APPENDIX 1

Earthworks QA Documentation

 Core50 Engineers Report on Subdivision Earthworks & Recommendations for Building Development





GREENHILL PARK RESIDENTIAL SUBDIVISION

STAGE 17 and 18a Area LUK, Greenhill Park, Hamilton

GEOTECHNICAL COMPLETION REPORT ON SUBDIVISION EARTHWORKS AND RECOMMENDATIONS FOR BUILDING DEVELOPMENT



Our Ref: CR171738-S17&S18a-01 v3 (Contour Plan Update)

Prepared for: Chedworth Properties Limited

Date: July 2022

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1.0 Subdivision Development Earthworks

1.1 Introduction

Stage 17 and 18a of Greenhill Park is currently accessible from Webb Drive and Watkins Street. Stage 17 and 18a comprises 61 residential lots (numbered 481 to 535 and 8025 to 8030). The locations of these lots are shown on attached subdivision plan 19-30410-17-RC1 included in Appendix A.

Bulk earthworks have been completed to re-contour the previously agricultural landscape for Stage 17 and 18a of the Greenhill Park Residential Subdivision in Hamilton. Works have been carried out in accordance with Hamilton City Council's (HCC) Subdivision Resource Consent: 0011.2019.7140.003. Prior to commencement of earthworks, geotechnical investigations were carried out by Beca Ltd (Beca) in 2016 [1] and summaries in DBCE Preliminary Report for L&K&Eldone (December 2019).

The Regional Infrastructure Technical Specifications (RITS) for Waikato set out the minimum standards for design and construction of public infrastructure within Hamilton City. Section 2.1.6 of the *Earthworks and Geotechnical Requirements* of the RITS states that the developer shall appoint a geo-professional to carry out functions as described in NZS 4404[5] Section 2.2.4. RITS Section 2.3.4.1 states that a geotechnical completion report shall be submitted as per NZS 4404 Section 2.6 including a statement of professional opinion on the suitability of land for building construction [4]. The developer has appointed CORE50 Ltd as the geo-professional.

To satisfy the requirements of HCC's Resource Consent, the RITS and NZS 4404, this report summarizes the observations and testing undertaken during the development of the stage, discusses the suitability of the ground for the support of the proposed residential buildings and contains recommendations for the disposal of stormwater runoff generated on individual sites.

Included in Appendix A of this report is the proposed subdivision plan comprising the proposed new lots for Area LUK Stage 17 and 18a. The included earthworks plan shows the cut/fill extent of the earthworks undertaken, test positions, and road and lot locations.

1.2 Earthworks in the Subdivision

The earthworks for stage 17 and 18a of the subdivision development were undertaken between October 2020 and May 2022.

These earthworks comprised:

- 1. The stripping of surface topsoil to expose underlying natural soils.
- 2. Cut of up to 3.0m.
- 3. The placement of filling within majority of the stage.
- 4. Backfilling and raising the ground level with new fill to create uniform fill platforms.
- 5. The reinstatement of the surface topsoil cover and subsequent grassing.

The soils encountered during the formation of the site and road subgrades were a mixture of silty sands and sandy silts, typical of younger Hinuera deposits, overlying clayey silt and silty clay, typical of Walton group deposits. The Walton Subgroup rises out of the Hinuera deposits that formed a ridge line running through the greater LUK area. These soils were those that had been identified in pre-construction site investigations by the Beca Report 2016. The published geology indicates that Area LUK soils comprise Hinuera Formation alluvium at surface with Walton Subgroup overlain by Hamilton Ash in the gently sloping hill within the LUK area.

The filling work was undertaken using the Walton Subgroup soils gained from areas of cut within stages 16 to 18a and the larger Greenhill Subdivision. Filling was undertaken during the summers of 2020 to 2022 when drying back of the soils was possible to close to optimum moisture contents to achieve near maximum compaction densities and undrained shear strengths.

Upon completion of the earthworks, approximately 100 to 300 mm of topsoil was placed across the sites and the finished surfaces were grassed in accordance with Conditions of the Resource Consent. Areas where an initial grass strike did not take place were re-grassed. While the target topsoil depths after the earthworks were to be around 300 mm, no guarantee is implied or given that the topsoil on any part of any lot is 300 mm or less and it is recommended that future owners or designers or builders check topsoil depths when preparing site development plans and cost schedules.

1.3 Earthworks Standards

The earthworks in filling were undertaken using in situ Silty CLAY and Clayey SILT mixtures gained from areas of cut within stages 16 to 18a and across the larger subdivision. The standards for the placement of filling, as stated in the earthworks contract documents, were to comply with NZS 4431:1989 "Code of Practice for Earth fill for Residential Development" and the Council RITS. Filling placed to these standards may be considered as good ground in terms of NZS 3604:2011 "Timber Framed Structures".

The compaction of the filling placed was monitored and tested for compaction density using a hand-held shear vane and nuclear densometer in finer grained Clayey SILT and Silty CLAY. The compaction control criteria adopted for engineered fill on site were as follows:

- Air voids percentage average value less than 10 %.
- Air voids percentage maximum single value 12 %.
- Undrained shear strength average value not less than 140 kPa.
- Undrained shear strength minimum single value 110 kPa.
- Compaction percentage average value not less than 95%.
- Compaction percentage minimum single value 90%.

1.4 Filled Ground

During the placement of filling on the road subgrades and on areas intended for residential development, the contractor, OLC, stripped and removed all topsoil and other surface organic soils. Post construction testing was carried out to confirm the interface between the cut and fill. Filling was placed in discrete layers with compaction applied through sheepsfoot drum rollers.

Subgrade inspections were carried out by the contractor and by CORE50 for verification purposes. The CORE50 subgrade and fill testing included a site walkover by the geotechnical engineer and site testing by a Geo-technician. As most of the filling placed comprised Clayey SILT and Silty CLAY identified in the pre-subdivision boreholes, testing of the compaction achieved was undertaken with a handheld shear vane and NDM testing (Nuclear Density Meter). Testing was based on the required air voids ratio (averaging 10% and no individual value of over 12%). In our experience, oven tests for air void correction can vary the air void result in this material by up to 3%. Oven tests were typically used for any on field air void result $\geq 6\%$. Solid density values were based on the same value used in the lab testing (2800kg/m³). This is a higher value that would typically be used but provides a conservative result so has been adopted without further question or testing.

The results indicate that the construction filling standards have been met. However due to the expansive nature of the fill material, unless stated otherwise, shallow or waffle foundations on all stage 17 and 18a lots must be designed to mitigate "M Class" expansive soils, i.e. NZS 3604:2011 foundations modified as per NZ Building Code B1/AS1 (28th November 2019) Section 7 or engineered waffle slabs constructed in compliance with AS2870-2011 Residential Slabs and Footings.

1.5 Areas of Cut

Areas partly developed in cut are shown on the cut fill plan (Appendix A). Lots 481 to 482 and 523 to 524 had between 100mm–3000mm of cut material. In these areas, the ground at formation levels was observed to comprise the same Clayey SILT and Silty CLAY that had been used for filling elsewhere in stages 16 to 18a and as identified by pre subdivision tests.

1.6 Test Results in Filling Placed

A summary of the tests undertaken by CORE50 is present in Appendix D.

The shear vane and nuclear densometer test results show that acceptable soil strengths had been developed in all fill areas tested.

1.7 Test Results in Areas of Cut and Natural Ground

Lots 481 to 482 and 523 to 524 were predominately reshaped in cut only areas. The natural ground under the respread topsoil comprised of silty clay and clayey silts as had been identified in the pre-subdivision investigation boreholes.

The results of the tests undertaken indicate that good ground strength is present, but with the likelihood of expansive soils.

1.8 Land Hazards

1.8.1 Land Stability

All lots across stages 17 and 18a have been graded as flat as possible with a desirable gradient of 0.5%. However, boundaries of various lots were battered to optimize use of fill material. Based on the competency of the inherent soils, there is a building restriction zone of 3m from the top of batter or any swale. Any lot bordering a stormwater swale has been identified as a Specific Engineering Design zone for foundations. The foundation design for these lots will also need to allow for appropriate setback or alternative design options (i.e. underpinning) where adjacent to the swales.

Standard good practice around small slopes of the site will be required. Buildings should be set back from the slopes and avoid either surcharging the slopes or undermining the slopes. All foundations within this area are subject to specific engineering design, and an assessment of the building location and earthworks should be carried out as a part of the engineering design/review of any section adjacent to a slope.

1.8.2 Flooding

The final lot levels have been set based on infrastructure requirements and freeboard from flood levels developed as part of the stormwater design for the larger subdivision. The means of disposal of stormwater runoff from lots in these stages of the subdivision are described in the catchment and overland flow assessments by Beca (interpretive Report Lot Levels Area LUK). In the report for area LUK, a 1% AEP flood event is identified for each swale system. A list of Minimum Lot Levels for Stage 17 and 18a is included in Appendix E.

Site grading during house construction must not lower finished levels below the minimum finished ground levels identified by S&L without further review of the impacts on flooding. Earthworks must not direct stormwater runoff to adjacent properties, or towards buildings, or create areas of localized ponding. All overland flow is to be towards the road frontage on each section, where falls will direct surface flow towards the swale system.

It is the responsibility of the building design professional to ensure that the requirements for mitigation for the hazard of flooding are met by the design prior to submitting to Council for consent. Confirmation of the swale construction and flood levels are excluded from the scope of this report and are to be covered separately with sign-off of infrastructure works.

1.8.3 Liquefaction

The potential for the hazard of liquefaction for Area LUK of the Greenhill Park Subdivision is discussed in the DBCE Preliminary Geotechnical Report. Geologically, stage 17 and 18a is a transition zone between younger Hinuera Deposits and older Walton Subgroup. The Hinuera deposits are considered liquefaction prone is subject to a seismic event coupled with a high groundwater. Zones of the subdivision that are in the low lying area will typically be subject to liquefaction effects during the ULS earthquake. Modelling using CLiq indicates that zones with less than 2m of fill over Stage 17 and 18a are considered TC2 unless further assessmetnis carried out. For lots with greater than 2m of fill added or sites on cohesive (i.e. Walton Group) deposits the riskis reduced and TC1 foundations are appropriate.

Note that updated liquefaction parameters (0.25g and M=5.9) have been used for checking the threshold, with LSN = 10 indicated for sites with 2m of fill added during subdivision earthworks. Additional fill/ground raising will reduce the risk of liquefaction triggering but increasing the non-liquefiable rafting layer.

Foundations near the top of the swales are subject to Specific Engineering Designs. The liquefaction summary plan is appended to this Completion report (Appendix A). Specifically, the requirements are:

- 0m 1.5m no habitable dwellings to be built within 1.5 m of the swale crest.
- Lots adjacent to storm water swales to have specific engineered foundation designs, i.e., Lots 519 and 531.

1.8.4 Expansive Soils

Underlying soils within stages 17 and 18a are typically either Hinuera Formation based deposits, or Walton Subgroup. The Hinuera Formation is predominantly sand, and silt based and considered non expansive or slightly expansive. The Walton Subgroup has a much higher clay content and is considered slightly to moderately expansive. Given the volcanic origins, the expansive nature of the soils is generally non-recoverable i.e., shrinkage only. However, the relatively high shrinkage potential of the Walton Subgroup means it would be normal to classify this as moderately expansive in its in-situ state i.e., 20-39mm.

1.8.5 Subsidence (Consolidation Settlement)

The DBCE Preliminary Geotechnical Report has identified areas within stages 17 and 18a may experience settlement of fill through consolidation of underlying Hinuera deposits. A minimum 6 month holding period between completion of bulk filling and foundation construction should be observed for Lots 491-496, 501-510, 519-522, 525-535, and 8025-8030. Completion of the bulk earthworks has been completed by September 2021. At time of report May 2022, no building works have taken place. We consider this has provided sufficient time for settlement to have occurred. Residential development can proceed without further consolidation periods required.

2.0 Disposal of Stormwater

Greenhill Park has been designed with a swale network to limit peak flows from the subdivision to 80 % of the 1 % AEP pre-development rate. S&L have provided the stormwater design for the current stage of the subdivision. As a part of this design, 100% of the onsite stormwater (up to the allowable impermeable area) has been allowed for in the system design. As such, no at source on site stormwater measures are required as a part of the overall stormwater design. This allows for a centralized stormwater system which has been stated as preferred for long term maintenance by Council. The piped drainage network has been designed to convey the 10% AEP flows from roads and lots to the swale network, with each lot to be provided with a piped service connection. Flow volumes over this design event may run overland into the swale network as secondary flow.

We recommend that reduced onsite water efficiency measures such as catchpit filters and reuse tanks be encouraged to improve water efficiency and reduce the sediment load downstream. Such measures should be at the discretion of the end user on a case-by-case basis.

The above recommendations do not supersede any additional measures that Council may require of each individual lot. Any council requirements in addition to the subdivision design should be followed. Any such requirements should be confirmed from council for this area. Any lot coverage over the maximum permitted will require site specific stormwater management to offset the effects of added runoff volume.

3.0 Retaining Walls

Engineered timber pole retaining walls up to 3.2m height were constructed around the boundary of Lot 525 to retain cut and fill slopes and create a near level lot platform. CORE50 has designed and carried out multiple inspections to confirm that the walls were constructed as per design. A site plan showing the retaining walls on site is included in Appendix A and a producer statement (PS4) for the retaining walls, is included in Appendix F.

To prevent overloading or undermining the retaining walls along Lot 525, The following Building Restriction Zones (BRZ) and Excavation Restriction Zones (ERZ) apply:

- a) BRZ: No buildings should be constructed within a minimum distance to the top of the wall equal to the height of the wall measured from the wall drainage system without engineering review of surcharge loading.
- b) ERZ: No temporary service trench, foundation, or excavation ≥300mm should be carried out within a minimum distance to the toe of the wall =1.5m and/or equal to the walls retained height (which ever is the greater) without engineering review.

4.0 Preliminary Foundation Recommendations

Based on our post-completion investigations, observations during construction and understanding of the site's geology and geotechnical hazards, we believe suitable foundations will generally be either TC2, M Class, or SED.

The lot summary table in Appendix B provides a summary of the anticipated ground conditions and preliminary foundation recommendations for each lot. Further lot-specific testing will be required to confirm foundation requirements. This may include testing prior to consent applications or during foundation excavations. The timing of the testing will be subject to Council requirements.

5.0 Professional Opinion

It has been demonstrated in this Geotechnical Completion Report, that earthworks have been completed and building platforms have been constructed to comply with Council's RITS specifications and the New Zealand Building Code. Recommendations have been provided within the report for the disposal of stormwater from individual lots, for the ongoing development of the lots and for the mitigation of liquefaction risk where applicable.

In accordance with RITS Section 2.3.4.1, a statement of professional opinion is enclosed in Appendix II of this document. This statement is presented in the form of Checklist 2.2 of Council's Development Manual, Volume 4: Quality Systems for Land Development, and is accompanied by a *Summary of Geotechnical Data for Individual Lots* which summarizes the information and recommendations contained in this report.

6.0 Applicability

Recommendations contained in this document are based on data from observations of site earthworks, boreholes, and test results. Inferences about the nature and continuity of subsoils away from these locations are made but cannot be guaranteed.

In all circumstances, if variations in the subsoils occur which differ from those described or are assumed to exist, the site should be inspected by an engineer suitably qualified to make an informed judgement and provide advice on appropriate improvement measures.

This report has been prepared specifically for Stages 17 and 18a as shown for Lots: 481 to 535 and 8025 to 8030 of Area LUK, Stages 17 and 18a within the Greenhill Park Residential Subdivision. No responsibility is accepted by CORE50 Ltd for the use of any part of this report for other development sites without their written approval.

Report Prepared By:

Aaron Kennedy Civil Engineer Date: 31st May 2022

Report Revised and Approved By:

Date: 14th July 2022

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Michael Richardson

Geotechnical Engineer CPEng

References

- [1] Ruakura Land Development LDP Geotechnical Factual Report by Beca, 15 April 2016.
- [2] C. Hughes and K. Read, "Ruakura Development Stage 1 Geotechnical Investigation Liquefaction Potential Detailed Assessment," Opus International Consultants, Ltd., Hamilton, New Zealand, 2014.
- [3] M. Hughes and L. Shuler, "Report on Preliminary Geotechnical Investigation, Ruakura Development, Hamilton," S&L Consultants, Ltd., Tauranga, New Zealand, 2015.
- [4] "Section 2 Earthworks and Geotechnical Requirements," in *Regional Infrastructure Technical Specifications*, Waikato Local Authority Shared Services, May 2018.
- [5] "NZS 4404 Land Development and Subdivision Infrastructure," in *New Zealand Standards*, Wellington, New Zealand, Standards New Zealand, 2010.
- [6] "Greenhill Park Geotechnical Interpretation and Design-Area 1" by Beca 28 October 2016.
- [7] "Part 5: Earthquake Actions New Zealand," in *NZS 1170.5:2004 Structural Design Actions*, Standards New Zealand, 2004.
- [8] "Greenhill Park Design Report Area I (Stage 5, 6, 7 & 8) by Beca 20 December 2016
- [9] "Clause B1: Structure," in Acceptable Solutions and Verification Methods For New Zealand Building Code, Wellington, Ministry of Business, Innovation and Employment, 2014.
- [10] "Part A: Technical Guidance," in *Repairing and rebuilding houses affected by the Canterbury earthquakes*, Wellington, Ministry of Business, Innovation and Employment, 2012.
- [11] "Clause E1: Surface Water," in Acceptable Solutions and Verification Methods For New Zealand Building Code, Wellington, Ministry of Business, Innovation and Employment, 2014.
- [12] *Regional Infrastructure Technical Specifications*, Waikato Local Authority Shared Services, May 2018.
- [13] "Preliminary Geotechnical Report Area K, L & Eldone," DB Consulting Engineers, December 2019.

Appendix A <u>Reference Drawings</u> Subdivision plan 19-30410-17-RC1 Cut/Fill Plan DBCE Preliminary Subdivision Foundation Plan









DBCE Preliminary Subdivision Foundation Plan



Appendix BGeotechnical Completion FormsChecklist 2.2 - Statement of Professional OpinionSummary of Geotechnical Data for Individual Lots

NZS 4404: 2010 SCHEDULE2A (Checklist 2.2)

STATEMENT OF PROFESSIONAL OPINION AS TO SUITABILITY OF LAND FOR BUILDING CONSTRUCTION

Development: Greenhill Park LUK Stage 17 and 18a

Developer: Chedworth Properties Limited

Date: 14 July 2022

At Pardoa Boulevard, Chartwell, Hamilton (Mussel White Street and Earp Crescent)

I, Michael Richardson of CORE50 Ltd, PO Box 1123, Taupo

Hereby confirm that:

- **1.0** I am a geo-professional as defined in clause **1.2.2** of NZS 4404:2010 and was retained by the developer as the geo- professional on the above development.
- 2.0 The extent of my inspections during construction, and the results of all tests carried out are described in my geotechnical completion report for Greenhill Park Area LUK Stages 17 and 18a dated May 2022 (reference 171738-S17&S18a-01)
- 3.0 In my professional opinion, not to be construed as a guarantee, I consider that:
 - a. The completed works give due regard to land slope and foundation stability considerations.
 - b. The site ground affected by engineered certified filling is suitable for the erection thereon of buildings designed according to the report recommendations provided that:
 - i. Lots 507 to 522, 531, 535 and 8025 to 8030 are subject to specific engineering review of foundations addressing TC2 liquefaction ground damage for the ULS design case.
 - ii. Remainder of Lots are subject to engineering review of foundations addressing M Class foundation requirements.
 - iii. All lots are subject to an engineering inspection during foundation excavations in lieu of further soils testing. Construction supervision from an engineer shall be carried out to confirm the shallow ground conditions are in accordance with this report and suitable for NZS3604 foundations for bearing strength.
- 4.0 This professional opinion is furnished to Hamilton City Council and the developer for their purposes alone on the express condition that it will not be relied upon by any other person and does not remove the necessity for the normal inspection of foundation conditions at the time of erection of any dwelling.
- 5.0 This certificate shall be read in conjunction with my geotechnical completion report referred to in clause 2 above and shall not be copied or reproduced except in conjunction with the full geotechnical completion report.

Signed		
	Michael Richardson	

Chartered Professional Engineer (Geotechnical) CPEng 1005467

Summary of Geotechnical Data for Individual Lots

DP No	P No: TB210C400 Property Address							Greenhill Park, Stage 17 & 18a, Hamilton										RC No:	11/2019/7140/003		
				Subsurf	ace Data			Foundatio	ons	_											
			Sul	bdivision Filling	Natural Topography Unworked	Na Topo E Wa	atural ography arth orked	Conventional Shallow Foundation to NZS 3604:2011	Specific Design	Building Restr Line	5/W Specific [S/W Soaka	S/W Reticula	Designated Bu Platform	Platform	Minimum Bu	Compressible	On-site Efflu Disposal	Consent Not		
Lot No:	Area (m²)	Shear Strength (kPa)	Y/N	Depth (m)	Y/N	Y/N	Depth (mm)	Y/N/NA	Y/N/NA	iction	Design	ige	ated	uilding		ilding	Soils	l	tice ⁶		Comment
481	377	117-205+	Y	0.3 ²	N	Y	2500 ²	N	Y ¹	Y	N^4	Ν	Ν	N		Y	Ν	Ν	Υ		
482	381	143-205+	Y	0.3 ²	N	Y	1500 ²	N	Y ¹	Y	N^4	Ν	Ν	N		Y	Ν	Ν	Υ		
483	450	130-205+	Y	0.3 ²	N	Y	1000 ²	N	Y ¹	Y	N^4	Ν	Ν	N		Y	Ν	Ν	Υ		
484	456	156-205+	Y	0.3-1.0 ²	N	Y	200 ²	N	Y ¹	Y	N^4	Ν	Ν	N		Y	Ν	Ν	Υ		
485	462	150-205+	Y	0.3-1.5 ²	N	Y	200 ²	N	Y ¹	Y	N^4	Ν	Ν	N		Y	Ν	Ν	Y		
486	467	159-205+	Y	0.3-1.5 ²	N	Y	500 ²	N	Y ¹	Y	N^4	Ν	Ν	N		Y	Ν	Ν	Y		
487	405	98-205+	Y	0.3-1.5 ²	N	Y	500 ²	N	Y ¹	Y	N ⁴	Ν	Ν	N		Y	Ν	Ν	Y		
488	410	172-205+	Y	0.3-0.8 ²	N	Y	1000 ²	N	Y ¹	Y	N ⁴	Ν	Ν	N		Y	Ν	Ν	Y		
489	414	143-202	Y	0.3-0.5 ²	N	Y	1500 ²	N	Y ¹	Y	N ⁴	Ν	Ν	N		Y	Ν	Ν	Y		
490	418	127-205+	Y	0.3-0.6 ²	N	Y	2000 ²	N	Y ¹	Y	N ⁴	Ν	Ν	N		Y	Ν	Ν	Y		
491	287	137-205+	Y	2.5-3.1 ²	N	Y	300 ²	N	Y ¹	Y	N ⁴	Ν	Ν	N		Y	Ν	Ν	Y		
492	296	164-205+	Y	2.5-3.4 ²	N	Y	300 ²	N	Y ¹	Y	N ⁴	Ν	Ν	N		Y	Ν	Ν	Y		
493	288	172-205+	Y	2.5-3.6 ²	N	Y	300 ²	N	Y ¹	Y	N ⁴	Ν	Ν	N		Y	Ν	Ν	Y		
494	345	156-205+	Y	3.4-3.5 ²	N	Y	300 ²	N	Y ¹	Y	N ⁴	Ν	Ν	N		Y	Ν	Ν	Y		
495	345	159-205+	Y	2.0-3.3 ²	N	Y	300 ²	N	Y ¹	Y	N ⁴	Ν	Ν	N		Y	Ν	Ν	Y		
496	345	143-205+	Y	0.5-2.62	N	Y	300 ²	N	Y ¹	Y	N ⁴	N	Ν	N		Y	Ν	N	Y		
497	345	159-205+	Y	0.5-1.5 ²	N	Y	1500 ²	N	Y ¹	Y	N ⁴	Ν	Ν	N		Y	Ν	Ν	Y		
498	345	140-205+	Y	0.5-0.82	N	Y	2000 ²	N	Y ¹	Y	N ⁴	Ν	Ν	N		Y	Ν	N	Y		
499	345	143-205	Y	0.3-0.72	N	Y	10002	N	Y ¹	Y	N ⁴	N	Ν	N		Y	Ν	N	Y		
500	345	107-205+	Y	0.3-1.52	N	Y	3002	N	Y ¹	Y	N ⁴	N	N	N		Y	N	N	Y		
501	345	140-205+	Y	1.5-2.52	N	Y	3002	N	Y ¹	Y	N ⁴	N	N	N		Y	N	N	Y		
502	345	140-205+	Y	2.0-2.52	N	Y	3002	N	Υ ¹	Y	N ⁴	N	N	N		Y	N	N	Y		
503	345	202-205+	Y	2.0-2.52	N	Y	3002	N	Y ¹	Y	N ⁴	N	N	N		Y	N	N	Y		
504	287	140-205+	Y	$2.0-2.7^{2}$	N	Y	3002	N	Y ¹	Y	N ⁴	N	N	N		Y	N	N	Y		
505	296	153-205+	Y	2.0-2.62	N	Y	3002	N	Y ¹	Y	N ⁴	N N	N	N		Y	N N	N N	Y		
506	288	142 205 -	Y	$2.0-2.6^{2}$	IN N	Y	3002	N	Y ⁺	Y	IN ⁴	N N	N N	N N	+	Y V	N N	IN N	Y		
507	312	143-205+	Y	$1.0-1.7^{2}$	IN N	Y	3002	N	Y ⁵	Y	IN ⁴	N N	N N	N N	+	Y V	N N	IN N	Y		
508	312	140-205+	Y	$1.0-1.7^{2}$	IN N	Y	3002	N	Y ⁵	Y	IN ⁴	N N	IN N	N	-	Y V	N N	IN N	Y		
509	312	1/0-205+	Y	1.0-1.42	IN	Y	3004	IN	۲ĭ	Ŷ	IN [∓]	IN	IN	IN		Y	ÎN -	IN	Y		

Greenhill Park Residential Subdivision, Stage 17 & 18a, Area LUK, Hamilton.

Geotechnical Completion Report on Subdivision Earthworks and Recommendations for Building Development.

Summary of Geotechnical Data for Individual Lots

DP No	P No: TB210C400 Property Address							Greenhill Park, Stage 17 & 18a, Hamilton								RC No:	11/2019/7140/003				
	Subsurface Data							Foundatio	ons	_	0						_				
			Sul	bdivision Filling	Natural Topography Unworked	Na Topo E Wa	atural ography arth orked	Conventional Shallow Foundation to NZS 3604:2011	Specific Design	Building Resti Line	W Specific I	S/W Soaka	S/W Reticul	Designated Bu Platform	Platform	Minimum Bu	Compressible	On-site Efflu Disposa	Consent No		
Lot No:	Area (m²)	Shear Strength (kPa)	Y/N	Depth (m)	Y/N	Y/N	Depth (mm)	Y/N/NA	Y/N/NA	riction	Design	lge	ated	uilding		ilding	Soils	uent I	tice ⁶		Comment
510	312	127-205+	Y	0.5-1.6 ²	N	Y	300 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
511	312	124-205+	Y	0.3-0.8 ²	N	Y	300 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
512	225	71-205+	Y	0.3-0.6 ²	N	Y	1000 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
513	210	79-190+	Y	0.3-0.6 ²	N	Υ	1000 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
514	210	136	Y	0.3-0.6 ²	N	Y	500 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
515	210	149	Y	0.3-0.6 ²	N	Υ	500 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
516	210	149	Y	0.3-0.9 ²	N	Υ	300 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
517	210	190+	Y	0.3-0.9 ²	N	Υ	300 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
518	230	190+	Y	0.3-0.9 ²	N	Υ	300 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
519	362	133-190+	Y	0.3-0.9 ²	N	Υ	1000 ²	N	Y ³	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ	SED – Fo	undations adjacent to swale batter.
520	362	149-190+	Y	0.3-1.1 ²	N	Υ	300 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
521	379	125-190+	Y	1.0-2.5 ²	N	Υ	300 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
522	345	149-176	Y	1.0-2.5 ²	N	Υ	300 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
523	422	156-205+	Y	0.3 ²	N	Υ	2500 ²	N	Y ¹	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
524	498	156-205+	Y	0.3 ²	N	Y	3000 ²	N	Y ¹	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
525	1512	140-205+	Y	0.3-3.2 ²	N	Υ	3500 ²	N	Y ¹	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
526	539	190-205+	Y	0.3-2.5 ²	N	Y	500 ²	N	Y ¹	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Y		
527	539	172-205+	Y	0.3-2.6 ²	N	Y	300 ²	N	Y ¹	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Y		
528	539	161-205+	Y	0.3-2.6 ²	N	Y	300 ²	N	Y ¹	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Y		
529	462	167-205+	Y	0.3-2.3 ²	N	Y	300 ²	N	Y ¹	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
530	462	199-205+	Y	0.3-2.3 ²	N	Y	300 ²	N	Y ¹	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
531	462	170-205+	Y	0.3-2.3 ²	N	Y	300 ²	N	Y ³	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ	SED – Lot o	currently adjacent to batter/SW drain.
532	425	170-205+	Y	1.0-2.7 ²	N	Y	300 ²	N	Y ¹	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
533	300	159-205+	Y	1.5-2.5 ²	N	Y	300 ²	N	Y ¹	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
534	425	170-205+	Y	1.5-2.5 ²	N	Y	300 ²	N	Y ¹	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
535	380	122-190+	Y	0.5-2.3 ²	N	Y	300 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
8025	225	156-166	Y	1.0-1.5 ²	N	Y	300 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
8026	175	152-190+	Y	1.0-1.5 ²	N	Y	300 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		
8027	175	190+	Y	0.5-1.3 ²	N	Y	300 ²	N	Y ⁵	Y	N^4	Ν	Ν	Ν	`	1	Ν	Ν	Υ		

Greenhill Park Residential Subdivision, Stage 17 & 18a, Area LUK, Hamilton.

Geotechnical Completion Report on Subdivision Earthworks and Recommendations for Building Development.

Summary of Geotechnical Data for Individual Lots

DP No	DP No: TB210C400 Property Address Greenhill Park, Stage 17 & 18a, Hamilton RC No: 11/2019/7140/003								11/2019/7140/003												
	Subsurface Data							Foundatio						_							
			Sul	odivision	Natural	Na	atural	Conventional	Specific					n	Desi		Con		<u>o </u>		
				Filling	Topography	Торо	ography	Shallow	Design				2 2	P	eng	PI	npr	D	nse 1-sit		
					Unworked	E	arth	Foundation to		Lin				atfo	ited	atfo	essi	ispo	te E		
						W	orked	NZS 3604:2011		e				2 m	Bu	brm	ble	Isal	filut		
	•	Shear	Y/N	Depth	Y/N	Y/N	Depth	Y/N/NA	Y/N/NA		ictio		Teo	+	ildi	Idin	Soi		lent		
Lot	Area	Strength		(m)			(mm)			-		5	1		ng	δα Π	S				Commont
INO:	(m-)	(кра)																			Comment
8028	175	190+	Y	0.5-1.3 ²	N	Y	300 ²	N	Y ⁵	Y	N	4 N	1 V	I I	N	Y	Ν	N	Y		
8029	175	152-190+	Υ	0.5-0.9 ²	N	Y	300 ²	N	Y ⁵	Y	Ν	4 N	I N	1 1	N	Y	Ν	N	Y		
8030	225	152-190+	Υ	0.3-0.9 ²	N	Υ	300 ²	N	Y ⁵	Y	N	⁴ N	JN	1 1	N	Y	Ν	N	Y		
NO	TES:	1) M Clas	s Fo	undations	Recommende	ed.															
	2) This considers approximately 300mm of topsoil removal across all lots prior to subdivision filling.																				
	3) Setback required for properties adjacent swales. SED type foundation to be adopted for all lots adjacent to swales. No foundations to be constructed <1.5m from top																				
	of slope. No specific engineer design required >3m from top of slope.																				
	4) Soakage testing is not required on individual lots. On site stormwater runoff reduction measures encouraged, i.e.; Re-use tanks, filters, and catchpits.																				
		5) TC2 Fc	ound	ations Rec	ommended.																

6) Consent Notice relating to Stormwater Controls required on all lots.

Appendix C <u>Laboratory Testing</u> Fill Material Lab Testing.

PLASTICITY INDEX FOR SOILS TEST REPORT

Project : Greenhill Park Greenhill Park Location : Client: DB Consulting Limited Contractor -Sampled by : Client 9/10/2020 Date sampled : 12/10/2020 Date received : Sampling method : **Bulk Sample** Sample condition : As received



Project No :	2-68165.00	-
Lab Ref No :	HA6441_PI	
Client Ref No :		

		Test Results	
	Sample Lab Ref No :	HA6441	
	Sample Location ID :	Not Stated	
	Sample Depth (m):	Not Stated	
	Soll Fraction Tested :	-425µm	
	Natural Water Content (%) :	50.8	
	Liquid Limit :	m	
	Plastic Limit :	50	
	Plasticity Index :	61	
	Sample Description :	HA6441_PI	CLAY with some silt and trace sand
Test Methods		Notes	
Water Content Liquid Limit Plastic Limit Plasticity Index	NZS 4402 : 1986, Test 2.1 NZS 4402 : 1986, Test 2.2 NZS 4402 : 1986, Test 2.3 NZS 4402 : 1986, Test 2.4	Soil fraction teste	d as shown.

Date tested : 16/10/20 Date reported : 21/10/20

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

All information supplied by Client

IANZ Approved Signatory

Date :

Designation : Senior Civil Engineering Technician 21/10/20



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LHF 2402 (08/20)

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Page 1 of 1

PARTICLE SIZE ANALYSIS (WET SIEVE METHOD) TEST REPORT



2-68165.00

HA6441_PSD

Project No. Lab Ref No.

Client Ref.

Project	Greenhill Park	6		
Location :	Greenhill Park			
Client :	DB Consulting	Limited		
Client/Sample Ref :	Not Stated			
Contractor :	-			
Borehole No:	Not Stated	Depth:	Not Stated	
Sampled by :	Client			
Date received :	12/10/20			
Sampling method	Bulk Sample			
Sample condition :	As received			
Sample description :	Sandy CLAY/S	ILT.		
Solid Particle Density (t)	hm ³):	N/A		
Water Content (as rece	(ved)	38.8	96	



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

Date Tested:

19/10/20 1

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Date Reported:

21/10/20

IANZ Approved Signatory Designation : Date :

Seniologivit Engineering Technician 21/10/20



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PF-LAB-100 01/07/20201

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PARTICLE SIZE ANALYSIS (HYDROMETER METHOD) TEST REPORT

Project:	Greenhill Park	¢	
Location -	Greenhill Park	6	
Client :	DB Consulting	Limite	d
Client/Sample Ref :	Not Stated		
Contractor	-		
Borehole No:	Not Stated	Depth	Not Stated
Sampled by :	Client		
Date received :	12/10/20		
Sampling method :	Bulk Sample		
Sample condition :	As received		
Sample description :	CLAY with sor	ne silt a	nd trace sand
Solid Particle Density (t	/m³l:	2.80	Assumed
Water Content (as rece	ived):	50.8	96

Project No.	2-68165.00	
Lab Ref No	HA6441_PSA	
Client Ref:		



Particle Size Analysis NZS 44021986: Test 2.8 4 (Washed Grading & Hydrometer Method) pH of suspension 18.0 (Whatmans Full Range pH Indicator paper) All information supplied by Client

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

Date Testedi

20/10/20

This report may only be reproduced in full

Date Reported:

21/10/20

JHE

IANZ Approved Signatory

Designation -Date :

Seniar Will Engineering Technickan 21/10/20



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LINEAR SHRINKAGE FOR SOILS TEST REPORT

Greenhill Park Project : Location : Greenhill Park Client: **DB** Consulting Engineers Ltd Contractor : Sampled by : Client Date sampled : 09/10/20 Date received : 12/10/20 Sampling method : Bulk Sample Sample condition : As received



Project No :	2-68165.00
Lab Ref No :	HA6441_L5
Client Ref No :	

		Test Res	ults
	Sample Lab Ref No :	HA6441	
	Location 1D :	Not Stated	
	Sample Depth (m) :	Not Stated	
	Soll Fraction Tested :	-425µm	
	Sample History :	Natural	
	Water Content as Rec'd (%) :	50.8	
2	Water Content at LS test (%) :	110.4	
	Linear Shrinkage (%) :	24	
	Sample Description : HA6441		CLAY with some silt and trace sand
Test Methods			Notes
Water Content	NZS 4402 : 1986, Test 2.1		
Linear Shrinkage	NZ5 4402 : 1986, Test 2.6		

Date tested : 20/10/20 Date reported : 21/10/20 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested. This report may only be reproduced in full. All information supplied by Client

IANZ Approved Signatory

Designation : Date : Senior Civil Engineering Technician 21/10/20

MAS



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LHF 2403 (08/20)

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DRY DENSITY / WATER CONTENT RELATIONSHIP STANDARD COMPACTION

Project :	Greenhill Park												
Location :	Greenhill Park												
Client :	DB Consulting Engineers Ltd												
Contractor :	-												
Sampled by :	Client	Client											
Date sampled :	9/10/20												
Sampling method :	Bulk Sample												
Sample description :	CLAY with some silt and trace	e sand. Reddish brow	'n										
Sample condition :	As received	Project No :	2-68165.00										
Solid density :	2.80 t/m ³ (Assumed) Lab Ref No : HA6441/2_MDD												
Source:	Not Stated Client Ref No :												
		A special of the second division in the second division of the secon											

				Test Results					
Maximum dry density		1.06	t/m³		Natural wa	ter content	50.4	96	
Optimum water co	ontent	54	96		Fraction tested 100% Passing 19mm sieve				
Sample ID	-	-120	-60	Nat	60	120	180	1	
Bulk density	t/m³	1.325	1.367	1.535	1.634	1.631	1.604		
Water content	96	43.Z	47.6	50,4	54.1	57.6	61.B		
Dry density	t/m ^a	0.925	0.926	1.021	1.060	1.035	0.991		
Sample condition		Hard	Hard	V.Stiff	Stiff	Firm	Soft		
		Dry	Moist	Moist	Moist	Moist-wet	Wet		
Peak stress	kPa	U.T.P	U.T.P	>192	124	108	48		
Remoulded stress	kPa	۰.	-	>192	84	52	24		



Test Methods

Notes NZ5 4402 : 1986 Test 4.1.1 (Standard) All information supplied by Client Compaction Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001

Date tested : 21/10/20 Date reported :

27/10/20

27/10/20

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Senior Civil Engineering Technician

CEREPITED

IANZ Approved Signatory



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Date

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Page 1 of 1

Telephone +64.7 856 2870 Website www.wsp.com/nz. Appendix D <u>Post Construction Test Results</u> Soil Tests by CORE50 NDMs



Soil Testing





(mm)

Notes:

	-			Project Name	Job Ref.		
C	シR	E5	0	Subdivision Test & Rep Stage 17 & 18a, Greenhill	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUT	IONS E	NGINEE	RED	Tested by	Date	Sheet No.	Lot No.
35250	5 M.C. 1			AK	12/04/2022	1	481
Undrained Shear (kPa)	No of blows /100mm	Scala (Blo	Penetrometer ows/100mm) 5 8 10 12 14 16	Soil D	Water Table		
			Good Ground	TOPSOIL with some cl	ay and silt; dark	brown; dry.	
190/50				CLAY SILT with traces o mica; light yellow brown moisture; high plastici	f fine pumiceous mottled orange; ty; low dilatancy;	material and very stiff; low sensitive.	
172/47				700mm: Becoming cream y	ellow brown.		
>205/63				1000mm: Becoming SILT w 1100mm: Traces of fine pu	vith some clay. miceous materia	l.	
124/47				1400mm: Becoming moist. 1500mm: Becoming cream	brown mottled o	range.	
117/42					ith minor fine or	ndo and minor	
127/28				clay with traces of carbonad brown speckled black; mois	ceous material; L st; very stiff; high	ight grey plasticity.	
				EOB at 2.0m, 1a	rget Borenole D	eptn.	
				-			
Woothor las-	E(OB = End Of	f Borehole UTF	P = Unable To Penetrate	UTE = Unable	To Extract	
Ground water Shear Vane re	ng up to te was not er adings are	esting was: Fi ncountered d e converted re	ne uring testing eadings, as per calil	pration Certificate. (Values an	e undrained shea	ar strength)	

- Shear Vane records include Re-moulded values where possible
- Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022



(mm)

Notes:

								Project Name	Job F	Ref.	
C	٥R	E	5	50)			Subdivision Test & Repo Stage 17 & 18a, Greenhill	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUTI	ONS E	NGI	NEE	RE	D			Tested by	Date	Sheet No.	Lot No.
								AK	12/04/2022	2	482
Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16					6	Soil De	Water Table		
						Good Ground	ł	TOPSOIL with some cla	ay and silt; dark	brown; dry.	
					_	- Results	5	300mm: Becoming clayey.			
186/53		_						CLAY SILT with traces of mica; light yellow brown n	fine pumiceous nottled orange;	material and very stiff; low	
>205/75									y, low unataricy,	Sensitive.	
								800mm: Becoming SILT with	h minor clay.		
161/53								1000mm: Becoming yellow l	brown mottled o	range.	
>205/		_									
								1400mm: Becoming CLAY S			
164/69											
146/50								1800mm: Becoming SILT w	ith some clay.		
								EOB at 2.0m, Tai	rget Borehole De	epth.	
143/33											
	E	0B = E	End C)f Bo	rehol	e U	ΓP	= Unable To Penetrate	UTE = Unable	To Extract	
Weather leading	ng up to te	sting v	vas: F	ine							
Ground water	was not er	ncount	ered (durin	g testi	ng	.J.I	rotion Contificate (1/-)		an atrace atta	
Shear Vane re	adings are	ude Ré	erted	read Ilded	ngs, a value	is per ca s where	nu DO	ration Certificate. (Values are	undrained shea	ar strengtn)	
Shear Vane Se	erial No.:	1471		E)	p. Da	te: 15/1	1/2	022			Rev3.6



(mm)

Notes:

								Project Na	Ref.						
C	3)R	F	Ē	5(0			Subdivi Stage 17	ision Test & & 18a, Gree	& Repo enhill F	rt Area LUK; Park, Hamiltor	171738-S17	&S18a-01		
SOLUT	IONS E	NG	INE	FR	ED			Tested by	1		Date	Sheet No.	Lot No.		
50101				-					AK		12/04/2022	3	483		
Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16					e r 4 16		Soil Description						
				_		gro gro	ood ound esult	TOPS	SOIL with sc	ome cla	y and silt; dark	brown; dry.			
>205/								CLAY S mica; or	SILT with tra range browr	aces of n; hard; low di	fine pumiceous low moisture; l ilatancy.	material and nigh plasticity;			
>205/								700mm: E	Becoming Cl	LAY mi	nor silt; brown	mottled orange.			
130/75								1000mm: 1100mm:	1000mm: Becoming very stiff; moderately sensitive. 1100mm: Becoming orange brown.						
175/53								SILT with	minor clav	and tra	ces of fine pur	iceous material			
>205/								and mica to har							
>205/								-							
								-	EOB at 2.0)m, Tar	get Borehole D	epth.			
								-							
								-							
Weather leadin Ground water Shear Vane re	E ng up to te was not er eadings are	OB = sting ncoun e conv	End (was: itered /erted	Of B Fine durii read	oreho ng tes dings,	ole sting , as pe	UTP er calib	= Unable	To Penetra ificate. (Valu	te ues are	UTE = Unable undrained she	To Extract ar strength)			
Shear Vane re	ecords inclu	ude R	le-mo	uldeo -	d valu	ies wh	ere po	ossible							
Snear vane S	erial No.:	14/1		E	xp. D	ate: 1	5/11/2	022					Rev3.6		



(mm)

Notes:

CORE50							Project Name Job F					Ref.		
							Subdivi Stage 17	ision Test & R & 18a Green	lepo hill F	rt Area LUK; Park_Hamilton	171738-S17	&S18a-01		
~.~			-				Tested by			Date	Sheet No.	Lot No.		
SOLUTI	IONS E	NGI	NEE	REL	5			AK		12/04/2022	4	484		
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala (Bl	a Peno lows/1	etrome 100mm 10 12	ter) 14 16		Soil Description						
						Result Good Ground	TOPS	SOIL with some	e cla	y and silt; dark	brown; dry.			
175/50							ENGIN	EERED FILL: (ow moisture; hi	CLA` igh p	Y SILT; brown r lasticity; low dila	nix; very stiff; atancy.			
172/47							CLAY with and mic bigh	th some silt an a; brown mottle	id tra ed oi dilata	ices of fine pur range; very stiff	iceous materia ; low moisture; ly sensitive			
156/63							600mm: I 800mm: I	600mm: Becoming CLAY SILT. 800mm: Becoming brown.						
>205/							-							
170/50							1300mm:	Becoming dar	rk bro	own; CLAY min	or silt.			
159/50							1500mm:	Minor carbona	aceo	us material.				
							-	EOB at 2.0m,	, Tar	get Borehole D	epth.			
							-							
	E	0B = E	nd O	f Bore	ehole	UTP	= Unable	To Penetrate		UTE = Unable	To Extract			
Weather leading	ng up to te	sting v	vas: F	ine										
Ground water	was not er	ncount	ered c	during	testing									
Shear Vane re	adings are	e conve	erted I	readin	gs, as j	per calib	ration Cert	ificate. (Values	s are	undrained shea	ar strength)			
Shear Vane S	erial No	uae Ke 1471	rnou	ided V Fyn	alues w	vnere po 15/11/2	022					Rev? F		
	Unur 110	1.41.1		-vh	. Duio.	10/11/2	~~~					1000.0		



(mm)

Notes:

							Project Name		Job Ref.	
C	S R	E	:5	C)		Subdivision Test & F Stage 17 & 18a, Green	eport Area LUK; hill Park, Hamilto	n 171738-S17	&S18a-01
SOLUT	IONS E	NGI	NEE	RED	5		Tested by	Date	Sheet No.	Lot No.
	570117=00		00044	199240			AK	12/04/2022	5	485
Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16					So	Water Table		
						 Good Ground Result 	TOPSOIL with some	e clay and silt; da	k brown; dry.	
>205/							ENGINEERED FILL: and traces of fine pumic various browns: hard:	CLAY SILT with n eous material and low moisture: hig	inor fine sands mica; mixture of plasticity: low	
							-	dilatancy.	. p	
150/69			_				CLAY SILT with trace	s of fine pumiceor tled red and oran	us material and ae: verv stiff: low	
4.04/00			1				moisture; high plast	icity; low dilatancy sensitive	; moderately	
101/00							-			
>205/							-			
186/111										
							1800mm: Becoming dar carbonaceous material.	k brown speckled	black; traces of	
172/93							EOB at 2.0m	Target Borehole	Depth.	
							-	Ũ	·	
							-			
							-			
Weather leading	E et ot nu to	UB = I	Ind O	ine	ehole	UTP	= Unable To Penetrate	UIE = Unab	e Io Extract	
Ground water	was not er	ncount	ered (during	testing	g				
Shear Vane re	adings are	e conv	erted	readin	igs, as	per calib	ration Certificate. (Values	are undrained sh	ear strength)	
Shear Vane re	cords inclu	ude Re	e-mou	lded v	alues	where po	ossible			

Exp. Date: 15/11/2022 Shear Vane Serial No.: 1471


(mm)

Notes:

							Project Name		Job Ref.	
CORE50							Subdivision Test & Repo Stage 17 & 18a, Greenhill	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUT	IONS E	NGI	VEEL	RED			Tested by	Date	Sheet No.	Lot No.
							AK	12/04/2022	6	486
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala (Blo 4 6	Penet ws/10	romete 0mm) 0 12 1	4 16	Soil De	escription		Water Table
					Gr	ood ound esult	TOPSOIL with some cla	ay and silt; dark	brown; dry.	
>205/	>205/						CLAY SILT with traces of mica; orange brown; hard; low d	fine pumiceous low moisture; h ilatancy.	material and igh plasticity;	
>205/	>205/						800mm: Becoming dark bro carbonaceous material.			
199/66	199/66						1000mm: Becoming very sti	ff; moderately s	ensitive.	
186/117	186/117						1200mm: Becoming orange			
							1500mm: Becoming yellow	brown mottled c	range.	
159/69							1600mm: Becoming SILT w	ith some clay ar	nd traces of fine	
							orange; very stiff to hard; low	a; yellow brown w moisture; high	nottled plasticity; low	
>205/							dilatancy; moderately sensit	ive.		
							EOB at 2.0m, Tai	rget Borehole D	epth.	
				D	-1	1175			T. F. ()	
Weather leading	EC na up to ter	stina w	n a Of as: Fin	Boreh Ne	ole	UIP	= Unable To Penetrate	UIE = Unable	10 Extract	
Ground water	was not en	icounte	red du	iring te	sting					
Shear Vane readings are converted readings, as per calibrat					s, as pe	r calib	ration Certificate. (Values are	undrained she	ar strength)	
Snear Vane re	cords inclu	ide Re-	mould	ed val	ues wh	ere po	SSIDIE			

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Exp. Date: 15/11/2022 Shear Vane Serial No.: 1471

CROBESO							Project I	Name			Job Ref.		
C	٥R	E	:5	50)		Subdi ^y Stage 1	vision Test 7 & 18a, Gre	& Repo eenhill	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01	
SOLUT	IONS E	NG	NER	RE	D		Tested b	ру		Date	Sheet No.	Lot No.	
								AK		12/04/2022	7	487	
Undrained Shear (kPa)	No of blows /100mm	0 2	Scal (B	a Per lows	netron /100m 10 1	neter m) 2 14 16			Soil De	escription		Water Table	
						- Result - Good Ground	TOF	PSOIL with s	ome cla	ay and silt; dark	brown; dry.		
>205/							ENG carbona black;	BINEERED F aceous mate hard; low m	FILL: CL erial; da oisture;	AY minor silt w rk orange browr high plasticity;	ith traces of n mix speckled low dilatancy.		
>205/							CLAY mica;	SILT with tr yellow brow	aces of	fine pumiceous ed red and oran	material and ge; hard; low		
>205/							_	moisture;	high pla	sticity; low dilat	ancy.		
172/101	2/101							1200mm: Becoming CLAY minor silt, carbonaceous material. 1300mm: Becoming dark brown speckled black.					
98/47		_					-						
							1700mm	n: Becoming	orange	brown mottled	red.		
172/72		_					_						
		_					-	EOB at 2.	.0m, Tai	rget Borehole D	epth.		
		_					-						
		_					-						
							-						
							-						
							-						
				M D .			- 11/2 - 1 ¹	• T• D•···•	-1-		To Future of		
Weather leading	E(na up to te	stina	⊏nd C was [.] F	זי Bo ine	renole	e uif	[,] = Unable	e To Penetra	ate	UIE = Unable	IO Extract		
Ground water	was not er	ncoun	tered	during	g testir	ng							
Shear Vane re	adings are	e conv	erted	readi	ngs, a	s per calib	oration Ce	rtificate. (Va	lues are	undrained she	ar strength)		
Shear Vane re	cords inclu	ude R	e-mou	Ilded	values	where po	ossible						

5 Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022

Depth

(mm)

Notes:

		-	- 0		Project N	ame		Job Ref.			
C	ЭR	E	SO		Subdiv	ision Test & Rep	ort Area LUK;	171738-S17	'&S18a-01		
SOLUTI	ONS E	NGINE	ERED		Tested by		Date	Sheet No	Lot No		
					Tested b				400		
						AK	12/04/2022	8	488		
Undrained Shear (kPa)	No of blows /100mm	Sca (I 0 2 4	lla Pene Blows/10 6 8	trometer D0mm) 10 12 14 16		Soil D	escription		Water Table		
				Good Ground Result	TOP	SOIL with some cl	ay and silt; dark	brown; dry.			
172/53					CLAY mica; o mois	SILT with traces o prange brown mott ture; high plasticity	f fine pumiceous tled red; very stif y; low dilatancy;	material and f to hard; low moderately			
>205/					800mm:	sensitive. - 800mm: Becoming yellow brown mottled red and orange.					
175/53					900mm: I	Becoming clayey S	SILT.	Ū			
					1100mm:	Becoming SILT w	vith some clay.				
>205/					_						
					1500mm:	Becoming clayey	SILT.				
199/93					_						
175/81					_						
					_	EOB at 2.0m, Ta	arget Borehole D	epth.			
					_						
					_						
					_						
					_						
					_						
	E	OB = End	Of Bore	hole UT	P = Unable	To Penetrate	UTE = Unable	To Extract			
Weather leading	ng up to te	sting was:	Fine								
Ground water	was not ei	ncountered	during t	esting							
Shear Vane re	adings are	e converteo	I reading	s, as per cal	Ibration Cer	tificate. (Values an	e undrained she	ar strength)			
Shear Vane S	erial No.:	1471	Exp.	Date: 15/11	/2022				Rev3.		

Depth (mm)

Notes:

CROBESO								Project Name		Job Ref.	
CORE50								Subdivision Test & Re Stage 17 & 18a, Greenh	port Area LUK; II Park, Hamiltor	171738-S17	'&S18a-01
SOLUTI	IONS E	NG	INE	ERE	D			Tested by	Date	Sheet No.	Lot No.
		0.00	100200					AK	12/04/2022	9	489
Undrained Shear (kPa)	No of blows /100mm	0 2	Sca (E	la Pe Blow	enetro s/100r 8 10	meter nm) 12 14	16	Soil	Description		Water Table
						Goo Grou Res	d nd ult	TOPSOIL with some	clay and silt; dark	brown; dry.	
202/60								CLAY SILT with traces mica; yellow brown mot hard: low moisture:			
143/69	143/69							800mm: Becoming clayey			
172/42	172/42							1000mm: Becoming sens 1100mm: Becoming SILT	itive. some clay.		
172/79								1200mm: Becoming yello	w brown.		
183/81	183/81										
172/81											
								EOB at 2.0m, ⁻	Farget Borehole D	epth.	
Moothor load		OB =	End (Of B	oreho	le l	JTP	= Unable To Penetrate	UTE = Unable	To Extract	
Ground water	was not e	ncour	was: I ntered	durir	ng test	ina					
Shear Vane re	adings are	e conv	verted	read	lings,	as per o	calib	ration Certificate. (Values	are undrained she	ar strength)	
Shear Vane re	ecords incl	ude R	Re-moi	uldeo	d value	es wher	e po	ssible			

5 Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022

Depth (mm)

Notes:



(mm)

Notes:

CO.DECO								Project Name			Job Ref.	
CORE50								Subdivision Te Stage 17 & 18a,	est & Repo Greenhill	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUTI	ONS E	NG	IN	EEI	RED			Tested by		Date	Sheet No.	Lot No.
			102	93	120			AK		12/04/2022	10	490
Undrained Shear (kPa)	No of blows /100mm	0	Sc 2 4	ala (Blo ₁ 6	Pene ws/10	trome 00mm 10 12	e ter) 14 16		Soil De	escription		Water Table
UTP					-		Result	-	(No topsoil a	at time of PCHA)		
>205/66							Good Ground	CLAY SILT wit mica; brown m plasticity; l	h traces of nottled orar ow dilatand	fine pumiceous nge; hard; low m cy; moderately s	material and oisture; high ensitive.	
400/70				_				600mm: Becomir				
186/79								700mm: Becomir	ng very stiff	:		
170/53												
4.0.0/0.0								-				
186/63								1400mm: Becom	ing yellow l	brown.		
127/36	127/36											
143/50												
								EOB a	t 2.0m, Tai	rget Borehole D	epth.	
								-				
								-				
								-				
				$ \rightarrow$				-				
								-				
								-				
								-				
								1				
			i									
	E	OB =	Enc	l Of	Bore	hole	UTP	= Unable To Pen	etrate	UTE = Unable	To Extract	
Weather leading up to testing was: Fine												
Ground water was not encountered during testing								rotion Contificate			an atraneth)	
Shear Vane readings are converted readings, as per calib Shear Vane records include Re-moulded values where po						s, as j lues v	vhere no	issible	values are	e unurained she	a strength)	
		2201		······								

Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022



(mm)

C C RE 50				Project Name Job Subdivision Test & Report Area LUK; Stage 17 & 18a Greenbill Park Hamilton 171738-S1				Ref.
C	5) P	F 5	\cap		18a, Greenhill Park, Ha	amilton	171738-S17	7&S18a-01
			~		Tested by	Date	Sheet No.	Lot No.
SOLUTI	ONSE	NGINEEI	RED		AK	28/04/2022	11	491
Undrained Shear (kPa)	No of blows /100mm	Scala (Blo 0 2 4 0	Penetrome ows/100mm 6 8 10 12	ter) 14 16	Soil De	escription		Water Table
			Go	od Ground sult	TOPSOIL with some cla	ay and silt; dark	brown; dry.	
					400mm: Becoming silty som	e clay.		
UTP	7 9 7 4				ENGINEERED FILL: CLAY and sands; brown mix; hard low dilatancy; me	SILT with traces d; low moisture; oderately sensit	s of fine pumice high plasticity; ive.	
167/69					1100mm: Becoming very stil			
>205/					1400mm: Becoming hard.			
>205/								
137/56					2000mm: Becoming very stil	ff.		
153/50								
159/69								
180/81	3							
	4				SILT with minor fine sands mottled orange; very stiff, I low p	and traces of c medium dense; lasticity.	lay; light grey low moisture;	
	6				3500mm: Becoming sandy.	,		
	8 7		7					
					EOB at 4.0m, Tar	rget Borehole D	epth.	
	EO	B = End Of I	Borehole	UTP =	Unable To Penetrate U	TE = Unable Te	o Extract	
Weather leadin	ng up to tes	sting was: Fin	Ie.					
Ground water	was not en	countered du	iring testing					
Shear Vane re	adings are	converted re	adings, as p	er calibra	ation Certificate. (Values are i	undrained shear	strength)	
Shear Vane re	cords inclu		Eve Det	nere pos	SIDIE			
Snear vane S	enai No.:	1471	⊨xp. Date:	15/11/20	UZZ			Rev3.6

			Project Name Job Subdivision Test & Report Area LUK; Stage 17 & 18a. Greenhill Park. Hamilton 171738-S			Job F	Ref.
C	NR	E50		18a, Greenhill Park, H	Hamilton	171738-S17	&S18a-01
SOLUTI	ONS EN	GINEERED		Tested by	Date	Sheet No.	Lot No.
SOLUTI	OND EN	IOINEERED		AK	28/04/2022	12	492
Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14	16	Soil D	Description		Water Table
		Good C	Ground	TOPSOIL with some c	lay and silt; dark	brown; dry.	
	7			ENGINEERED FILL: CLAY	SII T with traces	of fine pumice	
>205/	6 6			and sands; brown mix; har low dilatancy; n	rd; low moisture; noderately sensit	high plasticity; ive.	
	4 5		_				
>205/81	4		_				
>205/							
159/66		-		1500mm: Becoming very st	tiff; moderately se	ensitive.	
		-		1700mm: Moist.			
159/79							
	2						
	3		_				
	5			2300mm: Light grev streak	•		
	3		_	2000mm. Light grey streak			
172/81	2		_				
112/01	3						
	3						
	4	-					
	5	-					
164/81	4	-					
	3	-					
	3						
	5						
	4						
	6			Fine sandy SILT with tra	aces of fine pumic	ce; light grey	
	0 15		-	niottied yellow; medium del hiah	dilatancy.	, iow plasticity;	
	15			3600mm: Becoming dense	unatarioj.		
	20			3900mm: Becoming very d	ense		
	20			EOB at 4.0m Ta	arget Borehole De	epth.	
	EO	B = End Of Borehole	JTP =	Unable To Penetrate	UTE = Unable To	Extract	
Weather leadir	ng up to tes	sting was: Fine.	-				
Ground water	was not en	countered during testing					
Shear Vane re	adings are	converted readings, as per o	calibra	ation Certificate. (Values are	undrained shear	strength)	
Shear Vane re	cords inclu	ide Re-moulded values where	e pos	sible			
Shear Vane Se	erial No.:	1471 Exp. Date: 15	5/11/20)22			Rev3.6

(mm)

CORE50			Project Name Jol Subdivision Test & Report Area LUK; Stage 17 & 171739. S				Job F	Ref.						
CORE50						Subdivision Test & 18a, Gree	Report Area enhill Park, H	LUK; Stage 17 & amilton	171738-S17	'&S18a-01				
U '2	SOLUTIONS ENGINEERED									Tested by		Date	Sheet No.	Lot No.
SOLUTI	ONS EN	IG	IN	EE	RE	D				AK		28/04/2022	13	493
Undrained Shear (kPa)	No of blows /100mm	_0		Sc	ala (Blo	Pei ws	netro /100 3 10	omete mm) 12	er 14 16		Soil De	escription		Water Table
		-						- Good	d Ground s1	TOPSOIL wi	th some cla	ay and silt; dark	brown; dry.	
UTP	5 3 2 3	-		$\left\langle \right\rangle$	2					ENGINEERED F and sands; brow low d	ILL: CLAY vn mix; haro ilatancy; m	SILT with traces d; low moisture; oderately sensit	s of fine pumice high plasticity; ive.	
>205/														
172/66	72/66 2									1100mm: Becom	ing very sti	ff.		
>205/63														
172/66										1900mm: Some I	ight brown	streaks.		
>205/										2000mm: Becom	ing hard.			
>205/		-								2500mm: moist.				
>205/		-								2700mm: Some s	sandy SILT	•		
	1	-												
>205/	3 3 7	-	_	Ì										
175/81	5									3500mm: Becom	ing very sti	ff.		
	/	-				\mathcal{A}		_						
	ð 0	-					\vdash			SILT minor fine s	ands and t	races of clay; lig	ht grey mottled	
	9 10	-					\mathbf{i}			yellow; dense; lo	ow moisture	e; low plasticity;	high dilatancy.	
	10	-								FOB a	at 4.0m. Tai	raet Borehole D	enth	
	FO	I)B∶	= F	nd	Of F	Sore	ehol	e	UTP =		trate I	ITF = Unable To	o Extract	
Weather leadir	ng up to tes	stin		vas.	Fin	e.								
Ground water	was not en		unt	erec	l du	rina	test	tina						
Shear Vane re	adinos are	00 :	nve	erte	d rea	adir	ngs.	as pe	r calibr	ation Certificate. (\	/alues are	undrained shear	strenath)	
Shear Vane re	cords inclu	ide	Re	e-mc	ould	ed v	ju, alue	es who	ere pos	sible				
Shear Vane Se	erial No.:	14	71			Ex	кр. D	ate: 1	15/11/2	022				Rev3.6

Depth

(mm)

			Project Name Job Subdivision Test & Report Area LUK; Stage 17 & 171738-S			Job F	Ref.
Ce	D	E 50		Subdivision Test & Report Area 18a, Greenhill Park, Ha	LUK; Stage 17 & amilton	171738-S1	7&S18a-01
U '2		E30		Tested by	Date	Sheet No.	Lot No.
SOLUTI	ONS EN	IGINEERED		AK	28/04/2022	14	494
Undrained Shear (kPa)	No of blows /100mm	Scala Penetrome (Blows/100mm 0 2 4 6 8 10 12	e ter) 14 16	Soil De	escription		Water Table
		Go Re	od Ground sult	TOPSOIL with some cla	ay and silt; dark	brown; dry.	
>205/	6 5 3			ENGINEERED FILL: CLAY and sands; brown mix; hard low dilatancy; m	SILT with traces d; low moisture; oderately sensit	of fine pumice high plasticity; ive.	
>205/	4 6 4						
172/63	4 5			1100mm: Becoming very sti	ff.		
>205/	4			1300mm: Moist; Pinkish stre 1400mm: Becoming hard.	eaks.		
>205/							
156/69				2000mm: Becoming very sti	ff.		
170/79							
161/84							
	3			3000mm: Moist.			
159/81	3 2 3						
>205/	7 5 7			SILT with some fine sands mottled yellow; medium den high c	and traces of c se; low moisture lilatancy.	lay; light grey a; low plasticity;	
175/36	6 7				-		
				EOB at 4.0m, 1ai	rget Borehole De	epth.	
Weather leading	E0	sting was: Fine	019=	Unable To Penetrate U	TE = Unable To	Extract	
Ground water	ig up to tes	countered during testing					
Shear Vane re	adinas are	converted readings as n	er calibra	ation Certificate (Values are	undrained shear	strength)	
Shear Vane re	cords inclu	ide Re-moulded values w	here nos	sible	and anotalities of Cal	Subliguity	
Shear Vane Se	erial No.:	1471 Exp. Date:	15/11/2	022			Rev3.6

(mm)

CCODE50					Project Name		Job F	Ref.
Ce	D	55	\mathbf{O}		Subdivision Test & Report Area 18a, Greenhill Park, H	LUK; Stage 17 & amilton	171738-S17	&S18a-01
U '2		EU			Tested by	Date	Sheet No.	Lot No.
SOLUTI	ONS EN	GINEE	RED		AK	28/04/2022	15	495
Undrained Shear (kPa)	No of blows /100mm	S 0 2	cala Penetro (Blows/100n 4 6 8 10	meter n m) 12 14 16	Soil De	escription		Water Table
				Good Ground Result	TOPSOIL with some cla	ay and silt; dark	brown; dry.	
UTP	4 6 4				ENGINEERED FILL: CLAY and sands; brown mix; hard	SILT with traces d; low moisture;	s of fine pumice high plasticity;	
UTP	4 3 4					170.		
>205/	4 5 6							
	0				1500mm: Moist.			
202/66					1700mm: Light brown streak			
161/81					2100mm: Becoming very sti	ff.		
172/50	3							
	5 7	-						
	8 8 8							
159/36								
	5 4 5		2		SILT with some fine sands mottled yellow; mediun plasticity; ł	and traces of c dense; low mo nigh dilatancy.	lay; light grey isture; low	
	6 6							
	7	-			FOB at 4 0m. Tai	raet Borehole D	enth	
	EO	B = End	Of Borehole	UTP =	Unable To Penetrate	TE = Unable Te	o Extract	
Weather leading	ng up to tes	sting was	: Fine.					
Ground water	was not en	countere	d during testir	ng				
Shear Vane re	adings are	converte	d readings, a	s per calibra	ation Certificate. (Values are	undrained shear	strength)	
Shear Vane re	cords inclu	de Re-m	oulded values	s where pos	sible			
Shear Vane Se	erial No.:	1471	Exp. Da	te: 15/11/2	022			Rev3.6

(mm)

CCODE50							Project Name	Job H	Ref.				
CØRE 50							18a, Greenhill Park, Ha	LUK; Stage 17 &	171738-S1	7&S18a-01			
U' 2		-	5				Tested by	Date	Sheet No.	Lot No.			
SOLUTI	ONS EN	IGIN	EERE	D			AK	29/04/2022	16	496			
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala (Blo 4	Pene ows/1	trome 00mm 10 12	ter) 14 16	Soil De	escription		Water Table			
					Go Re	od Ground sult	TOPSOIL with some cla	y and silt; dark	brown; dry.				
UTP		-											
		-					ENGINEERED FILL: CLAY and sands; brown mix; hard	SILT with traces I; low moisture;	s of fine pumice high plasticity;				
>205/		-					iow unatancy, mo	Dueralery Serisit	IVE.				
		-											
186/69		-					1100mm: Becoming very stif	f.					
100/70		-				_							
183/50		-											
202/66		-					1700mm: Becoming hard.						
		-											
167/66		-					2000mm: Becoming very stif	if.					
		-											
186/81		-											
143/75		-						line numice and	minauhraumu				
		-					very stiff; low moisture; sensitive; l	high plasticity; i ow dilatancy.	moderately				
172/84		-					EOP at 2 0m Tar	raat Parabala D	onth				
							EOB at 3.011, Tai	get porenoie D	eptn.				
]						
		-											
	EO	B = Er	nd Of I	Boreh	ole	UTP =	Unable To Penetrate U	TE = Unable T	o Extract				
Weather leading	ng up to tes	sting w	as: Fir	ne.		5	U U U U U U U U U U U U U U U U U U U						
Ground water	was not en	counte	red du	iring te	esting								
Shear Vane re	adings are	conve	rted re	ading	s, as p	er calibr	ation Certificate. (Values are u	undrained shear	strength)				
Shear Vane records include Re-moulded values where po Shear Vane Serial No.: 1471 Exp. Date: 15/11/							SIDIE 022			Rev3.6			

Depth (mm)



(mm)

Notes:

-		-		0		Project Name	ort Area I IIK	Job Ref.				
Ciz	٧K	E	5	U		Stage 17 & 18a, Greenhill	Park, Hamilton	171738-S17	&S18a-01			
SOLUTI	ONS E	NGIN	NEER	ED		Tested by	Date	Sheet No.	Lot No.			
						AK	12/04/2022	17	497			
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala I (Blov 4 6	Penetro ws/100n 8 10	meter n m) 12 14 16	Soil De	escription		Water Table			
					- Result	TOPSOIL with some cla	TOPSOIL with some clay and silt; dark brown; dry.					
				-	Good Ground	300mm: Becoming clayey; ł	hard.					
450/47						-						
109/41						ENGINEERED FILL: CLAY and sands, traces of mica;						
205/66						to hard; low moisture, n moderate	ign plasticity; iovely sensitive.	w dilatancy;				
>205/						-						
						CLAY SILT with traces of t	fine numice and	mica: creamy				
202/79						yellow brown mottled oral plasticity; low dilatand						
202/66						1800mm: Becoming SILT w						
170/60						-						
170/05						EOB at 2.0m, Ta	rget Borehole D	epth.				
						-						
						-						
						-						
						-						
						_						
						-						
						-						
Weather leadi	E(na up to te	DB = E sting w	nd Of I as: Fin	Borehol e	e UTP	P = Unable To Penetrate	UTE = Unable	To Extract				
Ground water	was not er	ncounte	ered du	e ring testi	ing							
Shear Vane re	adings are	e conve	rted rea	adings, a	as per calib	pration Certificate. (Values are	e undrained shea	ar strength)				
Shear Vane re	ecords inclu	ude Re-	-mould	ed value	s where po	ossible						

Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022



(mm)

Notes:

Shear Vane Serial No.: 1471

Exp. Date: 15/11/2022

Rev3.

-	-	-			200		Project Name			Job Ref.	
C	۶R	E	5	C)		Subdivision Tes Stage 17 & 18a, 0	st & Repo Greenhill I	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUTI	ONS E	NGI	NEE	REC	>		Tested by		Date	Sheet No.	Lot No.
1000 Barbara		1999-19		a dagener	67 L.		AK		12/04/2022	18	498
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala (B	a Pen lows/* 6 8	etrom 100mn 10 12	eter n) 14 16		Soil De	escription		Water Table
						Good Ground Result	TOPSOIL with 300mm: Becoming	n some cla g clayey a	ay and silt; dark nd silty; hard.	brown; dry.	
UTP							ENGINEERED FIL sands; brown m dila	L: CLAY SI iix; hard; lov atancy; moc	LT with traces of w moisture; high p derately sensitive.	fine pumice and lasticity; low	
183/45							CLAY SILT with yellow brown mot plasticity; lc	traces of f tled orang	ine pumice and e; very stiff; low cy; moderately s	mica, creamy moisture; high ensitive.	
170/69							1200mm: Becomir	ng SILT wi	ith some clay.		
190/69							1500mm: Becomir	ng yellow l	brown.		
146/53							-				
140/50							EOB at	2.0m, Tai	rget Borehole De	epth.	
							-				
							-				
	E	ob = F	nd C)f Bor	ehole	UTP	e = Unable To Pene	trate	UTE = Unable	To Extract	
Weather leading	ng up to te	sting v	vas: F	ine							
Ground water	was not er	ncount	ered o	during	testing	9		, ,			
Shear Vane re	adings are	e conve Udo Pa	erted	readin	igs, as values i	per calib	oration Certificate. (/alues are	undrained shea	ar strength)	



(mm)

Notes:

	2.0	-		- /	-			Project Name		Job Ref.	
C	٥R	E	:2)(נ			Subdivision Test & Repo Stage 17 & 18a, Greenhill	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUTI	IONS E	NG	INE	ERE	D			Tested by	Date	Sheet No.	Lot No.
								AK	12/04/2022	19	499
Undrained Shear (kPa)	No of blows /100mm	0 2	Sca (E	la Pe Blows	enetro s/100n 8 10	meter n m) 12 14 1	6	Soil De	escription		Water Table
						- Result	t -	TOPSOIL with some cla	ay and silt; dark	brown; dry.	
						Good Ground	±	300mm: Becoming clayey a	nd silty; hard.		
>205/								ENGINEERED FILL: CLAY SI sands; brown mix; hard; lo dilatancy; mod	ILT with traces of w moisture; high p derately sensitive.	fine pumice and plasticity; low	
205/84								Silty CLAY with traces of pu	imice and mica;	orange brown; dilatancy:	
200/04				<u> </u>				moderate	ely sensitive.		
159/69								SILT with some clay and t very stiff; low moisture t dilatancy; moo	traces of fine pu o moist; high pla lerately sensitive	mice; brown; asticity; low e.	
143/50											
				_				1700mm: Becoming clayey	SILT; yellow bro	wn mottled	
>205/								orange.			
150/53								EOB at 2.0m, Ta	rget Borehole D	epth.	
				_							
				_							
				+							
				+							
				_							
				+							
Weather leading	E et ot qu	OB =	End (was:	Ut Bo Fine	orehol	e U	IP	= Unable To Penetrate	UIE = Unable	To Extract	
Ground water	was not er	ncoun	tered	durir	ng testi	ing					
Shear Vane re	adings are	e con	/erted	l read	lings, a	as per ca	libr	ration Certificate. (Values are	e undrained shea	ar strength)	
Shear Vane re	cords inclu	ude R	.e-mo	ulded	i value	s where	pos	ssible			

Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022



(mm)

Notes:

Shear Vane Serial No.: 1471

Exp. Date: 15/11/2022

Rev3.

CORE50							Project Name Subdivision Test & Repo	ort Area LUK;	Job Ref. 171738-S17	&S18a-01
SOULT	ONSE	NG	NIEE	DED			Stage 17 & 18a, Greenhill	Park, Hamilton	Sheet No	Lot No
SOLUTI	ONS E	NG	NEE	RED				29/04/2022	20	500
								25/04/2022	20	500
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala (Bl	1 Penet ows/10	tromete)0mm) 10 12 1	er 14 16	Soil De	escription		Water Table
		_			F (G	Result Good iround	TOPSOIL with some cla	ay and silt; dark	brown; dry.	
UTP							-			
							ENGINEERED FILL: CLAY and sands; brown mix; hard	SILT with traces d; low moisture;	s of fine pumice high plasticity;	
>205/									ive.	
>205/							SILT with some clay and hard; low moisture to moist moderate	traces of fine pu t; high plasticity; elv sensitive.	mice; brown; low dilatancy;	
127/50							1300mm: Becoming very sti	ff.		
159/63										
107/36										
							EOB at 2.0m. Ta	rget Borehole D	epth.	
							-			
							-			
			+							
							-			
		<u> </u>	End O	f Porol	holo	IITD	- Unable To Depotrate	LITE - Unabla	To Extract	
Weather leading	ng up to te	esting	was: F	ine	IOIE	UIF			TO EXILACI	
Ground water	was not ei	ncoun	tered d	luring te	esting					
Shear Vane re Shear Vane re	ecords incl	e conv ude R	erted r e-moul	eading: ded va	s, as pe lues wh	er calıb nere po	oration Certificate. (Values are	e undrained shea	ar strength)	



. (mm)

Notes:

		-	_	0		Project Name	De		Job F	Ref.
C	٧R	E	5	U		Subdivision Test & Stage 17 & 18a, Greer	керс nhill	Park, Hamilton	171738-S17	&S18a-01
SOLUT	IONS E	NGIN	EEF	RED		Tested by		Date	Sheet No.	Lot No.
						AK		29/05/2022	21	501
Undrained Shear (kPa)	No of blows /100mm	S 0 2 -	cala (Blo 1 6	Penetrom ws/100mr 8 10 12	eter n) 2 14 16	So	oil De	escription		Water Table
				Go	ood Ground	TOPSOIL with som	ne cla	ay and silt; dark	brown; dry.	
UTP						ENGINEERED FILL: C and sands; brown mix	LAY ; har	SILT with traces d; low moisture;	s of fine pumice high plasticity;	
>205/						low dilatand	cy; m	oderately sensit	ive.	
175/79			/			1000mm: Becoming ve	ery sti	ff.		
186/75						1200mm: Light brown s				
100/10										
159/60						1500mm: Reddish brov 1600mm: Moist.	wn.			
140/47										
	5		7			SILT with some fine medium dense; low mo	e sano	ds; light grey mo e; low plasticity;	ttled yellow; high dilatancy.	
	5 6		$\left.\right\rangle$			2600mm: Carbonaceou	us ma	aterial; Brown sp	eckled black.	
	5 5					2800mm: Becoming so	ome c	lay.		
186/33	4									
						EOB at 3.0m	n. Tai	rget Borehole D	epth.	
	E	OB = En	d Of	Borehole	UTP	= Unable To Penetrate	9	UTE = Unable	To Extract	
Weather leadin Ground water	ng up to te was not ei	esting was ncountere	s: Fin ed du	e ring testin	a					
Shear Vane re	adings are	e convert	ed re	adings, as	per calib	ration Certificate. (Value	es are	e undrained shea	ar strength)	
Shear Vane re	cords incl	ude Re-n	nould	ed values	where po	ssible				

Exp. Date: 15/11/2022 Shear Vane Serial No.: 1471



Depth (mm)

Notes:

	RE 50				Project Name		Job F	Ref.			
CORE50 SOLUTIONS ENGINEERED								Subdivision Test & Rep Stage 17 & 182, Greenbil	oort Area LUK; L Park, Hamilton	171738-S17	&S18a-01
~~~					-			Tested by	Date	Sheet No	Lot No
SOLUT	IONS E	NG	NE	ERI	ED			AK	29/05/2022	22	502
Undrained Shear (kPa)	No of blows /100mm	0 2	Sca (E	la P Blow	<b>enetr</b> <b>/s/100</b> 8 10	ometei Imm) 12 14	r   16	Soil I	Description		Water Table
						Go Gro Re:	od bund sults	TOPSOIL with some o	lay and silt; dark	brown; dry.	
UTP								ENGINEERED FILL: CLA and sands; brown mix; ha	Y SILT with trace ard; low moisture;	s of fine pumice high plasticity;	
202/81								low dilatancy;	moderately sensi	tive.	
199/79								1100mm: Becoming very s	stiff.		
159/60	159/60							1400mm: Light brown stre	aks.		
190/75								1600mm: Moist.			
140/69											
>205/								2300mm: Becoming hard.			
>205/								SILT with minor fine sand low moisture; low	; light grey mottle plasticity; high di	d yellow; hard; atancy.	
>205/								-			
								EOB at 3.0m. T	arget Borehole D	epth.	
	F/	<u> </u>	End 4	<u>)</u>	oreh			- Unoble Te Develuete		To Extract	
Weather leading	EC na un to to	JB =	End (	Ut B Fine	orend	Die	UIP	= Unable To Penetrate	UIE = Unable	10 Extract	
Ground water	was not er	ncoun	tered	duri	na tes	stina					
Shear Vane re	adings are	conv	rerted	rea	dings,	, as per	calib	ration Certificate. (Values a	re undrained she	ar strength)	
Shear Vane records include Re-moulded values where							ere po	ssible		<b>.</b> ,	
Shear Vane S	erial No.:	1471		E	Exp. D	ate: 15	5/11/2	022			Rev3.6



(mm)

Notes:

						Project Name		Job F	Ref.
CC	3R	F	5	0		Subdivision Test & Repo Stage 17 & 18a, Greenhill	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOUIT	ONSE	NGI	NEE	RED		Tested by	Date	Sheet No.	Lot No.
SOLUTI	UNS E	NGI	NEE	RED		AK	29/05/2022	23	503
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala (Blo	Penetrometer ows/100mm) 5 8 10 12 14 16	6	Soil De	escription		Water Table
				Good ground Result	-	TOPSOIL with some cla	ay and silt; dark	brown; dry.	
UTP						ENGINEERED FILL: CLAY and sands; brown mix; hard low dilatancy; m	SILT with traces d; low moisture; oderately sensit	s of fine pumice high plasticity; ive.	
>205/						900mm: Pinkish brown.			
>205/						1200mm: Light grey streaks 1300mm: Brown.			
>205/									
202/81						1700mm: Moist.			
202/98									
>205/96									
	5 5 4 6					Fine sandy SILT with trac mottled yellow; medium plasticity; h			
	6								
						EOB at 3.0m. Tar	rget Borehole Do	epth.	
	E	0B = E	nd O	Borehole U	ΓP	= Unable To Penetrate	UTE = Unable	To Extract	
Weather leading	ng up to te	sting w	as: Fi	ne					
Ground water	was not er	ncounte	ered d	uring testing	I.F.				
Shear Vane re	cords inclu	e conve ude Re	-moul	eadings, as per ca ded values where	non nor	ation Certificate. (Values are	e undrained shea	ar strength)	
Shear Vane Se	erial No.:	1471	mour	Exp. Date: 15/11	1/20	)22			Rev3.6



(mm)

Notes:

SOLUTI	CORESO							Project Name Subdivision Test & Reg Stage 17 & 18a, Greenhil Tested by AK	oort Area LUK; I Park, Hamilton Date 29/05/2022	Job F 171738-S17 Sheet No. 24	Ref. &S18a-01 Lot No. 504
Undrained Shear (kPa)	No of blows /100mm	0 2	Sca (I	lla Pe Blow	enetro s/100 8 10	ometer mm) 12 14	16	Soil [	Description		Water Table
						Go Gro	sult od ound	TOPSOIL with some c	lay and silt; dark	brown; dry.	
UTP >205/								ENGINEERED FILL: CLA and sands; brown mix; ha low dilatancy; i	Y SILT with trace rd; low moisture; moderately sensi	s of fine pumice high plasticity; tive.	
186/39			1	ļ 				1000mm: Becoming very s	stiff.		
								1200mm: Light grey streak	ïS.		
140/66	40/66							1400mm: Red mottling.			
153/72								1700mm: Dark brown. 1800mm: Moist.			
175/63								-			
159/66								2400mm: Light brown strea	aks.		
>205/								SILT with some fine sand mottled yellow; hard; lov di	ds and traces of o w moisture; low p latancy.	clay; light grey lasticity; high	
								EOB at 3.0m. T	arget Borehole D	epth.	
I	E	OB =	End	Of B	oreho	ole	UTP	e = Unable To Penetrate	UTE = Unable	To Extract	
Weather leadin Ground water Shear Vane re Shear Vane re	ng up to te was not e adings are cords incl	esting ncoun e conv ude R	was: tered ⁄ertec e-mo	Fine durii read uldeo	ng tes dings, d valu	ting as per es whe	calib ere po	ration Certificate. (Values a	re undrained she	ar strength)	

Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022

							Project Name	9		Job Ref.	
Ce	3D		5	C	)		Subdivisio	on Test & Repo	ort Area LUK;	171738-S17	&S18a-01
~ 'Z	25		J.J	C	/		Stage 17 & 1 Tested by	iða, Greennill í	Park, Hamilton	Sheet No	Lot No
SOLUT	IONS E	NGI	NEE	REI	D		Tested by				
								AK	29/05/2022	25	505
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala (Bl	a Per ows/	netrom /100mr 10 12	eter n) 2 14 16		Soil De	escription		Water Table
						- Good Ground - Result	TOPSOI	L with some cla	y and silt; dark	brown; dry.	
UTP							ENGINEERE and sands; I	ED FILL: CLAY Store	SILT with traces l; low moisture;	s of fine pumice high plasticity;	
153/72							_ lo	ow dilatancy; mo	oderately sensit	ive.	
			/				900mm: Crea	am streaks.			
>205/											
							1400mm: Ora	ange mottling.			
>205/	>205/										
>205/93							-				
205/93							-				
							-				
	2 5 5						Fine sandy S mottled or	SILT with traces ange and yellow plasticity; h	of clay and pur v; medium dens high dilatancy.	nice; light grey e; moist; low	
							EC	OB at 3.0m. Tar	get Borehole De	epth.	
							-				
							-				
	E	0B = E	End O	f Bo	rehole	UTP	= Unable To	Penetrate	UTE = Unable	To Extract	
Weather leading	ng up to te	sting v	vas: F	ine							
Ground water	was not er	ncount	ered c	luring	g testin	g					
Shear Vane re	adings are		erted I	readii	ngs, as	per calib	oration Certifica	ate. (Values are	undrained shea	ar strength)	
Shear Vane S	erial No ·	uue Ke 1471	;-IIIOU	iuea Evi	vaiues n Data	where po					Rova
	unun 10	1-11-1		<b>۲</b>	r. Daio		~~~				1.010.0

(mm)

Notes:



(mm)

Notes:

Shear Vane Serial No.: 1471

Exp. Date: 15/11/2022

	-	-		-		Project Name		Job Ref.	
C	۶R	E	5	0		Subdivision Test & Repo Stage 17 & 18a, Greenhill	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUTI	IONS E	NGIN	EEF	RED		Tested by	Date	Sheet No.	Lot No.
			Sec.	Sec.		AK	2/05/2022	26	506
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala (Blo 4 6	Penetro pws/100n 8 10	<b>meter</b> nm) 12 14 16	Soil De	escription		Water Table
					Good Ground Result	TOPSOIL with some cla	ay and silt; dark	brown; dry.	
>205/						ENGINEERED FILL: CLAY and sands; brown mix; harc low dilatancy; m [,]	SILT with traces d; low moisture; oderately sensit	s of fine pumice high plasticity; ive.	
>205/						- - 900mm: Light brown streaks	5.		
180/47									
>205/						-			
						1600mm: Pinkish streaks.			
>205/						1800mm: Cream streaks.			
>205/						-			
>205/79						-			
						2400mm: Becoming moist.			
156/72	5								
	5 5 7					Fine sandy SILT; light gre medium dense; low moisture	y mottled yellow e; low plasticity;	/ and orange; high dilatancy.	
						EOB at 3.0m. Ta	rget borehole de	epth.	
						-			
	E	OB = Er	d Of	Borehol	e UTP	= Unable To Penetrate	UTE = Unable	To Extract	
Weather leadir	ng up to te	sting wa	s: Fin	ıe					
Ground water	was not er		ed du tod ro	ring testir	ng as por calit	vration Cortificato (Values are	undrained she	ar strongth)	
Shear Vane re	cords inclu	ude Re-r	nould	ed value:	s where pc	ssible		a strengtrij	

Rev3.



(mm)

Notes:

							Project Name		Job Ref.	
C	٥R	E	5	5(	С		Subdivision Test & Rep Stage 17 & 18a, Greenhil	oort Area LUK; I Park, Hamilton	171738-S17	&S18a-01
SOLUT	IONS E	NG	INE	ER	ED		Tested by	Date	Sheet No.	Lot No.
			2023	201	20		AK	7/04/2022	27	507
Undrained Shear (kPa)	No of blows /100mm	0	Sca (E	lla P Blow 6	enetron /s/100m 8 10 1	neter m) 2 14 16	Soil I	Description		Water Table
		_				- Result	TOPSOIL with some c	lay and silt; dark	brown; dry.	
205/39						Ground	ENGINEERED FILL: CLA fine pumiceous material a	Y SILT with trace and mica; light bro	es of fine sand, own and brown	
159/42							mixture mottled orange, hard; low moisture; high p	pink and light gre asticity; low dilata	y; very stiff to ancy; sensitive.	
193/72		_						h		
>205/		_					1000mm: Becoming orange	brown. ny light brown.		
>205/		_					1300mm: Becoming yellow	/ brown mottled c	orange.	
>205/							1600mm: Becoming cream	i light brown.		
							1700mm: Becoming some	clay		
143/24							SILT with traces of fine sand grey mottled yellow speckle low moisture; low plast	ls and carbonaceo ed black; very stiff, icity; high dilatancy	us material; light medium dense; /; sensitive.	
							EOB at 2.0m. T	arget Borehole D	epth.	
							-			
							-			
							-			
							-			
							-			
							-			
			End		orohola		- Unoblo To Donaturata		To Extract	
Weather leading	ים אמ un to te	Sting	EUQ	Fine		; UIP	- Unable To Penetrate		I U EXITACI	
Ground water	was not er	ncou	ntered	dur	, ing testir	ng				
Shear Vane re	adings are	e con	vertec	l rea	dings, a	s per calib	pration Certificate. (Values a	re undrained she	ar strength)	
Shear varie re	COLOS INCI	uue F	۲e-Ш0	uiae	u values	s where po	JSSINIE			

Exp. Date: 15/11/2022 Shear Vane Serial No.: 1471

-	2.0	-		- /	-			Project Name		Job Ref.	
SOLUTIONS ENGINEERED								Subdivision Test & Repo Stage 17 & 18a Greenhill	ort Area LUK; Park_Hamilton	171738-S17	&S18a-01
SOLUTI	IONS E	NG	NE	ERE	D			Tested by	Date	Sheet No.	Lot No.
								AK	7/04/2022	28	508
Undrained Shear (kPa)	No of blows /100mm	0 2	Sca (E	la Pe Blows	enetroi s/100m 8 10	meter 1m) 12 14 16		Soil De	escription		Water Table
						Good Ground - Result	-	TOPSOIL with some cla	ay and silt; dark	brown; dry.	
>205/								ENGINEERED FILL: CLAY and fine pumiceous materi	/ SILT with trace al, some mica; o	es of fine sand prange brown,	
150/39								brown mix; very stiff to hard low dilatar	d; low moisture; hcy; sensitive.	high plasticity;	
143/36								800mm: Becoming SILT wit	h some clay and	l fine sands.	
								900mm: Becoming low plast	ticity.		
>205/			÷	_				1000mm: Becoming silty CL	AY; brown.		
~203/		_						1200mm: Traces of carbona speckled black.			
>205/								1400mm: Becoming SILT m 1500mm: Becoming interber			
140/36	2			_							
400/04	3 5 5							Medium to coarse silty pumiceous material; grey b dense: low moi	SAND with trac prown mottled or sture: well grad	ces of fine ange; medium	
100/24	5							EOB at 2.0m. Tai	rget Borehole D	epth.	
							_				
				-							
				_							
							-				
	E	0B =	End	Of B	orehol	e UT	P	= Unable To Penetrate	UTE = Unable	To Extract	
Weather leadin	ng up to te	sting	was:	Fine							
Shear Vane re	was not er eadings are	ncoun e conv	iered verted	ourir reac	ig testi linas, e	ng as per cali	iþr	ation Certificate. (Values are	e undrained she	ar strenath)	
Shear Vane re	ecords inclu	ude R	e-mo	uldec	l value	s where p	005	ssible			

5 Shear Vane Serial <u>No.: 1471</u> Exp. Date: 15/11/2022

Depth (mm)

Notes:

	-	-						Project Name			Job Ref.	
C	۶R	E	:5	5(	)			Subdivision Stage 17 & 18	Test & Repo a, Greenhill I	rt Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUTI	ONS E	NG	NE	ERE	D			Tested by		Date	Sheet No.	Lot No.
								Ak	(	7/04/2022	29	509
Undrained Shear (kPa)	No of blows /100mm	0 2	Sca (E	la Pe Blows	enetro s/100 8 10	omete mm) 12 14	r I 16		Soil De	escription		Water Table
170/36						Go Gro Re	ood ound esult	TOPSOIL ENGINEERE and pumice	with some cla D FILL: CLAY ous material,	y and silt; dark SILT and trace minor mica; miz	brown; dry. es of fine sand kture of light	
183/50		_						pla pla	asticity; low di	latancy; sensiti	/e.	
190/69		_										
>205/												
404/40								1400mm: Beco	ming orange	brown.		
>205/	4 4 3 4 4							SILT with trace light grey mottl dense; low	es of fine sand ed yellow spe v moisture; lov sen	ds and carbonad ackled black; ve w plasticity; high sitive.	ceous material; ry stiff, medium n dilatancy;	
>205/								EOE	3 at 2.0m. Tar	get Borehole Do	epth.	
	E	0B =	End (	Of Bo	oreho	le	UTP	= Unable To Po	enetrate	UTE = Unable	To Extract	
Weather leadin Ground water	ng up to te was not er	sting ncoun	was: I tered	Fine durin	ng tes	ting						
Shear Vane re	adings are	e conv	erted	read	lings,	as pei	r calib	ration Certificate	e. (Values are	undrained shea	ar strength)	
Shear Vane re	cords inclu	ude R	e-moi	ulded	l valu	es whe	ere po	ssible				

5 Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022

Depth

(mm)

Notes:



(mm)

Notes:

							Project Na	ame		Job Ref.	
C	٥R	E	:5	5(	)		Subdivi Stage 17	sion Test & Rep & 18a, Greenhill	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUTI	ONS E	NG	NE	ERE	D		Tested by		Date	Sheet No.	Lot No.
2.225.0	2012-22	271	007					AK	7/04/2022	30	510
Undrained Shear (kPa)	No of blows /100mm	0 2	Sca (E	la Pe Slows	netrom s/100mr 8 10 1	<b>1eter</b> m) 2 14 16		Soil D	escription		Water Table
202/50						Result     Good     Ground	TOPS ENGINE	COIL with some classing of the source of the	ay and silt; dark AY SILT with min	brown; dry. Ior fine sands r mica: mixture	
186/45							of variou	us browns; very s plasticity; low o	tiff to hard; low n dilatancy; sensiti	noisture; high ve.	
>205/							800mm: B - -	Secoming dark bro	own.		
450/00							1100mm:	Becoming cream	y light brown witl	n pink streaks.	
159/60				<u> </u>			1500mm:	Becoming orange	e brown.		
127/33 172/39	3 3 3						SILT with carbona stiff, me	traces of fine sar iceous material; L edium dense; low dilatanc	nd and pumiceou ight grey speckle moisture; low pl cy; sensitive.	us material and ed black; very asticity; high	
								EOB at 2.0m. Ta	arget Borehole D	epth.	
							-				
				<u> </u>			-				
							-				
							-				
	E	0B =	End (	Of Bo	orehole	UTF	e Unable	To Penetrate	UTE = Unable	To Extract	
Weather leadin Ground water Shear Vane re	ng up to te was not er eadings are	sting v ncount e conv	was: I tered rerted	Fine durir reac	ng testin Jings av	ig s per calił	pration Certi	ficate. (Values an	e undrained she	ar strength)	
Shear Vane re	cords inclu	ude R	e-moi	ulded	l values	where po	ssible				

Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022



(mm)

Notes:

			Project Name Job Ref.				
C	٥R	<b>E</b> 50		Subdivision Test & Repo Stage 17 & 18a, Greenhill F	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUT	IONS E	NGINEERED		Tested by	Date	Sheet No.	Lot No.
	S. March	and a second	-	АК	7/04/2022	31	511
Undrained Shear (kPa)	No of blows /100mm	Scala Penetro (Blows/100 0 2 4 6 8 10	<b>ometer</b> <b>Jmm)</b> 0 12 14 16	Soil De	escription		Water Table
>205/			Good Ground	TOPSOIL with some cla 300mm: Becoming Clayey.	y and silt; dark	brown; dry.	
>205/				ENGINEERED FILL: CLA and pumiceous material and browns mottled orange; hard low di	Y SILT with min traces of mica d; low moisture; ilatancy.	or fine sands ; mix of various high plasticity;	
>205/				CLAY with some silt and tra mica; orange brown; very s plasticity; low di	ces of pumiceo tiff to hard; low ilatancy; sensiti	us material and moisture; high ve.	
159/39				1300mm: Becoming very stit	ff.		
156/42				1500mm: Becoming moist.	ockled black: m	inor	
				carbonaceous material.			
124/33				1900mm: Traces of rootlets.			
156/47				EOB at 2.0m. Tar	get Borehole D	epth.	
	$\square$						
Wtherloodi	E0	)B = End Of Boreho	ole UTP	= Unable To Penetrate	UTE = Unable	To Extract	
Ground water	was not en	countered during tes	sting				

Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)

- Shear Vane records include Re-moulded values where possible
- Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022



(mm)

Notes: 

CO.DECO						Project Name Jo			Job F	Ref.	
C	ЭR	PF	ļ	5(	)			Subdivision Test & Repo Stage 17 & 18a Greenhill	ort Area LUK; Park Hamilton	171738-S17	&S18a-01
SOLUT	ONS E	NG	INE	ERE	D			Tested by	Date	Sheet No.	Lot No.
								Jessel Ladwa	2/05/2022	32	512
Undrained Shear (kPa)	No of blows /100mm	0 2	<b>Sca</b> (1	ala Pe Blows	netron 6/100m	neter m) 12 14 1	16	Soil De	escription		Water Table
190+	9				G	Good Grou	und	TOPSOIL with minor clay gravels; dark brown; dry. 30	y silt and traces Becoming silty a 0mm	of sand and and clayey at	
100	3		ſ								
UTP	3							Fine Sandy SILT with trace	s of fine numice	ous material.	
	3						_	light grey mottled orange	/yellow; medium	n dense; low	
UTP	3							moisture; low plasticity	; sensitive; high	dilatancy	
	3		X								
74/04	4										
/ 1/21	6							Becomes Silly SAND			
	4										
	7						•				
	22										
	UIP						-	Streaked green			
								ou canca green			
								EOB	@ 2.0m		
				_							
							_				
							-				
		H					_				
							-				
	EO	)B = E	ind C	of Bor	ehole	UT	P =	Unable To Penetrate	ITE = Unable T	o Extract	
Weather leading	ng up to te	sting	was:	Fine							
Ground water	was not er	ncoun	iterec	durin	g testii	ng o nor cr	-1:6	ration Cortificate (Values	undrained abo	ar atranath)	
Shear Vane re	cords inclu	ude R	le-mo	oulded	values	s per ca s where	e po	ssible		a suengun)	



(mm)

Notes:

							Project Name		JOD I	Ref.
CC	3) D	F	5	n	8		Subdivision Test & Rep	oort Area LUK; L Dark, Hamilton	171738-S17	7&S18a-01
			5		<u>,</u>		Tested by	Date	Sheet No.	Lot No.
SOLUTI	UNSE	NGI	NEE	RED			Jessel Ladwa	2/05/2022	33	513
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala (Blo	Pene ows/1	<b>tromete</b> <b>D0mm)</b> 10 12 14	<b>r</b> 4 16	Soil I	Description		Water Table
82/55 136/28 190+ 79/25 116/18 136/28 136/28	7         9         8         5         6         7         5         4         4         4         4         4         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7 <td< td=""><td></td><td></td><td></td><td></td><td>In the second seco</td><td>TOPSOIL with minor clays dark SILT, some fine sand material; light grey mottle to dense; low moisture d Becomes Silty SAND Becomes Clayey SILT Becoming dense.</td><td>ilt and traces of sat brown; dry. with traces of fine d orange/yellow; low plasticity; se ilatancy B @ 2.0m</td><td>nd and gravels; pumiceous medium dense nsitive; high</td><td></td></td<>					In the second seco	TOPSOIL with minor clays dark SILT, some fine sand material; light grey mottle to dense; low moisture d Becomes Silty SAND Becomes Clayey SILT Becoming dense.	ilt and traces of sat brown; dry. with traces of fine d orange/yellow; low plasticity; se ilatancy B @ 2.0m	nd and gravels; pumiceous medium dense nsitive; high	
							1			
	EO	B = En	nd Of E	Boreh	ole	UTP =	= Unable To Penetrate	UTE = Unable T	o Extract	
Weather leadi	ng up to te	sting w	as: Fil	ne urina t	ootina					
Shear Vane re	was not er adings are		erted di	anng t eading	esung is, as ne	r calih	pration Certificate (Values a	re undrained she	ar strength)	
Shear Vane re	cords inclu	ude Re	-moule	ded va	lues whe	ere po	ossible			

Rev3.6

Exp. Date: 13/07/2022 Shear Vane Serial No.: 3252



(mm)

Notes:

Shear Vane Serial No.: 3252

Exp. Date: 13/07/2022

Rev3.6

<b>C</b> @ <b>RE</b> 50							Project Name       Job         Subdivision Test & Report Area LUK;       171738-S1         Stage 17 & 18a, Greenhill Park, Hamilton       171738-S1				Ref. <b>'&amp;S18a-01</b>
SOUT		NCI					٦	Tested by	Date	Sheet No.	Lot No.
SOLUTI	ONSE	NGI	NEI	ERE	U			Jessel Ladwa	2/05/2022	34	514
Undrained Shear (kPa)	No of blows /100mm	0 2	Scal (B 4	<b>a Pen</b> lows/ 6 8	100mm	eter 1) 14 16		Soil De	escription		Water Table
	/100mm 7 7 10 7 10 7 4 5 4 4 4 4 5 6 5 6 4 8 7					14 16 Good ground Result 		TOPSOIL with minor clay gravels; da Fine Sandy SILT with trace light grey mottled orange moisture; low plasticity Becomes fine SAND minor s Becomes fine-medium brow	y silt and traces ark brown; dry es of fine pumica /yellow; mediun r; sensitive; high silt n SAND @ 2.0m	of sand and eous material; h dense; low dilatancy	
			i								
Weather less	EO	B = Er	nd Of	Bore	hole	UTP =	= l	Unable To Penetrate U	ITE = Unable T	o Extract	
Ground water Shear Vane re Shear Vane re	ng up to te was not er adings are cords incli	esting w ncounte e conve ude Re	vas: F ered o erted e-mou	une during readir Ided v	g testing ngs, as values v	) per calib where pc	ora	ation Certificate. (Values are sible	undrained shea	ar strength)	



(mm)

Notes:

						Project Name Jo				Ref.
CC	<b>SR</b>	E	5	0		Subdivision Stage 17 & 18a	Test & Repo a, Greenhill I	ort Area LUK; Park, Hamilton	171738-S17	'&S18a-01
SOLUTI	ONS E	NGIN	IEEE	RED		Tested by		Date	Sheet No.	Lot No.
001011	0.110 2					Jessel L	.adwa	2/05/2022	35	515
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala (Blov 4 6	Penetro ws/100n 8 10	<b>meter</b> 1 <b>m)</b> 12 14 16		Soil De	escription		Water Table
	10 4 5 7 8 7 5 4 5 5 6 7 7 8 7 8 7 8 7 8 7 8				Result         Good Ground         Good Ground         Image: Stress	TOPSOIL w ENGINEERED pumiceous ma (mottled orange moisture; high Fine SAND material; light g low moisture Becomes brown	ith minor clay gravels; da FILL: CLAY S terial and mica e/yellow/ speci plasticity; mor , minor silt wi grey mottled o e; low plastic n SAND EOB	y silt and traces ark brown; dry silLT with traces of a; light brown and ded black); very s derately sensitive; th traces of fine orange/yellow; n ity; sensitive; hig @ 2.0m	of sand and fine sand, fine brown mixture tiff to hard; low ; low dilatancy pumiceous nedium dense; gh dilatancy	
	EO	B = End	d Of B	orehole	UTP =	Unable To Pen	etrate U	TE = Unable Te	o Extract	
Weather leading	ng up to te	sting wa	as: Fin	е						
Ground water	was not er	ncounte	red du	ring testi	ng					
Shear Vane re	adings are	e conver	ted re	adings, a	as per calib	ration Certificate	. (Values are	undrained shea	ar strength)	
Shear Vane re	cords inclu	ude Re-	mould	ed value	s where po	ossible				



(mm)

Notes:

Project Name							Job Ref.		
C	٥R	<b>E</b> 5	0		Subdivision Test & Stage 17 & 18a, Gree	& Repo enhill I	rt Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUT	IONS E	NGINEE	RED		Tested by		Date	Sheet No.	Lot No.
		2014 - DA CONT	19972391		Jessel Ladwa		2/05/2022	36	516
Undrained Shear (kPa)	No of blows /100mm	Scala (Bl	a Penetrome lows/100mm 6 8 10 12	e <b>ter</b> 1) 14 16	5	Soil De	scription		Water Table
				Good Ground Result	TOPSOIL with mir grav Becoming clayey silt.	nor clay /els; da	v silt and traces rk brown; dry	of sand and	
149/55	6 3 2 3 3				ENGINEERED FILL fine pumiceous mate mixture (mottled orar low moisture; high	: CLAY erial and nge/yell plastici dila	SILT with trace d mica; light bro low/ speckled bl ty; moderately s tancy	es of fine sand, wn and brown lack); very stiff; sensitive; low	
	3 4 5 6 7 8 7 6				Fine Sandy SILT wit light grey mottled moisture; low pl Becomes moist	th trace orange asticity	es of fine pumice /yellow; medium ; sensitive; high	eous material; n dense; low dilatancy	
	6								
	FO	B = End Of	Borehole	(ITP =	Unable To Penetrate	اا د	TF = I Inable T	o Extract	
Weather leadin Ground water Shear Vane re Shear Vane re	ng up to te was not en adings are	esting was: F ncountered c e converted i ude Re-mou	ine luring testing readings, as lded values v	per calib	ration Certificate. (Valu	ues are	undrained shea	ar strength)	



(mm)

Notes:

-			-0		Project Name Job Ref. Subdivision Test & Report Area LUK; Stage 17 & 18a Greenbill Park Hamilton 171738-S1			17&\$18a-01		
C12	۷R	E	50		Stage 17 & 18a, Greenhill	Park, Hamilton	1/1/30-31/			
SOLUT	IONS E	NGIN	EERED		lested by	Date	Sheet No.	Lot No.		
			and a subject of the		Jessel Ladwa	3/05/2022	37	517		
Undrained Shear (kPa)	No of blows /100mm	<b>Sc</b> ( 0 2 4	ala Penetrom Blows/100mn 6 8 10 12	<b>eter</b> n) 2 14 16	Soil De	escription		Water Table		
	4			Good     Ground     Result	TOPSOIL with minor clay gravels; da Becoming clayey silt. ENGINEERED FILL: CLAY	y silt and traces ark brown; dry SILT with trace	of sand and			
190+	5 5 4 5 5				fine pumiceous material an mixture (mottled orange/yel low moisture; high plastic dila	d mica; light bro llow/ speckled b ity; moderately s atancy	wn and brown lack); very stiff; sensitive; low			
	5 6 8 8 7 8 5				Fine Sandy SILT with trace light grey mottled orange moisture; low plasticity	es of fine pumica /yellow; mediun /; sensitive; high	eous material; n dense; low n dilatancy			
	7		<b>Z</b>		Becomes moist					
					EOB	@ 2.0m				
	EO	B = End (	Of Borehole	UTP =	Unable To Penetrate	JTE = Unable T	o Extract			
Weather leadin Ground water Shear Vane re Shear Vane re	ng up to te was not er adings are cords inclu	sting was: ncountered converte ude Re-mo	: Fine d during testing d readings, as oulded values	g per calib where po	ration Certificate. (Values are ssible	e undrained shea	ar strength)			



(mm)

Notes:

	-	Project Name Job Ref.								
C	シR	E	5C	)		Subdivision Test Stage 17 & 18a, Gre	& Repo enhill	Park, Hamilton	171738-S17	'&S18a-01
SOLUT	IONS E	NGIN	EEREI	D		Tested by		Date	Sheet No.	Lot No.
	570117-00		19-1010-10	6		Jessel Ladwa	a	3/05/2022	38	518
Undrained Shear (kPa)	No of blows /100mm	<b>S</b> 0 2 4	cala Pen (Blows/ 4 6 8	<b>netrometer</b> ( <b>100mm)</b> 10 12 14	16		Soil De	escription		Water Table
				Goo Gro	od und	TOPSOIL with mi gra Becoming silty.	inor cla vels; da	y silt and traces ark brown; dry	of sand and	
UTP	9 8 7 6					ENGINEERED FILL fine pumiceous mat mixture (mottled ora moisture;	.: CLAY erial an nge/yel high pla	Y SILT with trace d mica; light bro low/ speckled bl asticity; low dilat	s of fine sand, wn and brown ack); hard; low ancy	
	5 5 4 5 6 5					Fine Sandy SILT w light grey mottled moisture; low p	ith trace orange lasticity	es of fine pumice :/yellow; mediun /; sensitive; high	eous material; i dense; low dilatancy	
	5 7 6					Becomes moist				
							EOB	@ 2.0m		
Moother	EO	B = End	Of Bore	hole U	ITP =	Unable To Penetrat	e l	JTE = Unable T	o Extract	
Ground water	ng up to te was not er	esting was	s: Fine ed during	testina						
Shear Vane re	adings are	e convert	ed readir	ngs, as per	calib	ration Certificate. (Val	ues are	e undrained shea	ar strength)	

Shear Vane records include Re-moulded values where possible



(mm)

Undrained

Shear (kPa)

UTP

133/46

R	<b>E</b> 50	Project Name Subdivision Test & Repo Stage 17 & 18a Greenbill	ort Area LUK; Park, Hamilton	Job Ref. 171738-S1	7&S18a-01
NS E	NGINEERED	Tested by	Date	Sheet No.	Lot No.
		Jessel Ladwa	4/05/2022	39	519
No of blows 00mm	Scala Penetrometer (Blows/100mm)           0         2         4         6         8         10         12         14         16	Soil D	escription		Water Table
3         3         5         4         10         16         12         12         10         6         3         4         3         4         3         4         3         4         3         4         3         4         3         4         3         4         3         4         3         4         3	0       2       4       0       8       10       12       14       10         1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1 </td <td>(No topsoil ) ENGINEERED FILL: CLAY 3 pumiceous material and mice hard; low moisture; high pla dil Becoming gravelly at 400m Fine Sandy SILT with trace light grey mottled orange moisture; low plasticity Becomes SILT, trace sand Becomes SILT EOB</td> <td>at time of PCHA) SILT with traces of a; light brown and sticity; moderately atancy m. Difficult augur es of fine pumice e/yellow; medium y; sensitive; high</td> <td>f fine sand, fine brown mixture; sensitive; low ring.</td> <td></td>	(No topsoil ) ENGINEERED FILL: CLAY 3 pumiceous material and mice hard; low moisture; high pla dil Becoming gravelly at 400m Fine Sandy SILT with trace light grey mottled orange moisture; low plasticity Becomes SILT, trace sand Becomes SILT EOB	at time of PCHA) SILT with traces of a; light brown and sticity; moderately atancy m. Difficult augur es of fine pumice e/yellow; medium y; sensitive; high	f fine sand, fine brown mixture; sensitive; low ring.	

## Notes: EOB = End Of Borehole UTP = Unable To Penetrate UTE = Unable To Extract Weather leading up to testing was: Fine Ground water was not encountered during testing Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)

Shear Vane records include Re-moulded values where possible 



(mm)

Notes: 

			Project Name		Job Ref.	
C	۶R	<b>E</b> 50	Subdivision Test & Repo Stage 17 & 18a, Greenhill	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUTI	ONS E	NGINEERED	Tested by	Date	Sheet No.	Lot No.
			Jessel Ladwa	4/05/2022	40	520
Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)           0         2         4         6         8         10         12         14         1	6	escription		Water Table
	2	Good	(No topsoil à	at time of PCHA)		
1/0//1	8	Besul	fine pumiceous material ar	r SILT with trace	es of fine sand, wn and brown	
143/41	4		mixture (mottled orange/ye	llow/ speckled b	lack); very stiff	
	4		to hard; low moisture; high	plasticity; moder	ately sensitive;	
UTP	3			mataricy.		
	4					
	10					
LITD	6 7					
UTF	10					
	12		Fire can be Oll Twith the			
	16		light arev mottled or	es of fine pumice ange/vellow: der	eous materiai; nse: low	
	18		moisture/moist; low plasti	city; sensitive; hi	igh dilatancy.	
190+	12		Becomes moist			
	8					
	10					
	9 10					
	10		EOB	@ 2.0m		
Weather leading	EO et ot au po	DB = End Of Borehole UT	P = Unable To Penetrate	JTE = Unable T	o Extract	

Ground water was not encountered during testing

Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)

- Shear Vane records include Re-moulded values where possible
- Shear Vane Serial No.: 3252 Exp. Date: 13/07/2022



(mm)

Notes:

					Project Name		JOD RET.	
C	ふR	E5	0		Subdivision Test & Rep Stage 17 & 18a, Greenhil	oort Area LUK; I Park, Hamilton	171738-S1	7&S18a-01
SOLUT	IONS E	NGINEE	RED		Tested by	Date	Sheet No.	Lot No.
					Jessel Ladwa	4/05/2022	41	521
Undrained Shear (kPa)	No of blows /100mm	Scala (Bl	a Penetromet ows/100mm) 6 8 10 12	t <b>er</b> 14 16	Soil I	Description		Water Table
	3			Result	(No topsoi	l at time of PCHA)		
	4			Good -	ENGINEERED FILL: CLA	Y SILT with trace	es of fine sand,	
UTP	5		(	Ground	fine pumiceous material a	ind mica; light bro	own and brown	
	5				mixture; very stiff to hard moderately se	a; iow moisture; n nsitive: low dilata	ign plasticity; ncv	
125/44	4				Becomes brown			
123/44	3				Decomes brown			
	5							
	4							
190+								
100.					licht man staatka			
190+					Light grey streaks			
190+								
					Dark brown speckled black	(		
167/60								
107/02								
	3							
UTP	4				Fine Sandy SILT with tra	ces of fine pumic	eous material;	
	4				moisture: low plastici	ty; sensitive: high	dilatancy.	
	4				······	.,, , <u>.</u>		
					EO	B @ 3.0m		
	FO	B = End Of	Borehole	UTP =	Unable To Penetrate	lITF = linable T	o Extract	
Weather leadi	ng up to te	esting was: F	ine	011 -	Shapie TO I chellale			
Ground water	was not e	ncountered c	luring testing					
<i></i>								

Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)

- Shear Vane records include Re-moulded values where possible
- Shear Vane Serial No.: 3252 Exp. Date: 13/07/2022


(mm)

Notes:

Shear Vane Serial No.: 3252

Exp. Date: 13/07/2022

Rev3.6

							F	Project Name		Job Ref.			
C	۶R	RE	:5	50			S	Subdivision Test & Rep Stage 17 & 18a, Greenhil	ort Area LUK; Park, Hamilton	171738-S17	'&S18a-01		
SOLUTI	IONS E	ING	NEE	RED			Т	lested by	Date	Sheet No.	Lot No.		
								Jessel Ladwa	4/05/2022	42	522		
Undrained Shear (kPa)	No of blows /100mm	0 2	Scal (B	a Pene lows/1	trome 00mm 10 12	e <b>ter</b> 1) 14 16		Soil D	escription		Water Table		
						Result Good Ground		TOPSOIL with minor cla gravels; c	ay silt and traces lark brown; dry	of sand and			
156/37													
149/34													
176/41							1	ENGINEERED FILL: CLAY SILT with traces of fine sand, fine pumiceous material and mica; light brown and brown mixture (mottled orange/yellow/ speckled black); very stiff; low moisture; high plasticity; moderately sensitive; low dilatancy					
171/38													
159/34							_						
	3 3 3						!	SILT, some fine sand v material; light grey mottlec low moisture; low plasti	vith traces of fine orange/yellow; r city; sensitive; hig	pumiceous nedium dense; gh dilatancy.			
								EOI	3 @ 3.0m				
							ſ						
					+								
\A/= =/	EC	)B = Ē	nd Of	Boreh	ole	UTP	= L	Jnable To Penetrate	UTE = Unable T	o Extract			
vveather leadin	ng up to te was not o	esting	was: F	INE	actina								
Shear Vane re	adinas ar	e conv	erted	reading	us. as	per calil	bra	tion Certificate. (Values a	e undrained she	ar strength)			
Shear Vane re	cords incl	lude R	e-mou	Ided va	alues v	vhere p	055	sible					



(mm)

Notes:

	Project Name	Ref.		
<b>C</b> @ <b>RE</b> 50	Subdivision Test & Repo Stage 17 & 18a, Greenhill F	rt Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUTIONS ENGINEERED	Tested by	Date	Sheet No.	Lot No.
	AK	12/04/2022	43	523
Undrained Shear (kPa)     No of blows /100mm     Scala Penetrometer (Blows/100mm)       0     2     4     6     8     10     12     14     16	Soil De	scription		Water Table
UTP Good ground UTP Good ground UTP GOOD Ground Result UTP GOOD GOOD GROUND UTP GOOD GOOD GROUND GOOD GR	(No topsoil a) CLAY SILT with traces of mica; brown; hard; dry; h 500mm: Becoming clayey SI orange. 700mm: Becoming very stiff;	t time of PCHA) fine pumiceous igh plasticity; lo ILT; yellow brov moderately set	material and w dilatancy. vn mottled nsitive.	
>205/81	1000mm: Becoming hard.			
156/63	1300mm: Becoming very stif 1400mm: Becoming creamy	f; moderately s brown.	ensitive.	
186/79 186/79   205/ 205/	1800mm: Becoming CLAY n	ninor silt; cream	ı light brown.	
	EOB at 2.0m, Tar	get Borehole D	epth.	
EOB = End Of Borehole UTP Weather leading up to testing was: Fine	= Unable To Penetrate	UIE = Unable	To Extract	
Ground water was not encountered during testing				
Shear Vane readings are converted readings, as per calibr	ation Certificate. (Values are	undrained shea	ar strength)	
Shear Vane Serial No.: 1471 Exp. Date: 15/11/20	שוטופי 22			Rev3.6



(mm)

Notes:

					Project Name	Ref.						
C	<b>SR</b>	E	=!	5	C	)			Subdivision Test & Repo Stage 17 & 18a, Greenhill I	ert Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUTI	ONS E	NG	IN	EEF	RED	5			Tested by	Date	Sheet No.	Lot No.
001011									AK	12/04/2022	44	524
Undrained Shear (kPa)	No of blows /100mm	0	<b>Sc</b> 2 4	cala   (Blov	Pene ws/1	etron 00m 10 1	n <b>eter</b> m) 2 14 16	6	Soil De	escription		Water Table
UTP					-		- Result		(No topsoil a	t time of PCHA)		
					-		- Good Ground		CLAY SILT with traces of mica; brown; hard; dry to lo	fine pumiceous w moisture; high	material and plasticity; low	
>205/		-	$\vdash$						ulla	lancy.		
>205/									700mm [.] Becoming silty CLA	Y [.] brown		
										,		
156/79				/					1000mm: Becoming very sti	ff; moderately s	ensitive.	
>205/									SII T with some clay and minor	fine cands and m	ica: creamy light	
									grey mottled orange; hard; lo dila	ow moisture; high tancy.	plasticity; low	
>205/									SILT minor clay traces of fine cream light grey speckled	sand and carbona d black; hard; high	aceous material; n plasticity.	
>205/									SILT with minor clay and tra carbonaceous material; or hard; low moiste	aces of fine san range brown sp ure; high plastic	d, pumice and eckled black; ity.	
									EOB at 2.0m, Tar	get Borehole D	epth.	
	F	0B =	Fnr	1 Of	Bore	hole	דוו	ΓP	= Unable To Penetrate	UTF = Unable	To Extract	-
Weather leading	ng up to te	esting	was	: Fin	e		51					
Ground water	was not er	ncour	ntere	ed du	ring	testir	ng					
Shear Vane re	adings are		verte	ed rea	adinę	gs, as	s per cal	libr	ration Certificate. (Values are	undrained shea	ar strength)	
Shear Vane re	cords inclu	ude F	≺e-m	ould	ed va	alues	where	pos	ssible			

Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022



Depth (mm)

Notes:

				Project Name						
C	٥R	E	5	0			Subdivision Test & Rep Stage 17 & 18a, Greenhill	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUT	IONS E	NGI	NEE	RED			Tested by	Date	Sheet No.	Lot No.
							AK	2/05/2022	45	525
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala (B	a Pene lows/1	etromete 00mm) 10 12 1	e <b>r</b> 4 16	Soil D	escription		Water Table
UTP 159/33 175/42					G G R	esult	<i>(No topsoil</i> SILT with minor clay and t light brown mottled orang plasticity; low o 600mm: White streaks. 700mm: Becoming CLAY S orange.	at time of PCHA) races of fine san e; very stiff; low dilatancy; sensiti SILT; light grey bi	d and pumice; moisture; high ve. rown mottled	
143/33							1000mm: Becoming moist.			
							1300mm: Becoming some (	clay.		
143/36							1500mm: Becoming pale b	rown.		
161/47							-			
140/31							EOB at 2.0m, Ta	arget Borehole D	epth.	
Weather leadir Ground water	EC ng up to te was not er	DB = I sting v icount	End O vas: F ered o	<b>if Bore</b> ine during t	testing	UTP	= Unable To Penetrate	UTE = Unable	To Extract	
Shear Vane re Shear Vane re	adings are cords inclu	conv ide Re	erted e-mou	reading Ided va	gs, as pe alues wh	er calib ere po	ration Certificate. (Values ar ossible	e undrained she	ar strength)	

5	Shear Vane Serial No.:	1471	Exp. Date: 15/11/2022
•		1711	LAP. Dato. 10/11/2022

								Project Name		Job Ref.	
C	3R	E	Ξ.	5	0			Subdivision Test & Re Stage 17 & 18a, Greenhi	oort Area LUK; I Park, Hamiltor	171738-S17	&S18a-01
SOLUT	IONS E	NG	IN	EER	ED			Tested by	Date	Sheet No.	Lot No.
								AK	9/05/2022	46	526
Undrained Shear (kPa)	No of blows /100mm	0 2	<b>Sca</b> (	ala P Blov 6	<b>Penet</b> vs/10 8 1	rome 0mm 0 12	<b>ter</b> ) 14 16	Soil	Description		Water Table
							Good Ground Result	TOPSOIL with some o	lay and silt; dark	brown; dry.	
UTP								ENGINEERED FILL: CLA	Y SILT with trace	s of fine pumice high plasticity:	
199/53								low dilatancy;	moderately sensi	tive.	
								800mm: Becoming light br	own mix.		
>205/								Silty CLAY with traces material and mica; brown low moisture; high plast	of fine pumice, ca speckled black; v city; low dilatanc	arbonaceous ery stiff to hard; y; moderately	
190/96		_						S	ensitive. brown speckled b	lack	
								1500mm: Becoming pare	e brown mottled	orange.	
>205/											
>205/									araat Parabala D	onth	
									arget Dorenoie D	epin.	
								-			
								-			
								-			
	F	0B =	End	Of F	3oreh	nole	IJTP	= Unable To Penetrate	UTE = Unable	To Extract	
Weather leading	ng up to te	sting	was:	Fine	)			Shaste to t chetrate			
Ground water	was not er	ncoun	terec	d dur	ing te	esting					
Shear Vane re	adings are	e conv	/erte	d rea	dings	s, as p	per calib	oration Certificate. (Values a	re undrained she	ar strength)	
Shear Vane Se	erial No	uae R 1471	.e-mo	Juide I	eu val Exn T	ues w Date:	/nere pc 15/11/2	022			Rev3.6
	onun 110	1711			-^h. r	Juic.	10/11/2	VLL			11043.0

(mm)

Notes:



(mm)

Notes:

								Project Name		Job Ref.	
C	3)R			5(	7			Subdivision Test & Repo	rt Area LUK; Park Hamilton	171738-S17	&S18a-01
				~	-			Tested by	Date	Sheet No.	Lot No.
SOLUTI	IONS E	NG	INE	ER	ED			AK	9/05/2022	47	527
			0.0	D		4					
Undrained Shear (kPa)	No of blows /100mm	0 2	<b>Sca</b> (	ala P Blow 6	enetro /s/100 8 10	ometer )mm) ) 12 14	16	Soil De	scription		Water Table
						Res	sult				
	'		$\vdash$			Gor	bc	TOPSOIL with some cla	y and silt; dark	brown; dry.	
	 					Grou	und				
UTP			$\square$		$\square$		_		SII T with trace:	s of fine numice	
	!		$\vdash$	+	+		_	and sands; brown mix; hard	l; low moisture;	high plasticity;	
172/63			$\mid$		++			low dilatancy; mo	oderately sensit	ive.	
			$\square$		+++		-	800mm: Becoming light brow	vn mix.		
>205/				-	++		-				
400/04			⊢∔+	_	++		_	1400 \/om/ oliff			
186/81				+	++		_	1400mm: very stiπ.			
				+	+						
>205/				1				1700mm: Becoming hard.			
			$\vdash$	_	++		_				
>205/			H	+	+		_				
205/66	[!										
				+	+		_				
>205/					+						
	3		$\parallel$	_	+		_	Fine sandy SILT with trac	es of fine pumi	ce: light grey	
	3 4	+		+	++		_	mottled yellow; medium	dense; low mo	isture; low	
				+	+			plasticity; n	igh dilatancy.		
			<u> </u>	$\mp$	$\square$		_	EOB at 3.0m. Tar	get Borehole De	epth.	
	!		H+	+	++		_				
				-	++						
	E	OB =	End	Of E	Soreh	ole	UTP	= Unable To Penetrate	UTE = Unable	To Extract	
Weather leadir	ng up to te	esting	was:	Fine	)						
Ground water Shear Vane re	was not ei Adings ar	ncoun e conv	terec verte	d rea	ing tes idings	sting as per	calib	aration Certificate. (Values are	undrained shea	ar strength)	
Shear Vane re	ecords incl	ude R	le-mr	oulde	ed valu	ues wher	re po	ossible		ar ou origury	

Exp. Date: 15/11/2022 Shear Vane Serial No.: 1471

COBECO			Project Name							
C	ЭR		5	()	)		Subdivision Test & Rep	ort Area LUK;	171738-S17	&S18a-01
SOULT	ONSE	NGIN	IEE	DEF			Stage 17 & 18a, Greennill	Park, Hamilton	Shoot No.	Let No
SOLUTI	ONSE	NOI	AFE	REL			Tested by	Date	Sheet NO.	LOUNO.
							AK	9/05/2022	48	528
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala (Bl	a Pen lows/′ 6 8	etrometer 100mm) 10 12 14	16	Soil D	escription		Water Table
					Goc Grou Res	od und sult	TOPSOIL with some cl 400mm: Becoming clayey s	ay and silt; dark silty.	brown; dry.	
161/47							ENGINEERED FILL: CLA	Y SILT with trace vn mix; very stiff	es of mica, fine to hard; low	
>205/	>205/						moisture; high plasticity			
							900mm: Streaks of light bro	own.		
>205/										
>205/79							1500: Becoming yellow bro	wn mix.		
>205/										
>205/							-			
>205/							-			
	3									
	3 5		>				Fine sandy SILT with tra mottled yellow; mediur plasticity;	ces of fine pumion n dense; low mo high dilatancy.	ce; light grey isture; low	
							EOB at 3.0m. Ta	arget Borehole D	epth.	
	E	OB = E	nd O	f Bor	ehole	UTP	= Unable To Penetrate	UTE = Unable	To Extract	
Weather leadi	ng up to te	esting w	as: F	ine						
Ground water	was not e	ncounte	red o	during	testing					
Shear Vane re	adings are	e conve	rted i	readin	gs, as per	calib	ration Certificate. (Values ar	e undrained shea	ar strength)	
Shear Vane re	cords incl	ude Re-	mou	lded v	alues wher	e po	ossible			
Shear Vane S	erial No.:	1471		Exp	). Date: 15/	11/2	022			Rev3.6

Depth (mm)

Notes:



(mm)

Notes:

CRIDECO			Project Name Subdivision Test & Repo				
C	٧R	E50	)	Stage 17 & 18a, Greenhill I	Park, Hamilton	171738-S17&S18a-01	
SOLUTI	ONS E	NGINEER	D	Tested by	Date	Sheet No.	Lot No.
				AK	9/05/2022	49	529
Undrained Shear (kPa)	No of blows /100mm	<b>Scala Pe</b> (Blow) 0 2 4 6	enetrometer s/100mm) 8 10 12 14 16	Soil De	escription		Water Table
			Good Ground Result	TOPSOIL with some cla	ay and silt; dark	brown; dry.	
UTP				ENGINEERED FILL: CLAY and sands; brown mix; very	SILT with traces stiff to hard; low	s of fine pumice / moisture; high	
167/31				plasticity; low d	ilatancy; sensitiv	ve.	
205/36				1000mm: Light grey streaks.			
>205/							
205/63							
186/81				1800mm: Very stiff.			
205/79							
	4			Fine sandy SILT with trac mottled yellow; medium plasticity; h	ces of fine pumic n dense; low mo nigh dilatancy.	ce; light grey isture; low	
	6 6 5						
	5						
				EOB at 3.0m. Tar	get Borehole Do	epth.	
Weather loadi	E e un to to	UB = End Of B	orehole UTP	= Unable To Penetrate	UIE = Unable	To Extract	
Ground water	was not ei	ncountered duri	na testina				
Shear Vane re	adings are	e converted read	dings, as per calib	ration Certificate. (Values are	undrained shea	ar strength)	
Shear Vane re	cords incl	ude Re-moulded	d values where po	ssible		<b>3</b> ,	

Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022



Depth (mm)

Notes:

								Project Name		Job Ref.	
C	٥R	E	5	50	)			Subdivision Test & Repo Stage 17 & 18a, Greenhill I	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUTI	ONS E	NGI	NEE	RE	D			Tested by	Date	Sheet No.	Lot No.
								AK	3/05/2022	50	530
Undrained Shear (kPa)	No of blows /100mm	0 2	Scal (B	a Pe lows 6 8	<b>netro</b> <b>/100n</b> 10	<b>meter</b> n <b>m)</b> 12 14 1	16	Soil De	escription		Water Table
UTP					_	- Resul	lt	(No topsoil a	t time of PCHA)		
202/66						Good Groun	d	ENGINEERED FILL: CL pumice, sand and mica; bro moisture; high pla	AY SILT with tra own mix; very st sticity; low dilata	aces of fine iff to hard; low ancy.	
199/69								800mm: Light grey streaks.			
199/47								1000mm: Dark brown streak 1100mm: Traces of carbona	s. ceous material.		
>205/											
205/36								1700mm: Pink streaks.			
>205/								1900mm: Creamy streaks.			
>205/											
	5 6 8 8							Fine sandy SILT with trac mottled yellow; medium plasticity; h 2700mm: Becoming very de	ces of fine pumic n dense; low mo nigh dilatancy. nse.	ce; light grey isture; low	
	12 11			-							
								EOB at 3.0m. Tar	get Borehole De	epth.	
10/ // // //	E	OB = E	nd C	)f Bo	rehol	e U	TP	= Unable To Penetrate	UTE = Unable	To Extract	
Weather leadin	ng up to te was not e	esting w	vas: F ered (	-ine durin	n teeti	ina					
Shear Vane re	adings are	e conve	erted	read	ings, a	as per ca	alibı	ration Certificate. (Values are	undrained shea	ar strength)	
Shear Vane re	cords incl	ude Re	e-mou	Ided	value	s where	po	ssible			
Shear Vane Se	erial No.:	1471		E>	φ. Da	te: 15/1	1/20	022			Rev3.6



Undrained

Shear (kPa)

UTP

>205/

>205/50

175/36

170/36

>205/

175/75

172/81

Depth

(mm)

Notes:

RE	50	Project Name Subdivision Test & Rep Stage 17 & 18a Greenhill	Project Name Subdivision Test & Report Area LUK; Stage 17 & 18a, Greenhill Park, Hamilton			
ONS ENG	SINEERED	Tested by	Date	Sheet No.	Lot No.	
		AK	3/05/2022	51	531	
<b>No of</b> blows 100mm 0	Scala Penetrometer (Blows/100mm) 2 4 6 8 10 12 14	Soil D	escription		Water Table	
	Image: constraint of the second of the se	t (No topsoil ENGINEERED FILL: C pumice, sand and mica; b moisture; high pl 800mm: L 1500mm: Becoming SILT r 1600mm: Becoming pale y 1800mm: Becoming CLAY 200mm: Becoming creamy Fine sandy SILT with tra mottled yellow; mediu plasticity;	at time of PCHA) LAY SILT with tr rown mix; very sl asticity; low dilata ight brown mix. ninor clay. ellow mottled pin SILT, traces fine light brown mix.	aces of fine tiff to hard; low ancy. k and orange. pumice. ce; light grey pisture; low		
8		EOB at 3.0m. Ta	arget Borehole D	epth.		
EOB :	= End Of Borehole	TP = Unable To Penetrate	UTE = Unable	To Extract		

Weather leading up to testing was: Fine 

Ground water was not encountered during testing 

Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)

- Shear Vane records include Re-moulded values where possible
- Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022



(mm)

Notes:

Shear Vane Serial No.: 1471

Exp. Date: 15/11/2022

Rev3.6

					Project Name			
C	۶R	<b>E</b> 5	50		Subdivision Test & Repo Stage 17 & 18a, Greenhill I	rt Area LUK; Park, Hamilton	171738-S17	&S18a-01
SOLUT	IONS E	NGINE	ERED		Tested by	Date	Sheet No.	Lot No.
					AK	28/04/2022	52	532
Undrained Shear (kPa)	No of blows /100mm	Sca (E	la Penetromete Blows/100mm) 6 8 10 12 1	er 14 16	Soil De	escription		Water Table
	1 2 7 3 5			Good Fround Result	TOPSOIL with some cla 400mm: Becoming clayey si	iy and silt; dark lty.	brown; dry.	
UTP	8 8 5 6				ENGINEERED FILL: CLAY and sands; brown mix; hard low dilatancy; m	SILT with traces l; low moisture; oderately sensit	s of fine pumice high plasticity; ive.	
					900mm: Traces of carbonac	eous material.		
170/66					1200mm: Becoming very sti	ff.		
>205/					1500mm: Becoming hard.			
>205/								
>205/								
186/66					2400mm: Becoming very sti	ff.		
	3				SILT minor fine sands with mottled yellow; medium plasticity; high d	n traces of pumi n dense; low mo ilatancy; sensiti	ce; light grey isture; low ve.	
					EOB at 3.0m, Tar	get Borehole Do	epth.	
	E	OB = End	Of Borehole	UTP	= Unable To Penetrate	UTE = Unable	To Extract	
Weather leading	ng up to te	sting was:	Fine					
Ground water	was not er	ncountered	during testing					
Shear Vane re	adings are	e converted	readings, as pe	er calibi	ration Certificate. (Values are	undrained shea	ar strength)	
Shear Vane re	cords inclu	ude Re-mo	ulded values wh	nere po	ssible			

				_	~			Project Na	ame			Job Ref.	
C	ЭR		-		()			Subdivi Stage 17	sion lest & 18っ Gr	: & Repo	ort Area LUK; Park Hamilton	171738-S17	&S18a-01
SOULT	IONS	ING	IN	EER	ED			Tested by		centini	Date	Sheet No	Lot No
30101				cer	ED			100100 03	A K		2/05/2022	52	522
									AN		2/03/2022	55	333
Undrained Shear (kPa)	No of blows /100mm	0 2	<b>Sc</b> ( 2 4	ala F (Blov 6	<b>Penetr</b> vs/100 8 10	ometer mm) 12 14	16			Soil De	escription		Water Table
						Re	sult						
						Go Gro	od ound	TOPS	SOIL with s	some cla	ay and silt; dark	brown; dry.	
UTP											CII T with trace	a of fina numica	
								and sand	s; brown r	.: CLAY mix; haro	d; low moisture;	s of fine pumice high plasticity;	
> 005/									low dilat	tancy; m	oderately sensi	tive.	
>205/				-				800mm· I	ight brown	n stroaks	2		
									-igitt brown	1 Sti Care			
>205/			1										
159/50				_		_		1300mm:	Becoming	y very sti	ff.		
				_									
175/36				_									
110/00				-				1700mm:	Becoming	moist.			
				-					Ū				
159/66				_									
				_		_		-					
				+				2300mm [.]	Recoming	ı vellow l	hrown		
199/72				+				200011111.	Decoming	y yonow i	510WII.		
				+									
	4							Fine san	dy SILT w	ith trace	s of pumice; lig	ht grey mottled	
	4			$\downarrow$				orange;	medium de	ense; lov	w moisture; low	plasticity; high	
	5			┦		_				dila	itancy.		
	5			_				-					
				_					EOB at 3	.0m. Tai	raet Borehole D	epth.	
				-									
	E	OB =	End	Of	Boreho	ole	UTP	= Unable	To Penetr	rate	UTE = Unable	To Extract	
Weather leadin	ng up to te	esting	was	: Fine	Э	<i></i>							
Ground water	was not el adinge are		itere	ם dui d re	ing tes adinge	as ner	calib	ration Cert	ificate (Va	alues are	undrained she	ar strength)	
Shear Vane re	cords incl	ude R	le-m	oulde	ed valu	les whe	ere po	ssible					

5 Shear Vane Serial No.: 1471 Exp. Date: 15/11/2022

Depth

(mm)

Notes:



(mm)

Notes:

							Project Name			
C	٥R	E	5	0			Subdivision Test & Repo Stage 17 & 18a, Greenhill	ort Area LUK; Park, Hamilton	171738-S178	&S18a-01
SOLUT	IONS E	INGI	NEE	RED			Tested by	Date	Sheet No.	Lot No.
							AK	2/05/2022	54	534
Undrained Shear (kPa)	No of blows /100mm	0 2	Scala (Blo 4 6	<b>Pene</b> ows/10	tromete )0mm) 10 12 1	er 14 16	Soil D	escription		Water Table
UTP >205/					( G F	Good round Result	(No topsoil ENGINEERED FILL: CLAY and sands; brown mix; har low dilatancy; m	at time of PCHA) SILT with traces d; low moisture; noderately sensit	s of fine pumice high plasticity; ive.	
>205/							800mm: Light brown streak	S.		
202/66							1400mm: Becoming yellow	brown.		
175/93										
	4 5 8 8						Fine sandy SILT with tra mottled yellow and orange low plasticity	ces of fine pumi ; medium dense /; high dilatancy.	ce; light grey ; low moisture;	
	10 11 10						2600mm: Becoming silty S/	AND.		
							EOB at 3.0m. Ta	rget Borehole D	epth.	
Weather leadir Ground water Shear Vane re Shear Vane re Shear Vane So	E ng up to te was not el adings are cords incli erial No.:	OB = E esting w ncounte e conve ude Re 1471	nd Of as: Fi ered d rted r -moul	f Borel ne uring te eading ded va Exp.	hole esting s, as pe lues wh Date: 1	UTP er calibi nere po 15/11/2	= Unable To Penetrate ration Certificate. (Values are ssible 022	UTE = Unable	To Extract	Rev3.



(mm)

Notes:

		_		Project Name		Job Ref.	
C	۶R	<b>E</b> 5	0	Subdivision Test & Repo Stage 17 & 18a, Greenhill	ort Area LUK; Park, Hamilton	171738-S17	'&S18a-01
SOLUTI	ONS E	NGINEE	RED	Tested by	Date	Sheet No.	Lot No.
				Jessel Ladwa	3/05/2022	55	535
Undrained Shear (kPa)	No of blows /100mm	Scala (Bl	Penetrometer       ows/100mm)       6     8     10     12     14     16	Soil De	Water Table		
UTP	5 3 5 3		Ground Ground Result	(No topsoil a ENGINEERED FILL: CLAY fine pumiceous material an mixture (mottled orange/ye			
163/49	3 5 4			to hard; low moisture; high   low c	plasticity; moder lilatancy	ately sensitive;	
130/38	4 5 3			-			
190+				1100mm: Dark brown streak 1200mm: Becoming light cre 1300mm: Becoming Clayey and traces of carbonaceous			
163/52				1400mm: Speckled black. 1600mm: Becoming CLAY S	SILT trace pumic	e; Brown.	
1/4/49				-			
122/57				-			
149/57	3 4 4 3 3			SILT, some fine sand wi material; light grey mottled low moisture; low plastic	ith traces of fine orange/yellow; r ity; sensitive; hig	pumiceous nedium dense; µh dilatancy.	
				EOB	@ 3.0m		
	EO	B = End Of	Borehole UTP =	Unable To Penetrate	JTE = Unable T	o Extract	
Weather leading Ground water	ng up to te was not er	esting was: Fi ncountered d	ne uring testing				

Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)

- Shear Vane records include Re-moulded values where possible
- Shear Vane Serial No.: 3252 Exp. Date: 13/07/2022



No of

blows

/100mm

Depth

(mm)

Undrained

Shear (kPa)

166/34

156/28

	Project Name		Job Ref.								
50	Subdivision Test & Repo Stage 17 & 18a, Greenhill I	ert Area LUK; Park, Hamilton	171738-S17	&S18a-01							
NEERED	Tested by	Date	Sheet No.	Lot No.							
	Jessel Ladwa	3/05/2022	56	8025-8026							
Scala Penetrometer       (Blows/100mm)       4     6     8     10     12     14     16	Soil De	Water Table									
Good Ground Result	TOPSOIL with minor clay gravels; da	/ silt and traces ırk brown; dry	of sand and								
	ENGINEERED FILL: CLAY fine pumiceous material an mixture (mottled orange/yell low moisture; high plastici dila	SILT with trace d mica; light bro low/ speckled bl ty; moderately s tancy.	es of fine sand, own and brown lack); very stiff; sensitive; low								
	Fine Sandy SILT with trace light grey mottled orange, moisture; low plasticity	Fine Sandy SILT with traces of fine pumiceous material; light grey mottled orange/yellow; medium dense; low moisture; low plasticity; sensitive; high dilatancy									
	EOB	@ 2.0m									

i i ! i İ -Ì -į ł Notes: EOB = End Of Borehole UTP = Unable To Penetrate UTE = Unable To Extract Weather leading up to testing was: Fine Ground water was not encountered during testing Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)

Shear Vane records include Re-moulded values where possible 

Shear Vane Serial No.: 3252 Exp. Date: 13/07/2022



Undrained

Shear (kPa)

176/34

152/33

UTP

Depth

(mm)

Notes: 

_		2.00	Project Name		Job Ref.	
۶R	<b>E</b> 50	)	Subdivision Test & Repo Stage 17 & 18a, Greenhill	ort Area LUK; Park, Hamilton	171738-S17	'&S18a-01
ONS E	NGINEERE	D	Tested by	Date	Sheet No.	Lot No.
			Jessel Ladwa	3/05/2022	57	8027-8028
No of blows /100mm	Scala Pen (Blows/1 0 2 4 6 8	etrometer 100mm) 10 12 14 16	Soil De	Water Table		
		Result Good Ground	TOPSOIL with minor cla gravels; da	y silt and traces ark brown; dry	of sand and	
6 4 3 3 3 4 4 5			ENGINEERED FILL: CLAY fine pumiceous material ar mixture (mottled orange/ye low moisture; high plastic dila	Y SILT with trace ad mica; light bro llow/ speckled bl ity; moderately s atancy.	es of fine sand, own and brown lack); very stiff; sensitive; low	
5 5 6 4 5 5			Fine Sandy SILT with trac light grey mottled orange moisture; low plasticity	es of fine pumice s/yellow; mediun y; sensitive; high	eous material; n dense; low dilatancy.	
			EOB	@ 2.0m		

EOB = End Of Borehole UTP = Unable To Penetrate UTE = Unable To Extract												
Neather leading up to testing was: Fine												
Ground water was not encountered during testing												
Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)												
Shear Vane records include Re-moulded values where possible												
Shear Vane Serial No.: 3252 Exp. Date: 13/07/2022												

Rev3.6



(mm)

Notes:

CODECO							Project Name	9		Job Ref.						
C	シR	RE	5	5(	)		Subdivisio Stage 17 & 1	n Test & Repo I8a, Greenhill I	ort Area LUK; Park, Hamilton	171738-S17	&S18a-01					
SOLUT	IONS E	NG	NE	ERE	D		Tested by	,	Date	Sheet No.	Lot No.					
0.000			SUCR	1000	10		Jesse	l Ladwa	3/05/2022	58	8029-8030					
Undrained Shear (kPa)	No of blows /100mm	0 2	Scal (B	la Pe llows	<b>netron</b> 5 <b>/100m</b> 3 10 1	neter m) 12 14 16		Soil De	escription		Water Table					
	8 Solution Contraction Contrac						TOPSOIL gravels; da	TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry; difficult to auger past 300mm								
UTP	8 6 4 4 2 2						ENGINEER fine pumice mixture (mot moisture									
	2 3 3 5 6 5 5 6 5 5						Silty fine S light grey m low moist									
								EOB	@ 2.0m							
	EO	)B = Ei	nd Of	fBor	ehole	UTP	= Unable To P	enetrate U	ITE = Unable T	o Extract						
Weather leadin Ground water Shear Vane re Shear Vane re	ng up to te was not en adings are cords incl	esting v ncount e conv ude Re	vas: F ered erted e-mou	⁻ine durin read ulded	g testir ings, a values	ng s per calil s where pe	oration Certifica	ate. (Values are	e undrained shea	ar strength)						

Shear Vane Serial No.: 3252 Exp. Date: 13/07/2022



				EA	RTHWOF	RKS FILI	REPO	RT						Proje	ct No:			773-TAUR00030
	Test Metho	ds : Shear Str acco	ength (using f ordance with l	field Shear vane NZS 4402:1986	in accordance with Test 2.1): Density (	NZGS 2001):Nu Calculations (in a	clear Densome	ter Testing (in a NZS 4402:1986	ccordance Tests 4.1.	with NZS 1.5(b))	4407:199	1 Test 4.2	.1): Water Content Testing (in		Page: 1 of 1			1 of 1
Client: D B Consulting Engineers 42 Tawn Place Pukete, Hamilton												Tests indicated as not accredited are outside the scope of the laboratory's accreditation						
Principal: Ranjan Ghiloria											ALANDA .			,,				
c.c. to:	-													Approved Signator	y:		Eric Paton	
Project:	Green Hill Park													Approved Signator	y Signature:		2. Pola	
Project Location	oject Location: Carrs Road										Date of Issue:	Date of Issue: 15/01/2021						
	-															IAI	NZ Accredited Labo	ratory Number:1352
				Wet	Oven	Dry	Solid	Air		Fie	eld						Mat	
Date	Work Order :	Tested	Test No.	Density	Water	Density	Density	Voids		Shear S	Strength	1	Tast Leastion	Easting	Northing	RL	teria	Comments
		Ву		<b>(t/m</b> ³ )	Content (%)	<b>(t/m</b> ³ )	<b>(t/m</b> ³ )	%		in	kPa		Test Location			(m)	l Tes	
									(UTP :	= Unabl	e to pen	etrate)					sted	
13/01/2021	TAUR21W00022	GY	7	1.61	56.9	1.03	2.8	4.7	NT	NT	NT	NT	-	-	-	-	Silty CLAY	-
13/01/2021	TAUR21W00022	GY	8	1.67	57.0	1.06	2.8	1.5	NT	NT	UTP	NT	-	-	-	-	Silty CLAY	
13/01/2021	TAUR21W00022	GY	9	1.65	49.6	1.10	2.8	5.8	NT	NT	NT	NT	-	-	-	-	Silty CLAY	
13/01/2021	TAUR21W00022	GY	10	1.71	46.0	1.17	2.8	4.5	NT	NT	NT	NT	-	-	-	-	Silty CLAY	
13/01/2021	TAUR21W00022	GY	11	1.63	46.7	1.11	2.8	8.4	NT	NT	NT	NT	-	-	-	-	Silty CLAY	
13/01/2021	TAUR21W00022	GY	12	1.72	38.9	1.24	2.8	7.5	NT	NT	NT	NT	-	-	-	-	Silty CLAY	

Project:	Greenhill Park		
Location:	Carrs Road Hamilton	Tested by: Date tested:	GY 13.01.21

# **NDM Direct Transmission**

Solid Density kg/m³:

Maximum Dry Density kg/m³:

**Optimum Moisture Content:** 

**Average Field Moisture Content:** 

Soil Material: CLAY SILT

Site Tech:

2800 (Assumed)

54.0 %

42.1 %

AK

1060 Report# HA6441/2



### 171738-LUK-SI: Stage 17 & 18a, Area LUK of Greenhill Park, Hamilton - Earthworks

Test Average	
Compaction PR%	112
Air Voids AV%	7
Shear Strength kPa	202
Degree of Saturation	-

			<u> </u>
<b>Targets</b>	Average	Min	Max
Compaction PR%:	≥ 95	90	-
Air Voids AV%:	≤ 10	-	12
Shear Strength kPa:	≥ 140	110	-
Degree of Saturation:	-	-	-

Test Methods : Shear Strength (Shear vane NZGS 2001): Nuclear Densometer Testing (NZS 4407:2015 Test 4.2)

NDM S/N: 79159, Exp Date: 24/05/2023

	Test Loca Sket	tion: Refer									Fiel	d Shear Streng	gth (kPa). She	ar Vane S/N: 14	71
Test#	RL	Test Date	Layer Thickness mm	Probe Depth mm	Wet Density kg/m ³	Oven Moisture Content MC%	Dry Density kg/m ³	Degree of Saturation DOS	Air Voids AV%	Compaction PR%	Test A	Test B	Test C	Test D (probe hole)	Average kPa
1	42.200	26/04/22	500	300	1659	40.6	1180	83	10	111	138	141	150	156	146
2	43.000	2/05/22	500	300	1634	41.0	1159	81	11	109	UTP	UTP	210	210	210
3	42.100	3/05/22	500	300	1704	48.0	1151	94	4	109	210	210	210	210	210
4	40.820	3/05/22	500	300	1711	45.2	1178	92	5	111	UTP	UTP	UTP	210	210
5	40.580	3/05/22	500	300	1724	40.8	1224	89	6	116	UTP	UTP	UTP	210	210
6	41.800	3/05/22	500	300	1687	41.1	1196	86	8	113	UTP	UTP	UTP	210	210
7	40.530	4/05/22	500	300	1725	39.8	1234	88	7	116	UTP	UTP	UTP	210	210
8	40.900	4/05/22	500	300	1704	40.6	1212	87	8	114	UTP	UTP	UTP	210	210

## **NDM Direct Transmission**



171738-LUK-SI: Stage 17 & 18a, Area LUK of Greenhill Park, Hamilton - Earthworks



# **NDM Direct Transmission**



### 171738-LUK-SI: Stage 17 & 18a, Area LUK of Greenhill Park, Hamilton - Earthworks



Appendix E <u>Stormwater Management</u> Minimum Lot Levels



	8	_				
LOWEST LEVEL	MINIMUM Finished Floor Level (FFL)		SQL			
13 36	/3.51		SHRIMPTON & LIPINSKI			
40.07	43.31					
43.27	43.42	A	DESIGN SPECIALISTS			
43.27	43.42		Ph. 07 577 6069			
43.04	43.19		Email: info@sltga.co.nz P.O. Box 231, Tauranga 3140			
42.96	43.11		www.sltag.co.nz			
42.88	43.03					
42.95	43.10		LEGEND:			
43 17	43.32					
43.15	/3 30		(38.2) SPOT HEIGHT			
42.02	42.17		GROUND   EVEL*			
43.02	43.17	В				
42.74	42.89		SLOPE ARROW			
42.60	42.75					
42.51	42.66					
42.61	42.76					
42.70	42.85		BOTTOW OF BANK			
42 82	42.97		BOTTOM OF WALL			
42.96	<u>/3 11</u>					
42.00	43.11		MAJOR CONTOUR			
43.09	43.24	c				
41.54	41.69		MINOR CONTOUR			
41.46	41.61					
41.41	41.56		CONTOUR INTERVAL = 0.20m			
41.31	41.46					
41.28	41.43	$\vdash$	4			
41 28	41 43		*GROUND LEVELS ARE NOT TO BE			
41.20	41.59					
41.43	41.30		USED FOR BUILDING DESIGN.			
41.42	41.57					
41.08	41.23					
41.12	41.27					
41.10	41.25					
41.10	41.25	D				
41 09	41 24					
39.14	30.20					
39.14	39.29					
39.14	39.29					
39.20	39.35					
39.24	39.39					
39.29	39.44	E				
39.33	39.48					
39.36	39.51					
39.10	39.25		Rev DESCRIPTION DRN CKD APP DATE			
39.87	40.02	-	0 PRELIMINARY NW BP BP 05/22			
40.46	40.02		1 ISSUED TO GEOTECH NW BP BP 05/22			
40.40	40.01					
40.74	40.89					
42.88	43.03	_				
42.88	43.03	F				
43.17	43.32		SURVEYED DESIGNED			
41.98	42.13		COORDINATE SYSTEM: NZGD 2000 - MOUNT EDEN			
41.65	41.80		HEIGHT DATUM: MOTURIKI LVD 1953			
41.26	41 41	$\vdash$	ORIGIN OF HEIGHT:			
<u>/1 00</u>	/1 0/		TITLE			
41.09	41.24		SECTIONS LEVELS			
40.95	41.10					
41.20	41.35		AND FLOW -			
41.95	42.10	G	GEOTECHNICAL			
41.54	41.69					
41.25	41.40		KEQUIKEWENI			
39.89	40.04					
40.92	41 07		PREPARED FOR			
40.63	/0.78	Γ				
40.00	40.70		Chedworth			
40.36	40.51		GREENHILL Properties Limited			
39.69	39.84					
39.52	39.67	L	STAGE 17			
39.43	39.58	"	ORIGINAL SCALES @ A3 STATUS			
			DO NOT SCALE DIMENSIONS AS-BUIL I			
			DRAWING NO REVISION			
30410-01-917-01 2						
	8					
	U		COPYRIGHT ON THIS DRAWING IS RESERVED			

Appendix F Retaining Wall Producer Statement (PS4)



### B1

# **PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW**

ISSUED BY	CORE50 Limited							
то	(Construction Review Firm) Chedworth Properties Limited / Chedworth Properties Limited							
(Owner/Developer)								
(Building Consent Authority)								
IN RESPECT OF TIMBER RETAINING WALL INSPECTION								
AT Lot 525, Stage 18, Greenhill Park								
(Address) Town/City Hamilton IOT 525 of Lot 2 DP 534384 SO								
We     CORE50 Limited     have been engaged by     Chedworth Properties Limited       (Construction Review Firm)     (Construction Review Firm)     (Construction Review Firm)								
To Provide	CM1 ✓ CM2 CM3 CM4 CM5 Engineering Categories OR Observation as per agreement							
with owner/developer Chedworth Properties Limited / Chedworth Properties Limited								
or 🗸 Other TIMBER RETAINING WALL INSPECTION services								
In respect of clai	(Extent of Engagement)							
documents relat	ng to Building Consent No 007.2021.00042864.001 and those relating to							
Building Consent Amendment(s) Nos.   N.A   Issued during the     course of the work. We have sighted these Building Consents and the conditions of attached to them.   Issued during the								
Authorised instru	ictions/variations(s) No. N.A (copies attached)							
or by the attache	d Schedule have been issued during the course of the works.							
On the basis of 🗸 this review 🗌 these review(s) and information supplied by the contractor during the course								
Of the works and	on behalf of the firm undertaking this Construction Review, I believe on reasonable grounds that							
All or Part only of the building works have been completed in accordance with the relevant requirement of the								
Building Consent	and Building Consent Amendments identified above, with respect to clause(s) B1							
of the Building Code. I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary competency to do so.								
l,	Jeet Singh am: 🗸 CPEng# 1011588							
(Name of Construction Review Professional) I am a Member of: 🗸 Engineering New Zealand and hold the following qualifications: BE Civil, MEngSt.								
The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$200,000.*								
SIGNED BY	Jeet Singh (Signature)							
(Name of Construction Review Professional)								
ON BEHALF OF	CORE50 Limited Date 12/04/2022 (Construction Review Firm)							

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000*.

#### This form is to accompany Forms 6 or 8 of the Building (Form) Regulations 2004 for the issue of a Code Compliance Certificate. THIS FORM AND ITS CONDITONS ARE COPYRIGHT TO ACENZ, ENGINEERING NEW ZEALAND AND NZIA

This form is only an extract from the complete PS4 document issued on the 12th of April, numbered: CR171738-AREA-LUK-S18-L525-SI. For the complete PS4 document, please contact administration@core50.nz.





BRZ: No buildings should be constructed within a minimum distance to the top of the wall equal to the height of the wall and measured from the wall drainage system, unless engineering review of the surcharge loading is carried out.

NOTE: Due to the building to boundary restrictions and low wall heights the encroachment of these zones' are expected to be

It will be the architects/draftsman responsibility to demarcate these zones on the applicable building consent drawings where encroachment occurs and notify their nominated engineer to

	Designer:	Drawn By:	Date:
ea LU & K,	ES	ES	18/11/2021
rk, Hamilton	Issue:	Scale:	Sheet Size:
	1	NTS	A3
	Job Number:	Sheet No.	
mber Retaining Wall & ERZ Detail	171738-S18	05	