.93	6.4	UTP	-	Pass
165		38.64	4	UTP	-	Pass
168		46.99	5	232	-	Pass
169	16/02/2015	45.83	1.5	231	-	Pass
170		45.35	3.8	230	-	Pass
175	20/02/2015	49.28	-2.9	224	-	Pass
176	20/02/2015	48.50	1.5	210	-	Pass
177		48.99	1.8	220	-	Pass
178	24/02/2045	48.76	7.7	225	-	Pass
179	24/02/2015	49.55	0.8	203	-	Pass
180	7	50.17	1.3	232	-	Pass
181		47.50	1.4	232	-	Pass
182	26/02/2015	47.00	4.4	195	-	Pass
183	7	34.00	4.4	219	-	Pass

Notes

1 Shear strength for NDM tests calculated from average of 4 vane tests at each test location.

2 A target Soilds Density of 2.44 t/m³ was assumed for silt/ash fill.

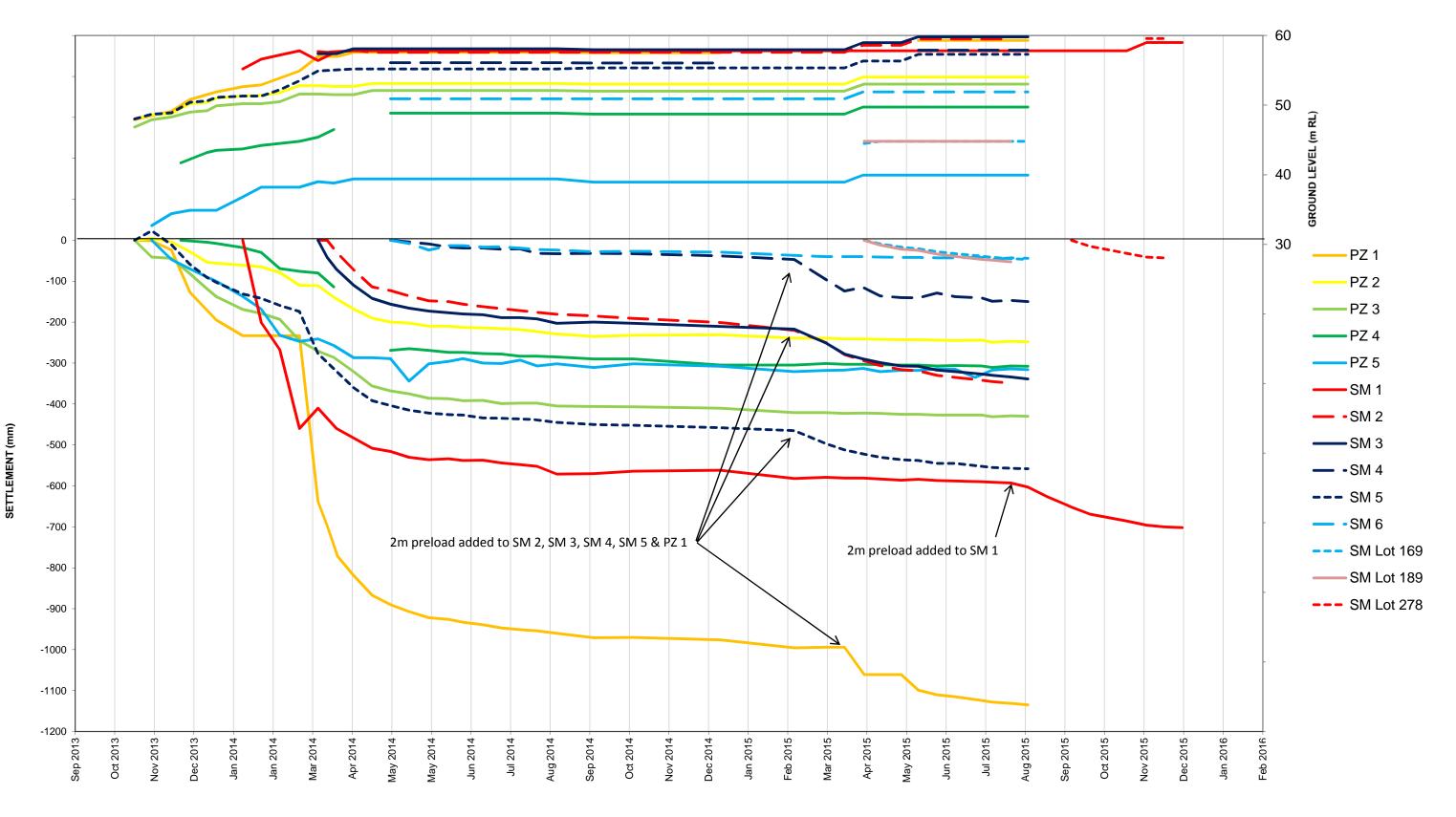
3 UTP = Unable to Penetrate

4 Test FT86 failed on shear vane likely due to sandy soils. Adjacent tests passed and failed fill 8.0m below finished ground surface.

Appendix F – Static Settlement Results



> SETTLEMENT VS TIME WESTERN AND CENTRAL GULLIES

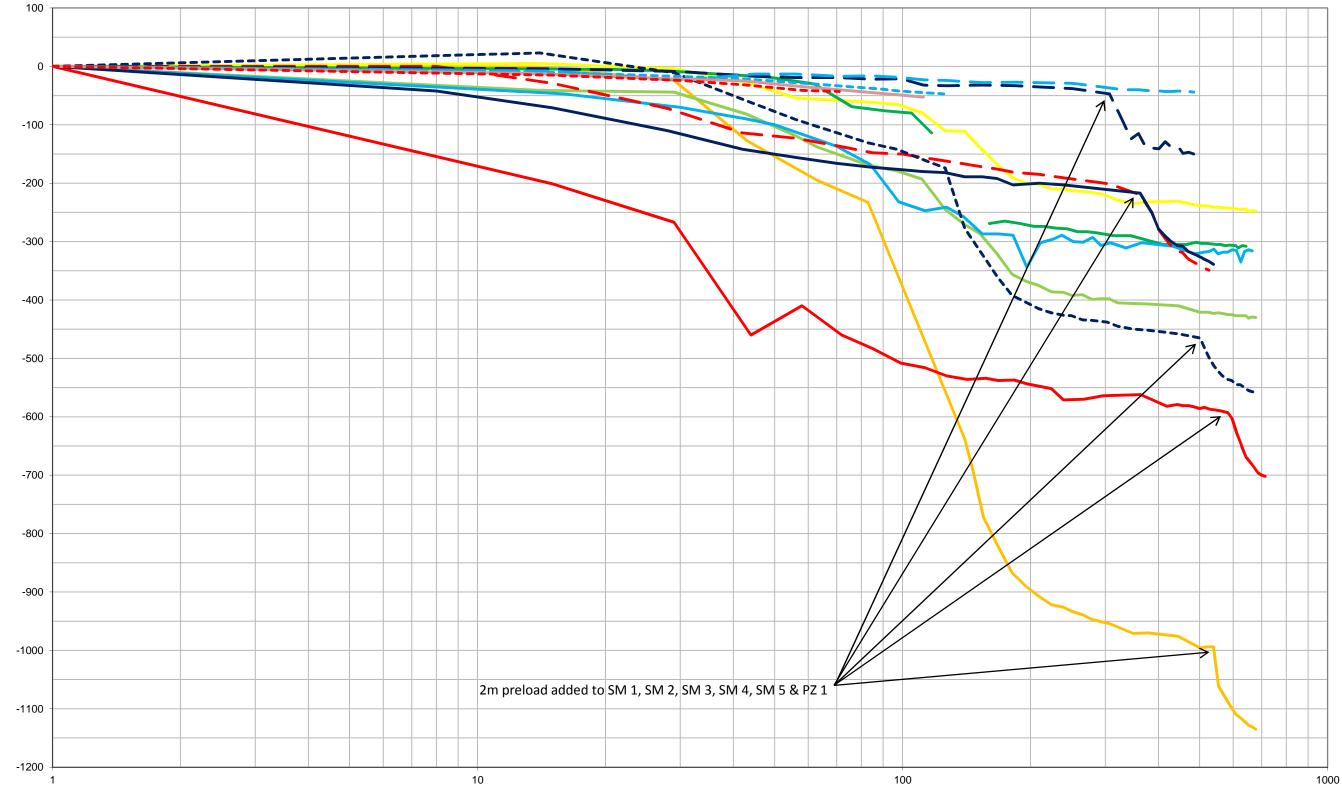


DATE

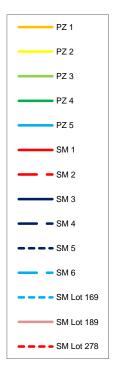


SETTLEMENT (mm)

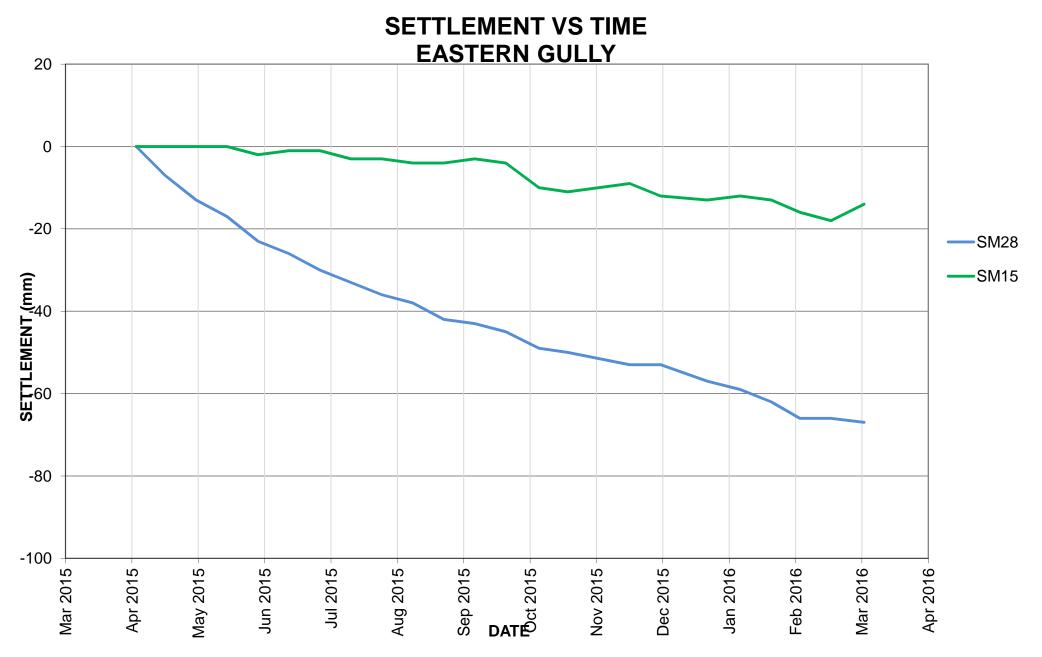
SETTLEMENT VS TIME (LOG SCALE) WESTERN AND CENTRAL GULLIES



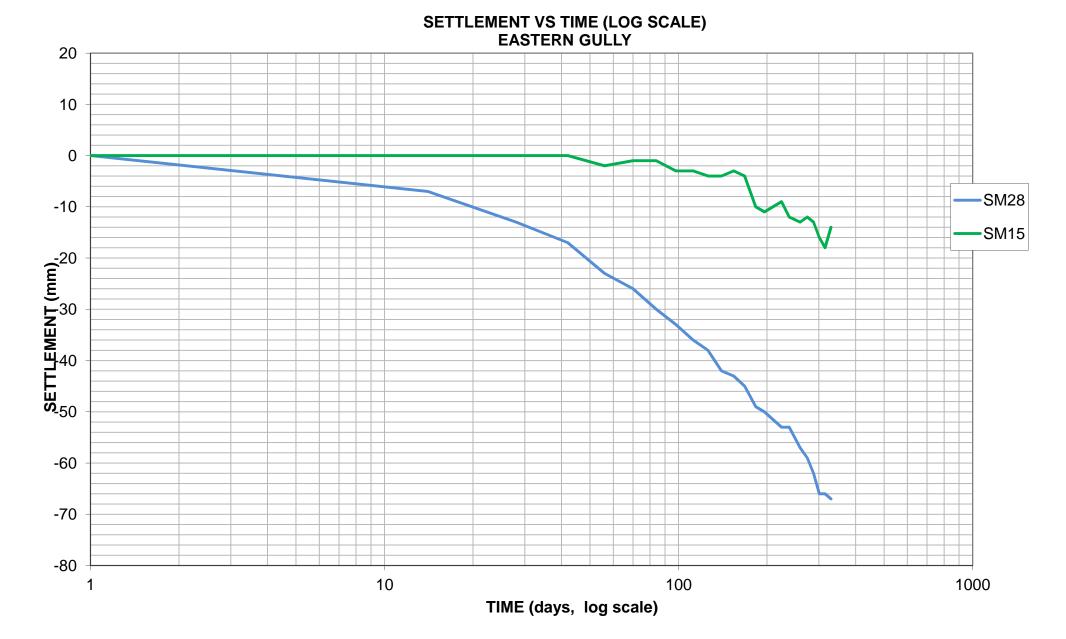
TIME (days, log scale)











1/04/2016