

30 August 2016

# STAGE 5 BALLINTOY PARK SUBDIVISION 26 & 28 BALLINTOY PARK DRIVE, WELCOME BAY

## **GEOTECHNICAL COMPLETION REPORT**

Hugh Green Group Limited Ref. TGA2016\_0121AB Rev0

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## 1. INTRODUCTION

This Geotechnical Completion Report has been prepared for Hugh Green Group Limited as part of the documentation to be submitted to the Tauranga City Council in general accordance with resource consent RC24492.

It contains a Geotechnical Suitability Statement, provides a review of existing geotechnical investigation data, the results of construction observations and quality control test data and as-built topographical plans supplied by Harrison Grierson Limited.

This report covers the construction period December 2015 to August 2016 and is intended to be used for certification purposes for lots numbered 1 to 29 and 31 to 32 inclusive.

## 2. GEOTECHNICAL QUALITY CONTROL

The works on this development were observed and tested by several different parties as outlined below. Responsibilities were as follows:

- Design, construction observations and certification for the retaining walls within lots 20, 21, 22 and 23 – Harrison Grierson Consultants Limited (HG);
- Design, construction observations and certification for the subdivision roading HG;
- Earthworks design, construction observations, review of quality control test data and preparation of Geotechnical Completion Report – CMW Geosciences (NZ) Limited (CMW).

## 3. DESCRIPTION OF SUBDIVISION

Stage 5 of the Ballintoy Park subdivision is situated off the northern side of Ballintoy Park Drive, approximately 1.8 kilometres south of Welcome Bay Road, Tauranga. It has an approximate plan area of 3.3 Ha.

The northern part of the site comprised a fairly uniform, moderately steep slope from RL 114 metres (Moturiki Datum) down towards RL 84 metres alongside residential properties along Bob Carter Place to the west. The southern part of the site comprised a steep-sided 10 to 12 metre deep arcuate feature around the perimeter, inferred to be a relic slip scarp with gently graded land present below it across the southern and central part of the site where adjacent to properties along Ballintoy Park Drive. The pre-development landform is depicted on the appended Original Contour Plan (Figure 01).

The proposed subdivision comprises 31 residential lots accessed from two cul-de-sac roads running centrally through the Stage 5 area. Stormwater flows generated from the development are piped to an attenuation pond within a small gully to the west with secondary flows being to this same feature via the formed roading network. Sanitary sewer is piped to the existing reticulation beyond the northwest subdivision boundary. A buried high pressure gas pipe extends along the northern boundary of Stage 5.

As depicted on the appended Cut / Fill Contour Plan (Figure No. 02) as derived from topographical data provided by HG, the ground levels within the Stage 5 area have been modified by subdivision earthworks incorporating cut and fill depths of up to 12 and 4 metres respectively from original ground levels. Whilst this has resulted in the formation of a moderately sloping 1(v):2.5(h) engineered cut within the north-eastern part of the site, it has elsewhere resulted in an easing of the former ground contours. A retaining wall was constructed across each of lots 20 and 21 and across lots 22 and 23.

## 4. RELATED REPORTS

A Geotechnical Investigation Report (GIR) was prepared by Foundation Engineering Consultants Limited (FECL), dated 30 May 2006 (ref. 12590) to support a resource consent application for the Ballintoy Park subdivision.

More recently, a Geotechnical Assessment Report was prepared by Coffey Geotechnics (NZ) Limited, dated 6 March 2015 (ref. GENZTAUC12590AB-AB) to support a resource consent application for Stage 5 of the Ballintoy Park subdivision.

The investigations and findings from those reports are summarised below and the conclusions and recommendations were taken into account during the earthworks development and have been reviewed during the preparation of this document.

## 5. INVESTIGATIONS COMPLETED

The above-referenced geotechnical investigations were completed by FECL and Coffey prior to the commencement of any earthworks taking place. They comprised a combination of machine and hand auger boreholes, trial pit excavations and cone penetrometer tests with those relevant to the Stage 5 area depicted on the appended Figure 01 and attached in Appendix B.

Slope stability analyses were completed by Coffey for the design cut batter above lots 15 to 19 inclusive. These showed that to achieve the minimum required factors of safety for slope stability, a maximum allowable gradient of 1:2.5 (vertical to horizontal) was recommended as depicted on the appended Cross Section A-A (Figure 04).

The arcuate slopes within the north-eastern part of the site represents a relic slip scarp that has gradients of up to 1(v):2(h) near the crest of the slope, becoming gentler towards the relatively flat ground within the centre of the feature. Based on the historical aerial photographs and an absence of colluvium below the slope, this slip scarp (and any associated colluvium) is assessed to be relic (very old) and expected to be mantled in volcanic ash.

Post construction hand auger boreholes in conjunction with in-situ shear vane tests were carried out within each lot to provide representative near-surface subsoil information for residential building construction.

All test locations are presented on Figures 01 & 03 and the results of all in-situ soil tests, together with detailed descriptions and depths of strata encountered during the post construction investigations, are appended (refer Appendix D).

## 6. OVERVIEW OF GEOLOGICAL CONDITIONS

Published geological information (Briggs et al, 1996, Geology of the Tauranga Area) indicates that the surrounding natural landform is underlain at depth by Pliocene age Papamoa Ignimbrite, which is reported to be brown partially-welded crystal and pumice rich and containing lithic andesite and rhyolite fragments. Large boulder outcrops that fit this general description are located along the toe of the valley to the west of the Ballintoy Park subdivision. Investigations completed by Coffey across Stage 5 inferred medium dense weathered ignimbrite at the base of CPT tests CPT05 and CPT07, where refusal occurred before reaching the target depth of 20 metres. Based on this, the surface of the weathered ignimbrite is typically deep and therefore would not be expected to have an influence on the engineering characteristics of Stage 5.

The ignimbrite is overlain by several to tens of metres of reworked sands, silts and clays associated with the Matua Subgroup together with a several metre thick characteristic ash sequence, comprising (from oldest to youngest) the very stiff to hard weathered silts/clays of the Hamilton ash followed by a thin Rotoehu ash layer overlain by sequence of stiff to very stiff recent rhyolitic airfall ash deposits of the post-Rotoehu ash.

## 7. EARTHWORKS OPERATIONS

## 7.1. Plant

The principal contractor for the project was HEB Contractors Limited. The main items of plant used by during the bulk earthworks phase comprised tractors with harrows, Terex motorscrapers, bulldozer towed scoops, hydraulic excavators and bulldozers with sheepsfoot rollers.

## 7.2. Construction Programme

Earthworks operations for this development commenced in December 2015 with the elevated central part of the site and the lower south-eastern part of the site and the construction of a temporary sediment retention pond within the south-western part of the site.

Following the main topsoil stripping and stockpiling operation the exposed subgrade was observed by our staff to confirm that a natural ash subgrade was exposed. At this time two test pits were excavated across the south-eastern part of the site under the direction of CMW to identify the nature of the near surface subsoils below the relic slip feature and to determine whether a watertable was present that would require the installation of deep subsoils drains prior to the placement of filling. The test pits encountered several metres of firm to stiff in-situ post-Rotoehu ashes overlying gravelly sands of the Hauparu Tephra, in turn underlain by inferred sands and silts of the Matua Subgroup. Based on an absence of an identifiable watertable the need for deep subsoil drains was not considered necessary.

The central hill/spur was then progressively downcut with the excavated material being placed and compacted across the lower southern and eastern parts of the site. Where cut depths of greater than 4 to 6 metres occurred, the subsoils were particularly wet and sensitive, which slowed earthworks operations significantly to ensure adequate drying of the fill was being achieved.

Filling was then placed across the western part of the site following topsoil stripping and benching of the subgrade. Retaining wall construction then commenced to support the filling within lots 20 to 23 inclusive.

Bulk filling within the Stage 5 area was completed in June 2016 after which a topsoil layer was respread across the lots.

Stormwater and Wastewater services pipes were then installed and the two cul-de-sac roads constructed between June and August 2016. This was followed by decommissioning and backfilling of the temporary silt retention pond.

## 8. GEOTECHNICAL QUALITY CONTROL

## 8.1. Site Observations

During the earthworks, site visits were typically undertaken on a weekly basis by CMW field staff to assess compliance with NZS 4431, Tauranga City Council IDC, the project specification and any other design recommendations.

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

- Adequate topsoil stripping;
- Benching of any sloping subgrades prior to fill placement;
- Placement and compaction of engineered fills;
- North-eastern cut batter constructed to design configuration;
- Drilling hand augers across the as-built landform to verify soil shear strength and consistency.

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

## 8.2. Compaction Control

Regular earthfill compaction testing was completed by the Fulton Hogan Limited Bay of Plenty laboratory, which is IANZ (International Accreditation New Zealand) accredited, with all results passed on to CMW for review. Occasional verification testing was also completed by CMW at selected locations as bulk filling progressed.

Based on a fill volume of 30,436m<sup>3</sup> as provided by HG and with 41 passed tests (each test comprising an NDM and four shear vane readings), this equates to 1 test per 740m<sup>3</sup> which is in excess of the frequency recommended by NZS 4431 and the TCC Infrastructure Development Code, this being at least 1 set of tests per 1,000 m<sup>3</sup> of earthfill volume.

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

## a) Cohesive Soils

Minimum Shear Strength (Measured by hand held shear vane calibrated using NZGS 2001 method) and Maximum Air Voids Method (As defined in NZS 4402) 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	150 kPa
Undrained shear strength minimum single value	140 kPa

\*The average value is determined over any ten consecutive tests

## b) Cohesionless Soils

A minimum of 5 blows per 100mm of penetration using a dynamic cone penetrometer (DCP).

## 8.3. Earthfill Suitability

Results of the earthfill quality control testing are provided in Appendix C, with fill test locations depicted on Figure 02.

Control tests carried out on the filling showed that on some occasions the required compaction standards were not being achieved, generally due to the subsoils being particularly wet and sensitive. Results of test failures were relayed to the contractor with instructions to carefully stage the bulk excavation work to allow cut soils time to sufficiently dry, by spreading, blending and discing and the reworking or replacing of any affected areas of fill until compliance with the appropriate standards were achieved.

Based on the appended earthfill quality control test results, together with having some reliance on the diligence of the bulk earthworks contractor at times when engineering staff were not present on site, we consider that the majority of the earthfill areas across the subject site have generally been constructed in accordance with NZS4431:1989, the TCC Infrastructure Development Code and site specific compaction control criteria. Post-construction boreholes identified an area across lots 22 and 23 not achieve the required standard to a depth of 1 metres and therefore these lots are subject to reduced geotechnical ultimate bearing capacities as explained below. This is primarily to limit future building loads so that ground settlements are kept to a minimum.

It should be noted that the backfilling and compaction of stormwater and sewer trenches on this subdivision were not inspected or tested and these should accordingly be classified as uncertified filling.

As is normal on all subdivisions, building developments involving foundations within a 45 degree zone of influence from all service pipe inverts will require specific design by a Chartered Professional

Engineer with a view to TCC Infrastructure Development Code requirements, including piling foundation loads to below that zone.

## 8.4. Fill Induced Settlements

As a result of the presence of generally firm to stiff natural subsoils and due to the length of time between the initial fill placement and preparation of this report, it is assessed that where there is no reduced soil bearing capacity for the recently placed filling, any fill induced settlements should be essentially complete and that any remaining ongoing settlement will be negligible and should comply with the minimum settlement criteria stated in Appendix B of Section B1/VM4 of the NZ Building Code.

## 8.5. Contractors Work

We have relied on the Contractor's diligence and construction observations to ensure that the works have been carried out in accordance with:

- i. The approved Contract drawings and design details;
- ii. The approved Contract specifications;
- iii. Authorised Variations to (i) and (ii) during the execution of the works;
- iv. The conditions of Resource and Earthworks Consents where applicable;
- v. The relevant recommendations and site instructions,

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

## 9. GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

## 9.1. Slope Stability Considerations

## Natural Escarpment

Across lots 8, 9 and 10 the escarpment has not been affected by subdivision earthworks and remains in its original state with slope gradients of up to 27 degrees to the horizontal extending over heights of up to 12 metres. Reference to historic aerial images held by TCC shows that the escarpment does not show any signs of instability since 1943 (the earliest image available). Further, as the escarpment is graded at what is commonly referred to as being 'stable' (1V:2H), the risk of future significant instability is considered to be low and at an acceptable level with respect to the Building Code.

## Engineered Cut Batter

A 13 metre high cut batter has been formed within the rear of lots 15, 16, 17 and 18, with an overall design batter gradient of 1(v):2.5(h) formed based on the results of specific slope stability analyses completed by Coffey and construction practicalities, namely the ability to re-spread a topsoil layer at the completion of bulk earthworks.

Based on this, and the results of previous slope stability analyses, the cut batters contain a slope stability factor of safety of greater than 1.5 meeting the requirements of the TCC Infrastructure Development Code.

## 9.2. Liquefaction and Lateral Spreading

Due to the site being elevated, the generally cohesive nature of the ground conditions exposed and geological age of these subsoils combined with several metres of non-saturated subsoils, the risk of damage due to the effects of liquefaction and lateral spreading during an Ultimate Limit State seismic event for an Importance Level 2 structure is considered to be low.

## 9.3. Building Restriction Lines

Lots 5 to 9, 13 and 14 to 19 inclusive are located along the toe of the slopes associated with the natural escarpment and engineered cut batter and have had building restriction lines (BRL's) imposed in order to limit the potential undermining of these slopes. No excavation or building works should take place upslope of the BRL unless supported by specific geotechnical investigation and reporting by a Category 1 Geotechnical Engineer.

A building restriction line has been imposed near the top of the retaining walls constructed across lots 20 to 23 inclusive to prevent increased surcharge loads being applied to these walls. Timber pole retaining walls by their nature undergo minor deflections on account of lateral loads and therefore there is to be no building development or earthfill placed to the west of the BRL unless prior approval is given by HG, the designer of those walls.

A BRL extends up the northern boundary of lots 19 and 20. This is to prevent any building development from occurring within the high pressure gas pipe easement.

The location of the building restriction lines is shown on Figure 03.

## 9.4. Foundation Bearing Capacity

Post construction boreholes and shear vane testing were completed following bulk earthworks operations. These field investigations targeted cut areas likely to contain soft to marginally firm surficial soils and also provided an independent verification check on the fill quality.

## Lots Located on Cut Ground

A large number of lots have been formed either fully or partially in natural or cut ground (see Lot Summary Report in Appendix A). By nature of its volcanic origin, these layered soils drape over the former topography leading to a variety of soil types being exposed both by the subdivision earthworks and by any future building platform preparation works. As a result, these layers of soft or sensitive soils and loose sands often become exposed over part of the proposed platform.

Where such soft or sensitive soils are known to exist within the top metre of any completed lot formation, it has been assessed that a reduced geotechnical ultimate bearing capacity of 210kPa should be available for design purposes. Based on the post-construction boreholes completed as well as observations made during the bulk earthworks, this is expected to encompass lots 14 to 18 and 25 to 27 respectively. Specifically designed lightweight pod raft foundations are recommended (e.g. rib-raft) to spread the load of the proposed building across these varied soils unless a higher geotechnical ultimate bearing capacity can be demonstrated by specific site investigation by a Chartered Professional Engineer.

## Lots Located on Filled Ground

A number of lots have been formed either partially or fully by placement of engineered fill at the time of subdivision earthworks. As described in Section 8.1, post-construction hand augers have indicated that the upper 1 metre of the filling within lots 22 and 23 has not met the minimum compaction criteria. These lots may experience slightly higher than normal rates of settlement within these fill soils over the design life of the building (not less than 50 years) and therefore specifically designed lightweight pod raft foundations (e.g. rib-raft) are recommended on these lots. This recommendation is specified in the appended Lot Summary Report.

Elsewhere, where engineered fill soils are known to exist a geotechnical ultimate bearing capacity of greater than 300kPa should be available allowing for design in accordance with NZS3604.

## All Lots

It should be noted that only limited testing was undertaken within the cut areas and while soil strengths appear to have increased significantly on exposure and drying, there can be no guarantee as to their consistency away from the test locations due to highly variable cut depths across relatively shallow areas. Also, where further cuts are proposed to provide a level building platform, weak soils could become exposed at design grade.

Where soft soils are encountered during routine foundation construction or inspections, undercutting and replacement of the problem soils or simple widening of building foundations may be required, necessitating the involvement of a Chartered Professional Engineer.

As required by Section B1/VM4 of the New Zealand Building Code Handbook, a strength reduction factor of 0.50 or 0.80 should be applied to all recommended geotechnical ultimate soil capacities in conjunction with their use in factored design load cases for static and earthquake overload conditions respectively.

## 9.5. Cut Fill / Retaining Wall Restrictions

If any earthworks are proposed they should be subject to the normal topsoil stripping, conditioning and appropriate compaction of any fills in accordance with the requirements of NZS 4431 and the TCC Infrastructure Development Code and subject to engineer inspections and certification at that time. Cut and fill embankments should be graded no steeper than 1:2.5 (vertical to horizontal) unless supported by engineer designed retaining walls.

It should be noted that re-compaction of locally derived silt/clay materials to engineer standard is generally considered difficult during winter months. Where earthworks are scheduled during wet weather, allowance may be required for importing sand or pumice materials as a fill source.

As mentioned previously, no cut or filling is to take place beyond the building restriction lines due to slope stability considerations.

Associated with these works may be the construction of retaining walls. To eliminate the potential for significant load interaction across lot boundaries, walls should be positioned based on the following:

- Retaining walls supporting proposed fills should be located no closer than twice their retained height from the downslope property boundary unless endorsed by specific investigation and design by a Category 2 Geotechnical Engineer;
- Retaining walls supporting proposed cuts should be located no closer than their wall height from the upslope property boundary unless endorsed by specific investigation and design by a Category 2 Geotechnical Engineer;
- Due to the sloping nature of the as-built subdivision surface, any retaining walls exceeding 1.5 metres in height or supporting a building or accessway/parking area should be designed by a Chartered Professional Engineer giving consideration to toe slope gradients and crest surcharge slopes and loading conditions.
- Unsupported cut and fill batters should be graded no steeper than 1 vertical to 2.5 horizontal and should also not encroach to within a distance equal to twice the height of any existing upslope retaining wall or the height of any existing downslope wall unless endorsed by specific investigation and design by a Category 2 Geotechnical Engineer.

## 9.6. Fill Induced Settlements

As a result of the pre-fill inspections, quality control testing and the elapsed time since the placement of the majority of the filling, induced differential settlements beneath or within the certified filling due to its imposed weight should be insignificant with respect to future residential building development and should comply with the minimum settlement criteria stated in Appendix B of Section B1/VM4 of the NZ Building Code.

Nonetheless, the building should still be designed to tolerate differential settlements of up to 1 in 240 (approximately 25mm over a 6 metre length of building) as required by the New Zealand Building Code, Section B1/VM4, clause B1.0.2, under the serviceability limit state load combinations of NZS 1170.

Further, it is noted that NZS 3604 only allows a maximum backfill depth of 600mm over the building platform of a dwelling on account of the risk of net increase in stress and resulting ground settlement unless preceded by specific investigation and assessment by a Chartered Professional Engineer.

## 9.7. Respread Topsoil

Topsoil was respread across the site at the completion of the earthworks development. Topsoil depths were checked across the subdivision by the drilling of boreholes following final landscape works. The results of this investigation, which are indicative only and subject to variation at other locations, show that topsoil depths vary from 200mm to 500mm.

Building development or future earthworks will require over-excavation of these respread topsoil materials to expose the natural or engineer certified earthfill subgrade, followed by the placement and compaction of further subfloor filling as required to achieve design grades.

## 9.8. Stormwater Management

It must be accepted that as a result of the sloping nature of the development, stormwater flows from existing grassed or future garden surfaces from upslope properties will continue to flow across downslope properties.

It is the responsibility of the upslope property owner to ensure that there is no increase in net flow or increase in the level of concentration of flows across any downslope boundary as a result of any proposed development on their lot. In this respect, all stormwater runoff generated from roof, driveway, impervious deck and other hard surfaces should be adequately collected and piped or otherwise diverted to the stormwater reticulation provided.

There is to be no in-ground disposal of stormwater by way of soakholes for any lots within this subdivision development.

## 9.9. Road Subgrades

All road subgrade preparation, inspections, testing and certification was completed under the direction of Harrison Grierson Consultants Limited.

## 9.10. Service Trenches

As given in Section 8.1, building developments involving foundations within a 45 degree zone of influence from pipe inverts will require Engineering design input.

## 9.11. Suitability Statement

A copy of our suitability statement, in the form of the Tauranga City Council forms G2 and G3 is appended.

## 10. LIMITATION

This report has been prepared for use by our client Hugh Green Group Limited, their consultants and Tauranga City Council. Liability for its use is limited to the scope of work for which it was prepared as it may not contain sufficient information for other parties or for other purposes.

It should be noted that factual data for this report has been obtained from discrete locations using normal geotechnical investigation techniques. As such investigation methods by their nature only provide information about a relatively small volume of subsoils, there may be special conditions pertaining to this site which have not been disclosed by the investigation and which have not been taken into account in the report. If variations in the subsoils occur from those described or assumed to exist then the matter should be referred back to CMW immediately.

## For and on behalf of CMW Geosciences (NZ) Ltd

Prepared by:

Luke McCann Engineering Geologist

Reviewed by:

Matt Packard Senior Geotechnical Engineer MIPENZ (Geotechnical), CPEng TCC Category 1 Geo-Professional

Distribution: 1 copy to Hugh Green Group Limited (electronic) 1 copy to Harrison Grierson Consultants Limited (electronic) Original held by CMW Geosciences (NZ) Limited Figures









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# Appendix A: Suitability Statement and Lot Summary Report

### CERTIFICATION

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

NAME OF SUBDIVISION	Stage 5 Ballintoy Park Subdivision, Welcome Bay
COUNCIL FILE NUMBER RC No:	RC 24492
ENGINEER RESPONSIBLE FOR	Matthew James Packard
DEVELOPMENT:	
QUALIFICATIONS:	BSc, MEngSc, MIPENZ (Geotechnical), CPEng

I, Matthew James Packard, of CMW Geosciences (NZ) Limited, 116 Cameron Road, Tauranga hereby confirm that:

- 1. I am a professional person, appropriately qualified with experience in geotechnical engineering to ascertain the suitability of the land for building development and was retained as the Soils Engineer to the above development.
- 2. An appropriate level of site investigation and construction supervision has been carried out under my direction and is described in my development evaluation report dated: Geotechnical Completion Report dated 30 August 2016 (ref. TGA2016\_0121AB Rev0).
- 3. In my professional opinion, not to be construed as a guarantee, I consider that;
  - a) Every part / the areas shown in my report dated 30 August 2016 of each new allotment is suitable for the erection thereon of the building types appropriate to the zoning of the land, provided that:
    - I. No buildings are located on or beyond the designated Building Restriction Lines shown on the Finished Contour Plan (Figure 03) appended to my 30 August 2016 report;
    - II. The specific recommendations provided in my 30 August 2016 report relating to the positioning of retaining walls and cut / fill batters is followed;
    - III. The specific recommendations provided in my 30 August 2016 report relating to the management of stormwater flows, is followed.
  - b) The engineer certified earth filling identified in my 30 August 2016 report and as shown on the Cut / Fill Contour Plan (Figure 02) appended to my 30 August 2016 report has been placed in accordance with the requirements of the Infrastructure Development Code.
  - c) The completed works give due regard to all land slope and foundation stability considerations.
  - d) The engineer filled ground is suitable for the erection thereon of specifically designed raft foundations or residential building not requiring specific design in terms of NZS 3604 and related documents (as specified in the Lot Summary Report), provided that the recommendations given in my report dated 30 August 2016 are followed and subject to routine inspections at the time of construction.
  - e) Development on lots 1 to 13, 19 to 21, 24, 28, 29, 31 and 32 is suitable for the erection of residential buildings not requiring specific design in terms of NZS 3604 and related documents subject to routine inspections at the time of building construction.
  - f) Due to the presence of soft natural subsoils or isolated pockets of low strength filling within the likely zone of influence of future shallow foundations on lots 14 to 18, 22, 23 and 25 to 27 inclusive, the geotechnical ultimate bearing pressure here should be limited to 210kPa unless higher values can be demonstrated by specific site investigations, foundation design and by construction inspections by a Chartered Professional Engineer experienced in geomechanics.
- 4. This professional opinion is furnished to the Council and the owner for their purpose alone, on the express condition that it will not be relied upon by any other person and does not remove the necessity for the normal inspection of foundation conditions at the time of erection for any dwelling.

Signed ...

Date ... 30/08/2016...



PRODUCER STATEMENT SUITABILITY OF LAND FOR BUILDING DEVELOPMENT INFRASTRUCTURE DEVELOPMENT CODE

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VE	TE U	7	726	197	Y	4.0	Y	Ν	-	Y	Ν	Υ	Ν	Ν	Υ	Ν	N	N	N N	Refer Finished Contour Plan	E
δ	E E	8	590	180	Y	4.0	Y	Ν	-	Y	Ν	Υ	Ν	Ν	Υ	Ν	N	N	N N	(Figure 03) for Building	(H
PM		9	1495	183	Y	4.0	Y	Ν	-	Y	Ν	Υ	Ν	Ν	Υ	N	N	N	N N		N
B	DT C	10	600	202	Y	4.0	Y	Ν	-	Y	Ν	Ν	Ν	Ν	Y	N	N	N	N N	200kDa saataabaiaal	CA
TO	SE	11	632	204	Y	4.0	Y	Ν	-	Y	Ν	Ν	Ν	Ν	Υ	Ν	N	N	N N	ultimate bearing capacity	L
ğ	DA	12	672	173	Y	4.0	Ν	Y	1.0	Y	Ν	Ν	Ν	Ν	Υ	N	N	N	N N		
DE		13	1811	197	Y	3.0	Y	N	-	Y	N	Y	N	N	Y	N	N	N	NN	300kPa geotechnical ultimate bearing capacity. Refer Finished Contour Plan (Figure 03) for Building Restriction Line	G3
VERSION July 2011	G	14	600	166	Ν	-	N	Y	10.0	N	Y	N	N	Ν	Y	N	N	N	N N	210kPa geotechnical ultimate bearing capacity	
-	S	15	1158	>208	Ν	-	Ν	Y	12.0	N	Y	Y	Ν	Ν	Y	N	N	N	N N	210kPa geotechnical	
		16	1250	108	Ν	-	Ν	Y	11.0	N	Y	Y	Ν	Ν	Y	N	N	N	N N	Refer Finished Contour Plan	
		17	670	124	Ν	-	N	Y	9.0	N	Y	Y	Ν	Ν	Y	N	N	N	N N	(Figure 03) for Building	
$\bigcirc$		18	1692	156	Ν	-	N	Y	7.0	N	Y	Υ	Ν	Ν	Y	N	N	N	N N	Restriction Line	

Tau		DP	No:	404308 & 38	3893 <i>°</i>	1	Property A	ddre	SS:	26 & 28 Balli	ntoy Pa	rk l	⊃riv	/e			R	C N	lo:	RC 24492	
range						Subsurfac	ce Data			Foundatio	ins	Ē			Des	Mi		0			
rCity		Lot No:	Area (m²)	Shear Strength (kPa) or DCP (blows per 100mm)	Sub F	division Tilling	Natural Topography Unworked	Na Topog Earth	itural grapghy worked	Conventional Shallow Foundation to NZS 3604:2011	Design	uilding Restriction	S/W Specific Desi	S/W Reticulate	ignated Building P	nimum Building Pla	Compressible Soi	n-site Effluent Disp	Consent Notice		
INFRA	UMN				Y/N	Depth (m)	Y/N	Y/N	Depth (m)	Y/N/NA	Y/N/NA	Line	gn		latform	atform	ls	osal		Comment	$\cap$
STR	IAR FC	19	874	122	Ν	-	N	Y	4.0	Y	Ν	Y	Ν	ΝY	'N	Ν	N	Ν	Ν	300kPa geotechnical	
UCI	Y O DR I	20	2160	147	Y	2.0	Y	Ν	-	Y	N	Y	Ν	ΝY	'N	Ν	Ν	Ν	Ν	Refer Finished Contour Plan	
URE	FG	21	1403	188	Y	2.0	Y	Ν	-	Y	N	Y	Ν	ΝY	'N	Ν	N	Ν	Ν	Restriction Line	
DEVE	EOTE	22	1247	185	Y	2.0	Y	Ν	-	Ν	Y	Y	N	NY	Ń	N	N	N	Ν	210kPa geotechnical ultimate bearing capacity. Refer Finished Contour Plan	HEOTH
LOPM	CHNI AL L	23	1339	196	Y	2.0	Y	Ν	-	Ν	Y	Y	N	ΝY	Ń	N	N	N	Ν	(Figure 03) for Building Restriction Line	CHNI
ENT (	CAL	24	1,382	152	Ν	-	N	Y	3.0	Ν	N	N	N	N Y	'N	N	N	Ν	Ν	300kPa geotechnical ultimate bearing capacity.	CAL
ğ	DA	25	1051	177	Ν	-	N	Y	5.0	N	Y	Ν	Ν	ΝY	'N	Ν	Ν	Ν	Ν	210kPa geotechnical	
E	E	26	896	183	Ν	-	N	Y	7.0	N	Y	Ν	Ν	ΝY	'N	Ν	Ν	Ν	Ν	ultimate bearing capacity.	
	-	27	585	102	Ν	-	N	Y	8.0	N	Y	Ν	Ν	ΝY	' N	Ν	Ν	Ν	Ν		$\cup$
		28	771	165	Y	2.0	Y	Ν	-	Y	N	Ν	Ν	ΝY	ΎΝ	Ν	Ν	Ν	Ν		$\bigcap$
T	$\ge$	29	755	11 blows per 100mm	Y	2.0	Y	Ν	-	Y	N	N	Ν	ΝY	'N	Ν	N	Ν	Ν	300kPa geotechnical	G3
VE Ju		31	797	204	Y	1.0	Y	Ν	-	Y	N	Ν	Ν	ΝY	' N	Ν	Ν	Ν	Ν	utilitate bearing capacity.	$\bigcirc$
RSIO ly 201	0	32	601	204	N	-	Y	N	-	Y	N	Ν	Ν	ΝY	ΎΝ	N	Ν	Ν	Ν		
1 NI	ಬ														-	-					
													$\left  \right $		+	┢					
[-]															┼	$\vdash$					
		L		1		1	1											L			

Appendix B: Pre Development Investigation Records



										Borehole ID.	BH501
C۲	hai	noor	in	a I	~~	. (	Carad Barabala			sheet:	1 of 2
	igi	neer	ļ	y L	<u>.0</u>	<u> </u>				project no.	GENZTAUC12590AB
clien	it:	Hugh C	Gree	en Lt	d					date started:	27 Aug 2014
princ	cipal:									date complet	ed: 27 Aug 2014
proje	ect:	Stage :	5 Ba	allint	toy P	ark, T	Tauranga			logged by:	SLC
locat	tion:	Betwee	en L	.ot 6	7 an	d 68				checked by:	EPD
positi	on: E:	376,459; N:	802,	136 (B0	OPC20	00)	surface elevation: 73.5 m (MOTL	JRIKI)	;	angle from horizontal:	90°
drill m	nodel: N	/lorooka, Tr	ack m	nounte	d		drilling fluid: None			nole diameter : 75 mm	vane id.:
drilli	ng info	rmation samples.			mate	erial sub	stance material description		्र अ	estimated defec	t additional observations and
nethod & support	ore run details	field tests & Is(50) (MPa) a = axial; d = diametral	3L (m)	lepth (m)	jraphic log	classification	SOIL TYPE:plasticity or particle characteristic colour, secondary and minor components ROCK TYPE:grain characterisics, colour, structure, minor components	noisture	consistency / elative densit	strength spacin (mm)	(type, inclination, planarity, roughness, coating, thickness, other)
	0 -		ш	0		0 %	ORGANIC SILT: non plastic, black	M	F		TOPSOIL FILL
AD	TCR= 100%		-73				SILT: low plasticity, pale grey brown,	_	н		
SPT PA	TCR= 89%	SPT 2, 3, 3, 3, 3, 3, 3	-72	-			minor fine grained sand, some topsoil inclusions, moist, hard.				
AD	TCR= 100%	N - 12	- -71	2.0			SILT: low plasticity, orange brown, moist, very stiff.	_	VSt		YOUNGER ASHES
	TCR= 78%	SPT 1, 1, 1, 2, 2, 2 N*=7	- -70	3.0	-						
AD	TCR= 100%		_	4.0-	-						
SPT	TCR= 89%	SPT HW/50mm, 1, 0, 0, 1, 0, 0 N*=1	-69	- 5.0			Sandy SILT: low to medium plasticity, orange brown, moist, soft. 5.00 m: becoming pale grey brown		S		HAUPARU TEPHRA
AD	TCR= 100%		-68	-			5.50 m: becoming pale grey	_			
<b>V</b>				<u> </u>	-	-	moist. loose.	cation	Consistency /	weathering & altera	tion* defect type planarity
Meti AS AD CB W NML0 NQ HQ PQ SPT	hod & si auger s auger o claw or washbo C NMLC wireline wireline standa test	upport screwing drilling r blade bit ore core (51.9 mm) e core (63.5mm e core (63.5mm e core (63.5mm d penetration		re detai R = Total R = Solid D = Rock tter Lev. wate Corr part	IS I Core Re I Core Re k Quality Oct., 73 V el on Dat er inflow nplete dril ial drilling	covery (% covery (% Designatio Vater e shown ling fluid loss	samples & field tests     classifi symbol       U## undisturbed sample     Based on       ##mm diameter     Classific       D     disturbed sample       B     buik disturbed sample       E     environmental sample       HP     hand penetrometer (kPa)       N     standard penetration test (SFT       NC     SPT - sample recovered       VS     vane shear;       peak/remouded (kPa)     S       R     refusal	Cation S → Unified ation System Ye st urated stic limit id limit	VS very soft S soft F firm St stiff VS very stiff H hard Fb friable VL very loose L loose MD medium de D dense VD very dense	RS residual soil CW completely weath HW highly weathered MW moderately weath SW slightly weathered UW unweathered W replaced with A for al strength VW very weathered W weak MS moderately strong S strong VS very strong ES extremely strong	BS bedding step PT parting CU curved JT joint UN undulating hered SZ shear zone ST stepped d SS shear surface IR Irregular CO contact Iteration SC crushed seam SM seam POL polished SN stain SO smooth VN veneer RO rough VR very rough



		•									Borehole II	<b>)</b> .	BH501
Er	nai	noor	in	аI	~~	. (	Corod Borobolo				sheet:		2 of 2
	iyi	lieei		y L	-0	<u> </u>					project no.		GENZTAUC12590A
clien	t:	Hugh (	Gre	en Li	td						date started	d:	27 Aug 2014
princ	ipal:										date compl	eted:	27 Aug 2014
proje	ect:	Stage	5 B	allin	toy P	ark, i	Tauranga				logged by:		SLC
locat	ion:	Betwee	en L	.ot 6	7 an	d 68					checked by	<i>r</i> :	EPD
positi	on: E:	376,459; N	: 802,	136 (B	OPC20	00)	surface elevation: 73.5 m (MOTU	RIKI)		ang	le from horizonta	al: 90°	,
drill m	odel: N	Morooka, Tr	rack n	nounte	d mate	orial sub	drilling fluid: None			hole	e diameter : 75 m	ım	vane id.:
unin		samples,				5	material description		sity	ø	estimated de	fect	additional observations and
nethod & support	tore run details	a = axial; d = diametral	3L (m)	lepth (m)	jraphic loç	classificati symbol	SOIL TYPE:plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE:grain characterisics, colour, structure, minor components	noisture	onsistency elative den	veathering	šiengui spa (m		(type, inclination, planarity, roughness, coating, thickness, other)
	0 -	SPT		0		00	Silty CLAY: medium plasticity, orange	M	St to	> (0 )	<u> </u>	1 0 0 1	HAMILTON ASH
	TCR= 122% TCR= 100% TCR= 122%	1, 0, 0, 0, 1, 2 N*=3 SPT 1, 1, 1, 2, 2, N*=7 SPT	67 66 65	7.0-			7.10 m: becoming pale brown		VSt				
AU	TCR= 0% TCR= 100%	2, 2, 3, 3, 3, 3 N=12	-64	10.0 -			Sandy SILT: medium plasticity, pale grey, some clay, moist, hard.	_	н				WEATHERED IGNIMBRITE
			-63			а а							
	TCR=	SPT 3, 4, 4, 4, 5,											
í ,	100%	6 N*=19				4							
			-62	11.0 -	-		Borehole BH501 terminated at 10.95 m Target depth						
metr AS AD CB W NML0 NQ HQ PQ SPT	auger auger claw o washb NMLC wirelin wirelin wirelin standa test	upport screwing drilling r blade bit ore core (51.9 mm e core (47.6mm e core (63.5mm e core (85.0mm ard penetration	) ) ) ) ) ) ) ) ) ) ) ) ) )	R = Tota R = Solid D = Roc ater	I Core Re d Core Re k Quality Oct., 73 V rel on Dat er inflow nplete dril tial drilling	l covery (% Designatic Vater e shown ling fluid log g fluid loss	samples & field tests classificat U## undisturbed sample ##mm diameter Based on D disturbed sample E environmental sample HP hand penetrometer (kPa) N standard penetration test (SF N SPT - sample recovered N SPT - sample recovered N SPT wane shear; peak/remouded (kPa) R refusal W iliquid	t ation , Unified tion System , t t ated ic limit i limit	Consistence relative de VS very sc S soft F firm St stiff VSt very st H hard Fb friable VL very lo L loose VD very de	cy / nsity off ose n dense ense	weathering & alt weathering & alt CW completely we HW highly weathe MW moderately w Ws slightly weath UW unweathered Wr eplaced with A fo strength VW very weak W weak MS moderately str S strong VS very strong ES extremely stro	eathered eathered eathered ered or alteration	Image: Constraint of the system         Defact type         planarity           BS         bedding shear         PL         planar           PT         parting         CU         curved           JT         joint         UN         undulating           JS         stear zone         ST         stepped           SS         shear surface         IR         irregular           CO         contact         ior         SM         seam           roughness         coating         SL         slickensided         CN         clean           POL         polished         SN         stain         SO         smooth         VN         veneer           RO         rough         CO         coating         VR         very rough         VR         very rough



			-									Boreho	ole ID.	BH502
	C.	nai	noor	in	a I	~	• _ C	orad Barabala				sheet:		1 of 2
-		iyi	neer		y L	<u>.0</u>	J - C					project	no.	GENZTAUC12590AB
	clier	nt:	Hugh G	Gree	en Lt	d						date st	arted:	27 Aug 2014
	prin	cipal:										date co	ompleted:	27 Aug 2014
	proj	ect:	Stage &	5 Ba	allint	oy F	Park, T	auranga				logged	l by:	SLC
_	loca	ition:	Near to	р о	of Loa	t 203	3					checke	ed by:	EPD
ſ	posit	ion: E:	376,630; N:	802,1	164 (BC	OPC20	)00)	surface elevation: 112.0 m (MO	TURIKI)		ang	le from hor	izontal: 90°	
ł	drill r drill	nodel: N ina info	Morooka, Tra	ack m	nounted	mat	erial sub	drilling fluid: None			hole	e diameter :	: 75 mm	vane id.:
İ	thod &	e run stails	samples, field tests & Is(50) (MPa)	(m)	pth (m)	Iphic log	ssification	material description SOIL TYPE:plasticity or particle characteristic colour, secondary and minor components ROCK TYPE:grain characterisics, colour,	isture indition	isistency / ative density	athering & eration	estimated strength	defect spacing (mm)	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other)
ŀ	ang sup	o eb	d = diametral	112	dep	dra	cla syr	Structure, minor components	e is M	con	alte	S S S S S S	20 20 2000 2000	particular general
				- -111				GRGANIC SILT: non plastic, plack, fine rootlets in top 100mm, moist. SILT: low plasticity, pale brown, moist, stiff.	M	St				YOUNGER ASHES
				-110	- 2.0— -			Sandy SILT: low plasticity, orange brown, sand is fine to medium grained, moist to wet, soft.	M to W	'S				HAUPARU TEPHRA 
					-		- - -	Silty SAND: fine to medium grained, uniform, pale grey, moist to wet, loose.		L				ROTOEHU ASH
				-109	3.0			<b>Clayey SILT</b> : medium plasticity, dark brown, moist, very stiff.	M	VSt				HAMILTON ASH
				-108	4.0									-
				-107	- 5.0 - - -			4.80 m: becoming pale brown						- - - - - - - -
	Met AS AD CB W NML NQ HQ PQ SPT	thod & s auger auger claw o washb C NMLC wirelin wirelin wirelin standa test	upport screwing drilling r blade bit ore core (51.9 mm) ie core (65.9 mm) ie core (65.5mm) ard penetration		re detail R = Total R = Solid D = Rock ter Leve wate com parti	Core Re Core Re Core Re Quality Oct., 73 V el on Dat er inflow plete dri ial drillin	acovery (%) acovery (%) Designation Water te shown Iling fluid loss	samples & field tests         classifiest           U## undisturbed sample ##mm diameter         Based of Based of Based of Based of Classifiest           n(%)         D         disturbed sample environmental sample           HP         hand penetrometer (kPa) N standard penetration test (SFThoistu N* SPT - sample recovered Nc SPT with solid cone peak/remouded (kPa) R refusal         D         driv model Standard penetration test (SFThoistu N* SPT - sample recovered Standard penetration test (SFThoistu N* SPT - sample recovered N* SPT - sample recovered N* SPT         M         W	rication ols on Unified cation System re ist t urated stic limit uid limit	consistem relative de VS verys S soft F firm St stiff VSt verys H hard Fb friable VL veryt D dense VD very c	soft stiff e oose um dense dense	weathering RS residua CW comple HW highly MW moder: SW slightly UW unweat "W replaced v strength VW very we W weak MS moders S strong VS very str ES extreme	J & alteration* al soil tely weathered weathered ately weathered weathered weathered whered with A for alteratio eak ately strong rong ely strong	defect type     planarity       BS     bedding shear     PL     planar       PT     parting     CU     curved       JT     joint     N     undulating       SZ     shear zone     ST     stepped       SS     shear surface     IR     Irregular       CO     contact     R     stepped       SM     seam     Station     Station       POL     polished     SN     stain       SO     smooth     VN     veneer       RO     rough     CO     coating       VR     very rough     VR     very rough



											Boreho	ole ID.	BH502
C۲	nai	noor	in	~ I	~		Carad Barabala				sheet:		2 of 2
	iyi	lieei		y L	-06	) - C					project	no.	GENZTAUC12590
clien	t:	Hugh (	Gree	en Li	td						date sta	arted:	27 Aug 2014
princ	ipal:										date co	ompleted:	27 Aug 2014
proje	ect:	Stage a	5 Ba	allin	toy P	ark, 1	Fauranga				logged	by:	SLC
locat	ion:	Near to	ор о	of Lo	t 203	8					checke	ed by:	EPD
positi	on: E:	376,630; N:	802,	164 (B	OPC20	00)	surface elevation: 112.0 m (MOTL	JRIKI)		ang	le from hori	zontal: 90°	
drill m drilli	odel: N	Morooka, Tr	ack n	nounte	d mate	rial sub	drilling fluid: None			hole	e diameter :	75 mm	vane id.:
ethod & pport	etails	samples, field tests & Is(50) (MPa)	(m) -	pth (m)	aphic log	assification mbol	material description SOIL TYPE:plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE:grain characterisics, colour, churchurg, minor components	oisture ndition	ative density	eration	estimated strength	defect spacing (mm)	additional observations and defect descriptions (type, inclination, planarity, roughne coating, thickness, other)
ns	8 9	d = diametral	126 196	de	dıs dıs	sy cla	Silty CLAY: high plasticity pale	Ĕ S M	os≣ ≸ VSt	alt	E < s ¥ < s	500000	particular gene
AD		DS	- -105 - -104 - - 103 -	7.0			9.00 m: becoming pale brown		S				
			- 101	11.0 -			10.50 m Target depth						
metř AS CB W NMLO NQ HQ PQ SPT	nod & s auger auger claw o washb C NMLC wirelin wirelin standa test	upport screwing drilling r blade bit ore core (51.9 mm) e core (51.9 mm) e core (63.5mm e core (63.0mm ard penetration	CO TC SC RC ) ) Wa ) )	R = Tota R = Solia D = Roc ater 10 Lev wat cor par	Il Core Re d Core Re & Quality Oct., 73 V rel on Dat rer inflow nplete dril tial drilling	covery (%) covery (%) Designation Vater e shown ling fluid lo g fluid loss	samples & field tests         classific symbols           U## undisturbed sample ##mm diameter         Based on i           D         disturbed sample           B         bulk disturbed sample           HP hand penetrometral sample         Classificat           HP hand penetrometret (kPa)         N           N SPT - sample recovered         M           N°         SPT with solid cone           VS vane shear; peak/remouded (kPa)         W           R         refusal	ation Unified ion System ated c limit limit	Consistency relative dense VS very soft S soft F firm VSt very stiff H hard Fb friable VL very loos L loose MD medium of D dense VD very dense	/ sity e dense se	weathering RS residual CW complet HW highly v MW modera SW slightly UW unweath *W replaced w strength VW very we W weak MS moderal S strong VS very str ES extreme	& alteration* I soil tely weathered weathered weathered hered hered hered tith A for alteratio ak tely strong ong aly strong	defect type         planarity           BS         bedding shear         PL         planar           PT         paring         CU         curved           JT         joint         UN         undulating           SZ         shear zone         ST         stepped           CO         contact         IR         Irregular           CO         contact         IR         stepped           SS         stekensided         CN         clean           POL         polished         SN         stain           SO         smooth         VN         veneer           RO<





client:

### principal:

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EXCAVATION

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GENZTAUC12590AB project no. Hugh Green Ltd 28 Aug 2014 date excavated: 28 Aug 2014 date completed: Stage 5 Ballintoy Park, Tauranga logged by: SLC **EPD** Lot 2 checked by: position: E: 376,615; N: 802,048 (BOPC2000) surface elevation: 94.0 m (MOTURIKI) pit orientation: equipment type: 12t Excavator Track excavation method: excavation dimensions: vane id.: DR4523 excavation information material substance consistency / relative density material description vane structure and class ification g shear ⊕ remoulde ⊙ peak samples & additional observations Ē moisture condition SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components field tests graphic I symbol Ē depth ( water (kPa) Ч ORGANIC SILT: non plastic, black TOPSOIL | | | |YOUNGER ASHES Sandy SILT: non plastic, orange brown, sand is St to fine to medium grained, stiff to very stiff. VSt |||||93.5 0.5 | | |||||el Io 111 93.0 1.0 ⊕⊚||| ||||1111 92.5 1.5 ||||||¢¦ 2.0 92.0 Ð Not Encountered ||||||||||||||||2.5 -91.5 €i⊙ii 91.0 3.0 |||||||||€o 35 90.5 Gravelly SAND: fine to coarse grained, well S HAUPARU TEPHRA o, graded, orange, gravels are fine grained completely weathered pumice. Crushes to wet silt when St HAMILTON ASH reworked, soft. |||||Silty CLAY: medium plasticity, pale brown, stiff. 90.0 4.0 ⊕lol I I CLAY: medium plasticity, pale grey brown with black and purple grey specks, stiff. -89.5 4.5 |||||||||||1111 ||||||89 N | 5.0 Test pit TP502 terminated at 5.0 m Target depth | | | | |-88.5 5.5 classification symbol & samples & field tests consistency / relative density penetration soil description undisturbed sample ##mm diameter U## VS very soft 2 0 based on Unified natural exposure D disturbed sample s soft no resistance Classification System existing excavation firm 1 backhoe bucket

Excavation ID.

sheet:

**TP502** 1 of 1

St

H Fb

VL

MD

D

VD

L

VSt

moisture

D

М

w wet

W,

dry moist

W<sub>P</sub> plastic limit

liquid limit

stiff

hard

friable

loose

dense

very loose

very dense

medium dense

very stiff



Hugh Green Ltd client:

## principal:

### project: Stage 5 Ballintoy Park, Tauranga

Lot 2 location:

Excavation ID. TP503 sheet: 1 of 1 GENZTAUC12590AB project no. date excavated: 28 Aug 2014 28 Aug 2014 date completed: logged by: SLC EPD checked by:

	posi	ition	: E: 3	76,6	56; N: 802	2,075 (B	OPC20	) 000		surface elevation: 95.5 m (MOTURIKI)	pit	orientatio	n:	
	equ	ipm	ent typ	be: 12	2t Excava	tor Trac	k			excavation method:	excavation d	imension	<b>S</b> :	vane id.:
	exc	cava	ation i	nfor	mation			mate	erial sub	stance				
	nethod	support	penetration	vater	samples field tests	ar (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture	consistency / elative density	vane shear ⊕ remoulded ⊚ peak (kPa)	structure and additional observations
ŀ		N N	- ~ ~			95.5		$ \rangle$	0 0	ORGANIC SILT: non plastic, black		, 02	0 = = 0	TOPSOIL
						-95.0	- - 0.5			SILT: non plastic, orange brown, some fine grained sand, stiff to very stiff.		St to VSt	_                                 ⊕	YOUNGER ASHES
09/09/2014 13:35						-94.5	- 1.0 -							-
< <drawingfile>&gt; (</drawingfile>						-94.0	- 1.5 - -						⊕©     	
S SLC 270814.GPJ				lot Encountered		-93.5	- 2.0 - -			Clayey SILT: low to medium plasticity, brown, becoming pale brown at 2.4m, semi friable, stif very stiff.	ff to			
S AND TEST PILS				Z		-93.0	2.5	0 0 0 0 0 0 77777		Gravelly SAND: fine to coarse grained, well graded, orange, gravels are fine grained comp weathered pumice. Gravel becomes wet silt wi reworked, soft.	pletely hen	S		
12590AB AUGERS						-92.5	3.0 — - -			CLAY: medium to high plasticity, pale grey bro with black specks (possible manganese)., stiff.	wn	St		HAMILTON ASH
TION GENZTAUC						-92.0	3.5							-
g COF EXCAVA						-91.5	4.0			Silty SAND: fine to medium grained, poorly		MD	⊕  @               	WEATHERED IGNIMBRITE
ev:AO Lo	<b>,</b>					-91.0	- 4.5			graded, pale grey mottled orange brown with b specks., medium dense.	Ласк			-
CDF_0_9_05_LIBRARY.GLB						-90.5	5.0			Test pit TP503 terminated at 4.6 m Target depth				
	method     −90.0       method     penetra       N     natural exposure       X     existing excavation       BH     backhoe bucket       B     bulldozer blade       R     ripper       E     excavator       support     N       N     none       S     shoring				10-Oct level o water i	no resis ranging refusal -12 wat n date s nflow putflow	stance to er shown	samples & field tests         U##       undisturbed sample         D       disturbed sample         B       bulk disturbed sample         E       environmental sample         HP       hand penetrometer (kPa)         N       standard penetration test (SPT)         N*       SPT - sample recovered         Nc       SPT with solid cone         VS       vane shearpeak/remouded         (uncorrected kPa)       R         R       refusal	Classifi soi bas Classi moisture D dry M moist W <sub>p</sub> plasti W <sub>p</sub> plasti W <sub>k</sub> liquid	cation syn descriptie ed on Unifi fication Sy: : limit limit	h <b>bol &amp;</b> on ed stem	consistency / relative density         VS       very soft         S       soft         F       firm         St       stiff         VSt       very stiff         H       hard         Fb       friable         VL       very loose         L       loose         MD       medium dense         D       dense         VD       very dense		



Hugh Green Ltd client:

## principal:

### project: Stage 5 Ballintoy Park, Tauranga

Lot 2 location:

Excavation ID. **TP504** sheet: 1 of 1 GENZTAUC12590AB project no. date excavated: 28 Aug 2014 28 Aug 2014 date completed: logged by: SLC EPD checked by:

р	osition: E: 376,695; N: 802,094 (B						OPC20	) 000		surface elevation: 97.0 m (MOTURIKI)		pit ori	entation	:		
e	quip	me	nt typ	e: 12	2t Excava	tor Trac	k			excavation method:	excavati	on dim	ensions	-		vane id.: DR4523
Ŀ	xca	vat	ion i	nfor	mation			mate	erial sub	stance			1			
method	support		penetration	water	samples & field tests	s la s	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic colour, secondary and minor components	>,	moisture condition	consistency / relative density	va she ⊕rem ⊙p (kF	ear noulded peak Pa)	structure and additional observations
Ā	N	Ţ	3 10			97.0		$ \rangle$	0 0	ORGANIC SILT: non plastic, black		2 0	02		1	TOPSOIL
							-									-
						-96.5	0.5			SILT: low plasticity, orange brown, very stiff to hard.			VSt to H			YOUNGER ASHES
							-									
014 13:35						-96.0	- 1.0 —							 ⊕   	 ⊕  	-
> 09/09/2							-									-
awingFile>						-95.5	1.5							⊕   	₽  	
GPJ < <dr< td=""><td></td><td></td><td></td><td></td><td></td><td>-05.0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td></dr<>						-05.0										-
-C 270814				ountered		90.0	2.0									-
ST PITS SI				Not Enc		-94.5	2.5-			Sandy SILT: non plastic, pale brown, sand is t	fine				  ⊕	-
S AND TE							-			grained, very stiff to hard.						-
AB AUGER					-94.0	3.0									-	
UC12590/							-							⊕i i     	)     	
I GENZTA						-93.5	3.5	0 0 0 0	c	Gravelly SAND: fine to coarse grained, well graded, orange, gravels are fine grained comp	pletely		L			
CAVATION						-93.0	- - 4.0			reworked, loose. Sandy SILT: non plastic, pale brown, sand is t	fine					ROTOEHU ASH
g COF EX			     				-			Silty SAND: fine grained, uniform, pale grey, s silt inclusions <20mm, loose.	some		St	-     ⊕ ⊙  		HAMILTON ASH
rev:AO Lo						-92.5	4.5			Silty CLAY: high plasticity, pale grey brown wi black specks, trace coarse grained sand, stiff.	ith					-
KY.GLE	V									Toot pit TD504 terminated at 4.9 m						-
05_LIBRA						-92.0	5.0			Target depth						-
CDF_0_9_							-									
						-91.5	5.5 —									
	method     p       N     natural exposure       X     existing excavation       BH     backhoe bucket       B     bulldozer blade       R     ripper       E     excavator       support     None       S     shoring			vater	10-Oct level o water i water o	no resis ranging refusal -12 wat n date nflow putflow	stance j to ser shown	samples & field tests       U##     undisturbed sample       D     disturbed sample       B     bulk disturbed sample       E     environmental sample       HP     hand penetrometer (kPa)       N     standard penetration test (SPT)       N*     SPT - sample recovered       Nc     SPT with solid cone       VS     vane shearpeak/remouded       (uncorrected kPa)       R     refusal	Cla C mois D c M n W v W <sub>P</sub> F W <sub>L</sub> li	assificat soil de based Classific ture dry noist vet blastic lim iquid lim	tion syml escriptio on Unifie ation Sys mit	<b>bol &amp;</b> n d tem		consistency / relative density       VS     very soft       S     soft       F     firm       St     stiff       VSt     very stiff       H     hard       Fb     friable       VL     very loose       L     loose       MD     medium dense       D     dense		
	S	sh	oring				water o	outflow		R refusal		iquiu iii				D VD



Hugh Green Ltd client:

## principal:

### project: Stage 5 Ballintoy Park, Tauranga

Lot 2 location:

Excavation ID. **TP505** 1 of 1 sheet: GENZTAUC12590AB project no. date excavated: 28 Aug 2014 28 Aug 2014 date completed: logged by: SLC checked by: EPD

	position: E: 376,713; N: 802,061 (BOPC2000) surface elevation: 97.5 m (MOT									surrace elevation: 97.5 m (MOTURIKI)	n (MOTURIKI) pit orientation:			
L	equ	ipme	nt typ	e: 1	2t Excavato	or Trac	k			excavation method:	excavation din	nensions:	vane id.: DR4523	
	exc	cavat	tion i	nfor	mation			mate	erial sub	stance				
			tion		samples 8			ŋ	tion	material description		<u>, is</u> vane	structure and	
	po	tio	netra	5	field tests	Ê	h (m)	hic lo	sifica bol	SOIL TYPE: plasticity or particle characteristic	, sture	e e d si e d si e d o peak		
	met	supp	be 	wate		RL (	dept	grap	sym	colour, secondary and minor components	mois	(kPa) 200 (kPa)		
Ī	<b>A</b>	N				97.5	_	$ \rangle$		ORGANIC SILT: non plastic, black, rootlets in	top M		TOPSOIL	
							-	$ \rangle$		100mm, moist.			-	
							_			SILT: non plastic, orange brown, some fine to		St to H	YOUNGER ASHES	
			::			-97.0	0.5-			medium grained sand, moist, sun to hard.		⊕ ⊙	_	
			!!				-						-	
22			::				-						-	
4 13:0		II I				-96.5	1.0						_	
9/201			¦				-						-	
0/60 <		į	ii				-						-	
File>:						-96.0	1.5-					⊕⊚	_	
awing		į	i i l				-						-	
Ş							-						-	
4.GPJ		į	ii			-95.5	2.0						-	
27081				tered			_						-	
SLC 2		i	11	noor			_			2.2 m: with minor clay, becoming pale brown			-	
PITS	ш́			Vot Er		-95.0	25-						-	
TEST		į	ii	-		00.0							-	
AND							-					V\$ UTP	-	
GERS		Шį	i i l			04.5	20						-	
AU(						-94.5	3.0	o o	¢	Gravelly SAND: fine to coarse grained, well	d	S	HAUPARU TEPHRA	
2590/		į	i i				-	o o	¢	completely weathered pumice. Gravel become	es wet		-	
AUC1							-			Silt when reworked, moist, soft.	fine	St	-	
ENZT		Шį	ii			-94.0	3.5			to medium grained sand, moist, stiff.			-	
9 NO			¦				-	<u>XXX</u>		Gravelly SAND: fine to coarse grained, well		S	-	
<b>VATI</b>		II į					_	o. o		graded, brown orange, gravels are fine graine completely weathered pumice. Gravel become	d es wet		-	
EXC/						-93.5	4.0	o o o	c	silt when reworked, moist, soft.				
COF		!	!!				-	0 0 0	e				-	
D Log							-			SILT: low plasticity, pale cream brown, some f	ine	St	ROTOEHU ASH [?]	
rev:A(			11			-93.0	4.5-			to meulum graineu sanu, moist, stiff.			-	
.GLB	<b>↓</b>  ,	<b>↓</b>   ¦					-					۩	-	
RARY	+						_			Test pit TP505 terminated at 4.8 m				
5_LIB						-92.5	5.0			i arget depth			-	
0_0_0							-						-	
CDF							-						-	
						-92.0	5.5 —							
ſ	m	ethod				penetra	tion	-	·I	samples & field tests	classifica	ation symbol &	consistency / relative density	
	N natural exposure				- N I	<u>,</u>			U## undisturbed sample ##mm diameter D disturbed sample	based	d on Unified	VS very soft S soft		
	X R⊦	ex H ha	isting	exca	vation ket		1	no resis ranging	stance to	B bulk disturbed sample	Classifi	cation System	F firm	
	B	bu	illdoze	r bla	de			refusal		HP hand penetrometer (kPa)	moisture		VSt very stiff	
	к Е	rip ex	per cavat	or	· · ·	water	10-0-1	t-12 wat	er	N         standard penetration test (SPT)           N*         SPT - sample recovered	D dry M moist		H hard Fb friable	
	support			shown	Nc SPT with solid cone VS vane shearpeak/remouded	W wet W <sub>P</sub> plastic I	limit	VL very loose L loose						
	N none S shoring				water o	outflow		(uncorrected kPa) R refusal	W <sub>L</sub> liquid lin	nit	MD medium dense D dense			
	S shoring					'	1				1		VD very dense	



Hugh Green Ltd client:

Lot 203

## principal:

location:

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### project: Stage 5 Ballintoy Park, Tauranga

sheet: 1 of 1 GENZTAUC12590AB project no. date excavated: 28 Aug 2014 28 Aug 2014 date completed: logged by: SLC checked by: EPD

**TP506** 

Excavation ID.

ſ	position: E: 376,592; N: 802,094 (BOPC2000)									surface elevation: 102.5 m (MOTURIKI)	pit	orientatior	n:	
L	equi	ipme	ent ty	be: 1	2t Excava	tor Trac	k			excavation method:	excavation d	imensions	3:	vane id.: DR4523
	exc	ava	tion	infor	mation			mate	erial sub	stance				
	nethod	noddns	penetration	vater	samples field test	% %	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic colour, secondary and minor components	j. moisture	consistency / consistency / elative density	vane shear ⊕remoulded ⊚ peak (kPa)	structure and additional observations
ľ		N		_		102.5	-	Š		ORGANIC SILT: non plastic, black, moist.	M			TOPSOIL
						-102.0	- - 0.5 -			<b>SILT</b> : non plastic, orange brown, minor fine grained sand, moist, stiff to very stiff.		St to VSt	●	YOUNGER ASHES
3/09/2014 13:35						-101.5	- - 5 1.0 <i></i> -						+         ⊕   ⊙    	
:DrawingFile>> 09						-101.0	- - 1.5 -						 ⊕ ⁰     	
LC 270814.GPJ <<				ountered		-100.5	- 2.0	0 0 0 0 0 0 0 0 0		Gravelly SAND: orange brown, moist, soft.		S	<sup>1</sup>           ⊕⊕                   	HAUPARU TEPHRA
ID TEST PITS SI	ш   			Not Enco		-100.0	- 2.5 -	0	c	Sandy SILT: low plasticity, pale brown, some grained sand, moist, soft to firm.	fine	S to F		ROTOEHU ASH
2590AB AUGERS AN						-99.5	- 3.0— -			2.8 m: becoming pale brown				-
I GENZTAUC1						-99.0	- 3.5 -			INTERBEDDED SILTY SAND AND SANDY S		L		-
g COF EXCAVATION						-98.5	- - 4.0 - -			sits are non to low plasticity, pale brown, mind to medium grained sand. Sands are fine to me grained, pale brown, moist, loose.	or fine edium			
GLB rev:AO Lo						-98.0	4.5			Clayey SILT: non plastic, dark brown, dry, har	rd. D	н	- γs υτρ	HAMILTON ASH
0_9_05_LIBRARY						-97.5	5.0	<u>~~~</u>		Test pit TP506 terminated at 4.8 m Target depth				-
CDF						-97.0	5.5-							
	method     p       N     natural exposure       X     existing excavation       BH     backhoe bucket       B     bulldozer blade       R     ripper       E     excavator       support     N       N     none       S     shoring								stance to er shown	samples & field tests         U##       undisturbed sample         D       disturbed sample         B       bulk disturbed sample         E       environmental sample         HP       hand penetrometer (kPa)         N       standard penetration test (SPT)         N*       SPT - sample recovered         Nc       SPT with solid cone         VS       vane shearpeak/remouded         (uncorrected kPa)       R         R       refusal	classifi         soil           bas         classifi           Classi         classifi           moisture         D           D         dry           M         moist           W         wet           W <sub>p</sub> plastic           W <sub>k</sub> liquid	cation sym descriptio ed on Unifie fication Sys	abol & on ed stem	consistency / relative density         VS       very soft         S       soft         F       firm         St       stiff         VSt       very stiff         H       hard         Fb       friable         VL       very loose         L       loose         MD       medium dense         D       dense         VD       very dense



client: Hugh Green Ltd

## principal:

## project: Stage 5 Ballintoy Park, Tauranga

location: Lot 203

 Excavation ID.
 TP507

 sheet:
 1 of 1

 project no.
 GENZTAUC12590AB

 date excavated:
 28 Aug 2014

 date completed:
 28 Aug 2014

 logged by:
 SLC

 checked by:
 EPD

	position: E: 376,566; N: 802,140 (BOPC2000 )									surface elevation: 99.0 m (MOTURIKI)	pit orientation:					
	equi	pme	ent typ	e: 12	2t Excava	itor Trac	k			excavation method:	excavat	ion dime	ensions	:		vane id.: DR4523
	exc	cava	tion i	nfor	mation			mate	rial subs	tance						
	nethod	lioddn	penetration	/ater	samples a field tests	sr (m)	epth (m)	raphic log	lass ification ymbol	material description SOIL TYPE: plasticity or particle characteristic colour, secondary and minor components	, ,	ondition	onsistency / elative density	var she ⊕remo ⊙pe	ne ear <sup>Dulded</sup> eak	structure and additional observations
ŀ		<u>v</u> –	9 M	>		- 99.0	0	n N	0 00	ORGANIC SILT: non plastic, black, moist.		M	02	8 5	1 1	TOPSOIL
							-									-
						-98.5	0.5			SILT: non plastic, pale brown, moist, stiff.			St			YOUNGER ASHES
09/2014 13:35						-98.0	- 1.0							 ⊕ ⊙ 		
/ingFile>> 09/0						-97.5	- - 1.5							     ⊕  ♀		
I.GPJ < <draw< td=""><td></td><td rowspan="4"></td><td></td><td>untered</td><td></td><td>-97.0</td><td>2.0-</td><td></td><td></td><td>Sandy SILT: non plastic, orange brown, sand fine to medium grained, moist, stiff. Silty SAND: fine to coarse grained, moist, stiff</td><td>is</td><td></td><td>۩                </td><td></td><td></td></draw<>				untered		-97.0	2.0-			Sandy SILT: non plastic, orange brown, sand fine to medium grained, moist, stiff. Silty SAND: fine to coarse grained, moist, stiff	is		۩       			
S SLC 270814	Ξ.			Not Enco			-	2.5		SILT: low plasticity, pale brown, moist, stiff.						
S AND TEST PIT						-96.5	2.5									
590AB AUGER:						-96.0	3.0— -			INTERBEDDED SILTY SAND AND SANDY SI silts are non to low plasticity, pale brown, mino to medium grained sand. Sands are fine to me	LT: or fine edium		L			ROTOEHU ASH
GENZTAUC12						-95.5	5 3.5-			grained, pale brown, moist, loose.						
F EXCAVATION						-95.0	- 4.0			Clayey SILT: non plastic, dark brown, becomin	ng	D	Н	       /s u	       	
g CO	¥   1						-	XX							  -	-
.GLB rev:AO Lo						-94.5	4.5 4.5			Test pit TP507 terminated at 4.3 m Target depth						-
05_LIBRARY						-94.0	- 5.0									
CDF_0_9						-93.5	- - 5.5									
	method     p       N     natural exposure       X     existing excavation       BH     backhoe bucket       B     bulldozer blade       R     ripper       E     excavator       support     N       N     none       S     shoring					-93.5 5.5 penetration ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow water outflow				samples & field tests       U##     undisturbed sample       D     disturbed sample       B     bulk disturbed sample       E     environmental sample       HP     hand penetrometer (kPa)       N     standard penetration test (SPT)       N*     SPT - sample recovered       Nc     SPT with solid cone       VS     vane shearpeak/remouded       (uncorrected kPa)       R     refusal	Cl mois D M W W P W L	assificat soil de based Classifica sture dry moist wet plastic lin liquid limi	ion syml scriptio on Unifie titon Sys	bol & n ed tem		consistency / relative density         VS       very soft         S       soft         F       firm         St       stiff         VSt       very stiff         H       hard         Fb       friable         VL       very loose         L       loose         MD       medium dense         D       dense         VD       very dense



client: Hugh Green Ltd

## principal:

## project: Stage 5 Ballintoy Park, Tauranga

location: Lot 203

Excavation ID.**TP508**sheet:1 of 1project no.**GENZTAUC12590AB**date excavated:28 Aug 2014date completed:28 Aug 2014logged by:SLCchecked by:EPD

ſ	oosition: E: 376,538; N: 802,172 (BOPC2000)									surface elevation: 92.5 m (MOTURIKI)	pit or	rientation:	
	equ	ipm	ent ty	pe: 1	2t Excav	ator Trac	k			excavation method:	excavation dim	nensions:	vane id.: DR4523
ļ	excavation information							mate	erial sub	stance			
	method	support	penetration	water	samples field tes	st &	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic colour, secondary and minor components	moisture	oconsistency / relative density so (%ba) 00 00 00 00 00 00 00 00 00 00 00 00 00	structure and additional observations
ŀ		N				92.5	-	$ \rangle$		ORGANIC SILT: non plastic, black, moist.	M		TOPSOIL
						-92.0	- - 0.5			SILT: non plastic, orange brown, minor fine grained sand, moist, stiff to very stiff.		St to VSt         ⊕   ⊕         	YOUNGER ASHES
09/2014 13:35						-91.5	- - 1.0 -					                     	
DrawingFile>> 09/						-91.0	- - 1.5						-
C 270814.GPJ <<[				Icountered		-90.5	2.0-	0 0 0 0	c	Gravelly SAND: orange, moist, firm.		F	HAUPARU TEPHRA
VD TEST PITS SLO	Ú     			Not Er		-90.0	2.5-			2.2 m: becoming pale brown, sensitive			
390AB AUGERS AN						-89.5				Sandy SILT: low plasticity, pale brown, sand is grained, minor clay, some white mottles, moist to very stiff.	s fine t, stiff	St to VSt                           ⊕ ❷	ROTOEHU ASH
DN GENZTAUC12						-89.0							-
<b>J COF EXCAVATIO</b>						-88.5	4.0					         ⊕     ₀  	
3 rev:AO Lo	v	v				-88.0	4.5-			Clayey SILT: non plastic, dark brown, dry, frial very hard, dry, hard.	ble, D	H	HAMILTON ASH
DF_0_9_05_LIBRARY.GL						-87.5	5.0			Target depth			
5						-87.0	5.5-						
	method     penetration       N     natural exposure       X     existing excavation       BH     backhoe bucket       B     buildozer blade       R     ripper       E     excavator       support     N       N     none       S     shoring					vater	ation ∽ 10-Oci level o water i water o	no resis ranging refusal t-12 wat n date nflow putflow	stance to er shown	samples & field tests       U##     undisturbed sample ##mm diameter       D     disturbed sample       B     bulk disturbed sample       E     environmental sample       HP     hand penetrometer (kPa)       N     standard penetration test (SPT)       N*     SPT - sample recovered       Nc     SPT with solid cone       VS     vane shearpeak/remouded       (uncorrected kPa)       R     refusal	classifica       soil c       basec       Classific       moisture       D     dry       M     moist       W     wet       W <sub>P</sub> plastic li       W <sub>L</sub> liquid lin	ation symbol & lescription d on Unified cation System imit imit	consistency / relative density       VS     very soft       S     soft       F     firm       St     stiff       VSt     very stiff       H     hard       Fb     friable       VL     very loose       L     loose       MD     medium dense       D     dense       VD     very dense



Hugh Green Ltd client:

## principal:

### project: Stage 5 Ballintoy Park, Tauranga

Lot 203 location:

Excavation ID. **TP509** sheet: 1 of 1 GENZTAUC12590AB project no. date excavated: 28 Aug 2014 28 Aug 2014 date completed: logged by: SLC EPD checked by:

	position: E: 376,554; N: 802,191 (BOPC2000)							) 000		surface elevation: 97.0 m (MOTURIKI) pit orientation:					
	equ	ipm	ent typ	e: 1	2t Excava	tor Trac	k			excavation method:	excavation	n dime	ensions		vane id.: DR4523
	exc	cava	ation i	nfor	mation			mate	erial sub	stance					
	method	support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic colour, secondary and minor components		moisture condition	consistency / relative density	vane shear ⊕ remoulded ⊚ peak (kPa) 0 8 5 8	structure and additional observations
ł	<u> </u>	ол - N 	35			97.0	-	Ň	0 0	ORGANIC SILT: non plastic, black, moist.		M	01		
						-96.5	0.5			SILT: low plasticity, orange brown, moist, stiff very stiff.	to		St to VSt		YOUNGER ASHES
09/09/2014 13:35						-96.0	- 1.0 -							 ⊕  ©            	
< <drawingfile>&gt;</drawingfile>				intered		-95.5	- 1.5 - -			Sandy SILT: non plastic, brown orange, moist to very stiff.	i, stiff			 ⊕ ©             	HAUPARU TEPHRA
SLC 270814.GPJ	ш Ш			Not Encol		-95.0	- 2.0 - -			SAND: fine to coarse grained, well graded, ora brown, moist, loose. Sandy SILT: low plasticity, pale brown grey, m stiff.	ange noist,		L St		ROTOEHU ASH
S AND TEST PITS						-94.5	- 2.5 - -							 ⊕⊕         	
C12590AB AUGER						-94.0	3.0 — - -			Sandy SILT: pale grey, moist, stiff.					
GENZTAU						-93.5	3.5			SAND: fine grained, uniform, pale grey, moist, loose.			L	             уз.0те	
CAVATION	V,	v				93.0	- - -4.0			Clayey SILT: non plastic, dark brown, friable, whard.	dry,	D	Н		HAMILTON ASH
Log COF E)							-			Target depth					
ARY.GLB rev:AO						-92.5	4.5								
DF_0_9_05_LIBR						-92.0	5.0								
°						-91.5	5.5 -								
	method       N     natural exposure       X     existing excavation       BH     backhoe bucket       B     bulldozer blade       R     ripper       E     excavator       support     N       N     none       S     shoring					xposure excavation bucket blade r r r uncent to blade r r				samples & field tests         U##       undisturbed sample         D       disturbed sample         B       bulk disturbed sample         E       environmental sample         HP       hand penetrometer (kPa)         N       standard penetration test (SPT)         N*       SPT - sample recovered         Nc       SPT with solid cone         VS       vane shearpeak/remouded         (uncorrected kPa)       R	Clas Cla Cla Cla Cla D dr M mo W we W <sub>P</sub> pla W <sub>L</sub> liq	sificati soil de based d assifica ure y oist et astic lim uid limi	ion syml scription on Unifie tion Syst	<b>bol &amp;</b> n d tem	consistency / relative density       VS     very soft       S     soft       F     firm       St     stiff       VSt     very stiff       H     hard       Fb     friable       VL     very loose       L     loose       MD     medium dense       D     dense       VD     very dense



Hugh Green Ltd client:

## principal:

### project: Stage 5 Ballintoy Park, Tauranga

#### Between Lot 67 and 68 location:

Excavation ID. **TP510** sheet: 1 of 1 GENZTAUC12590AB project no. date excavated: 28 Aug 2014 28 Aug 2014 date completed: logged by: SLC checked by: EPD

F	position: E: 376,465; N: 802,119 (BOPC2000 )									surface elevation: 74.0 m (MOTURIKI)	pit ori	entation	12	
ŀ	qui	pm	ent ty	pe: 12	2t Excava	tor Trac	k			excavation method:	excavation dim	ensions	:	vane id.: DR4523
	exc	ava	ation	infor	mation			mate	rial sub	stance				
		penetration penetration penetration % selection (m) penetration % selection (m) penetration % selection (m) penetration % selection (m) (m) (m) ) (m) (m) (m) (m) (m) (m) (				lepth (m)	Iraphic log	lass ification symbol	material description SOIL TYPE: plasticity or particle characteristic colour, secondary and minor components	noisture	onsistency / elative density	vane shear ⊕remoulded ⊚peak	structure and additional observations	
tS AND TEST PITS SLC 270814.GPJ < <drawingfile>&gt; 09/09/2014 13:35</drawingfile>				Not Encountered W		-73.5 -73.0 -72.5 -72.0 -71.5		ō		ORGANIC SILT: non plastic, black, some brow silt inclusions, dry to moist. Sandy SILT: non plastic, brown mottled pale brown, dry to moist, hard.	vn D to M	H	000000000000000000000000000000000000	TOPSOIL FILL
IN LOG COF EXCAVATION GENZTAUCT29904B AUGEN						-71.0	3.0			SILT: non plastic, orange brown, some fine grained sand, dry to moist, stiff to very stiff.		St to VSt	VS UTP                   	YOUNGER ASHES
		1				-69.5 -69.0 -68.5	4.5			Test pit TP510 terminated at 4.6 m Target depth				
	method     penetration       N     natural exposure       X     existing excavation       BH     backhoe bucket       B     bulldozer blade       R     ripper       E     excavator       support     10-Oct-12 water       N     none       S     shoring						10-Oci level o water i	no resis ranging refusal t-12 wate n date s nflow putflow	tance to er hown	samples & field tests       U##     undisturbed sample ##mm diameter       D     disturbed sample       B     bulk disturbed sample       E     environmental sample       HP     hand penetrometer (kPa)       N     standard penetration test (SPT)       N*     SPT - sample recovered       Nc     SPT with solid cone       VS     vane shearpeak/remouded       (uncorrected kPa)       R     refusal	classifica         soil d         based         Classific         moisture         D       dry         M       moist         W       wet         Wp.       plastic lin         W_L       liquid lim	tion sym escriptio on Unific ation Sys mit mit	bol & n ed tem	consistency / relative density       VS     very soft       S     soft       F     firm       St     stiff       VS     very stiff       H     hard       Fb     friable       VL     very loose       L     loose       MD     medium dense       D     dense       VD     very dense



Hugh Green Ltd client:

## principal:

### project: Stage 5 Ballintoy Park, Tauranga

#### Between Lot 67 and 68 location:

Excavation ID. TP511 1 of 1 sheet: GENZTAUC12590AB project no. date excavated: 28 Aug 2014 28 Aug 2014 date completed: logged by: SLC checked by: EPD

position: E: 376,454; N: 802,158 (BOPC2000)									surface elevation: 74.0 m (MOTURIKI) pit orientation:				
equ	uip	ment typ	be: 12	2t Excavat	tor Trac	k			excavation method:	excavation dimensions:			vane id.: DR4523
ех	cca	vation i	nfor	mation			mate	rial subs	tance				
method	support	penetration	water	samples 8 field tests	RL (m)	depth (m)	graphic log	class ification symbol	material description SOIL TYPE: plasticity or particle characteristic colour, secondary and minor components	, o du di construre	condition consistency / relative density	vane shear ⊕remoulded ⊚peak (kPa)	structure and additional observations
	N	3 5 7			-73.5				ORGANIC SILT: non plastic, black, moist.	N	1		TOPSOIL FILL
2					-73.0	- - - 1.0-			Sandy SILT: non plastic, brown mottled pale brown, some fine to medium grained sand, m hard.	ioist,	Н	_                         \v\$ UTP 	
					-72.5	- - - 1.5 —			grained sand, moist, very stiff.		VSI		TOUNGER ASHES
					-72.0	- - - 2.0							-
			t Encountered		-71.5	- - 2.5 -						            ⊕ ⊚    	
			No		-71.0	- - 3.0- -			SAND: fine to coarse grained, well graded, or brown, moist, loose.	ange	L	         ⊕ ●         	HAUPARU TEPHRA
					-70.5	- 3.5 <i>—</i> -			SILT: low plasticity, brown, moist, stiff to very 3.7 m: becoming pale brown	stiff.	St to VSt		
					-70.0	4.0						 ⊕ ⊙               	
					-69.5	4.5			INTERBEDDED SANDS AND SILT: sands an fine to medium grained, pale brown grey. Silts low plasticity, pale brown with minor fine grain sand, moist, stiff.	e s are led	St		ROTOEHU ASH
					-69.0	5.0 - -			5.0 m: becoming dark red brown				-
					-68.5	5.5-			Test pit TP511 terminated at 5.4 m Target depth				_
method         N       natural exposure         X       existing excavation         BH       backhoe bucket         B       bulldozer blade         R       ripper         E       excavator         support       N         N       none         S       shoring					vater	10-Oc level c water	no resis ranging refusal t-12 wate t-12 wate sinflow outflow	tance to er hown	samples & field tests       U##     undisturbed sample       D     disturbed sample       B     bulk disturbed sample       E     environmental sample       HP     hand penetrometer (kPa)       N     standard penetration test (SPT)       N*     SPT - sample recovered       Nc     SPT with solid cone       VS     vane shearpeak/remouded       (uncorrected kPa)       R     refusal	classi so ba Class D dry M mois W wet W <sub>P</sub> plast W <sub>L</sub> liquid	tic limit descriptic sed on Unifid sification Sys t t ic limit d limit	bol & n ed stem	consistency / relative density       VS     very soft       S     soft       F     firm       St     stiff       VSt     very stiff       H     hard       Fb     friable       VL     very loose       L     loose       MD     medium dense       D     dense       VD     very dense
		Tria	Pit	No.	Т	P 12							
---	--	--------------------	-----------	-------------	---------------------	--------------							
Project Location: 166 Walkite Road, Welcome Bay, Ta	luranga			Sheet	12 of	17							
Job Number: 12590		Logged By:	Proce	essed By	: Date:	06 1 0							
≥ pit mN mE Ground B.L.						26.1.0							
Location: Description: Refer to site plan		Ē	wate	Dial	inity	and							
		epth a	pund	ane Read	So	mple bora							
ភ SOIL DESCRIPTION			อี	24	ង	ra Sa							
TOPSOIL													
MULLOCK : Soft, slightly plastic, dark brown/black slightly clayey silt,	A A A A A A A A A A A A A A A A A A A		[	38	3.2								
	****												
	****												
	~~~~~ ~~~~~	****=1.0		38	2.7								
NATURAL : Very loose, light grey/green, slightly sliby SAND, with wee	thered X·X·X·X	****											
ignimbrite and slightly weathered pumice clasts up to 50 mm diameter feldspar and minor biolite. Orange/brown weathered ignimbrite on un	nierou , quartz, ****** slono sido	***											
- becoming very stiff to hard		č.č.j <b>=</b> 1.5		140++									
	****	e e t											
	2101010 2101010 2101010	× × +											
	2.2.2.2 2.2.2.2 2.2.2.2			140++									
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honomies hard	****	****											
- becoming hard	****	* * *											
E.O.P at 3.0 metres.	*****	*:*: <u>*</u> 3.0		140++									
		E I											
			Í										
		- 3.5											
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		-											
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		   5.0											
		  5.0 											
Comments:	Toppall		Sandater		Dhutart	++							
Comments: Excavator Used Minor water seepage at 1.2 Excavator Used	Topsoil Sand		Sandstone		Plutonic	++							
FOUNDATION Comments: Minor water seepage at 1.2 metres. Excavator Used Daewoo EX 125 Checked:	Topsoil Sand Fill Grave		Sandstone		Plutonic No Core	++							

-

1	Client			Hugh Green Group	Limited				Trial	Pit I			TI 40
	Project	t Locati	on :	166 Waikite Boad, V	Velcome Bav. Ta	uranna			i i ruti		Sheet	12 0	F 13
				,	voloome buy, ra	urungu		Logg	d Dur	Droot			17
	Job Nu	mber:		12590				A	-М	J	WH	Date:	26.1.06
j	≧ Pit	mN		mE	Ground R.L.				~	ter	_		2~0
	Location:	Descriptio	n:	Refer to site plan				코 고	<u>ш</u>	dwa	e Dia	itivity	le an aton betall
				SOIL DESCRIPTIO	אכ			Ď	Depl	Inou	Van Rea	Sens	abol est C
$\mathbf{F}$	TOPSC	NL								0			
	NATUR damp	AL : Soft, s	lightly pla	ıstic, orange/brown slig	htly clayey fine san	dy SILT,			- - - - -		34	3.4	
	- becom	ling firm									80	5.7	
Ę									- 		80	2.6	
ost Rotoehii A	Loose, b sized), w	lack flecke vith quartz,	d orange feldspar,	slightly silty SAND, (fin biotite, molst	e to coarse grained	l to fine grav			- 2.0		70	2.3	
ď.								* * * * * * * * * * * * * * * * * * * *	- 2.5		80	2.7	
	- becomi pumice ii	ng light bro nclusions (v	wn/crean veathered	n, with major manganes d Ignimbrite)	e and extremely w	eathered		****	- 3.0	:	58	1.8	
							****	* * * * * *	- 3.5		74	2.5	
	Loose, lig	htly plastic,	AND (fine	lightly fine sandy slighti e to medium grained),w	y clayey SILT, sligi	nt texture			-4.0		45	2.4	
Rotoehu Ash	metres, q	uartz, felds	par, biotii	ie, wet		-			4.5		67	2.1	
	- becomin E.O.P at l	g medium- 5.0 metres	dense				<u>  : : : :</u>		5.0		140++		
									5.5				
			0		Magazineta 11				6.0				
6			Ground	ents: water not encountered	Daewoo	Topsoll			· ·  S	andston		Plutonic	++++
	FOUN	DATION			Checked:	Clay F-				meeton			·
	ENGIN	EERING				Silt X				olcanic	· <del>····</del>	-	

1	Client :			Hugh Green Gr	roup L	.imited			•	Trial	Pit I	No.	T	P 14
	Project	Locati	on :	166 Waikite Ro	ad, W	/elcome Bay, Ta	uranga					Sheet	: 14 of	17
	Job Nu	mber:		12590					Logge Al	ed By: LM	Proce	∍ssed By WH	: Date:	26.1.06
Ę	Pit	mN		mE		Ground R.L.					ter	=_		
ligrap	Location:	Descriptio	n:	Refer to site pla	n					th (Th	dwa	e Dia ading	sitivity	le an Detail
Stral				SOIL DESCRI	PTIO	N				Dep	Grour	Van Rea	Sens	Samp Labo Test [
F	TOPSO		liebthue	lastia empresidare	un nilei				$\sum$	-				
	NATUR	AL : FIIII, S	ngnuy p	lastic, orange/orov	vn siigi	ntiy clayey tine sai	nay SILT			-				
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Ash								****	***	-		70	3,9	
nhac								XXXX	××× ×××	-				
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Past	biotite, n	noist	uy anty c	MINE (IIIIE IO COAI	se gia	ineu), quanz, ieiu:	spar and mind	x x x x x x x x x x	* * *	-				
	- becomi	ng light bro	wn, dam	p				*****	* * * * * *	-				
	<ul> <li>becomi ignimbriti</li> </ul>	ng light bro e), with min	wrı/creai or lithics	n, fine to coarse g , moderate iron ar	rained 1d mar	l to fine gravel size Iganese stianing	ed (weathered	*****	* * *	-2.0		62	2.2	
								*****	* * *	-				
								*****	* * *	-				
	Firm, ligh	it grey/creat	m SAND	(fine to medium g	grained	l) well sorted, qua	rtz, feldspar	****	****	2.5		54	1.8	
		inte, wen wa	ISHEU											
IL As										- 3.0		66	2.5	
otaeh														
Ē	bosomir	a cott								25				
	- 09001111	iy son							F	- 0.0		34	1.1	
_	Very stiff.	sliphtly play	stic dad	chrown slightly de		Johtly fine candy S	u T with		 					
Ash	moderate	manganes	e mottle:	s S	1909 3	ідпаў шіе запаў с	n⊏1, with	XXXX		4.0		140.4.4		
tton /									Ωł			1-01-1		
Hami	- becomin	g non-plast	ic, dark l	brown, indurated,	with in	on and manganes	e stalning	XXXX	*** ***					
	E.O.P at 4	1.5 metres				·······				4.5		140++		
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~			Comm	ents:		Excavator Used:	Topsnil N			6.U S	andstore		Plutonir	+++4
			Ground	lwater not encoun	tered	Daewoo EX 125		Grave		Si	ltstone	**** *	No Core	+++
V	FOUNI					Checked:	Clay	Organ	ic **	.**.**   1   1	mestone		1	
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**Appendix C: Fill Quality Control Data** 

		Bay of Plenty Labo	oratory
Ful	ton Hogan	Poplar Lane, T Private Bag 12016, Taurang Telephone: +64 7 54 Facsimile: +64 7 54 www.fultonhoga 0800 LABOR/	e Puke a 3143 2 9672 2245 an.com ATORY
Material T	est Report	Report No: MAT:BOP15S-0	<b>2761</b> No: 1
Client: Paul HEB PO B	Roberts Construction Ltd lox 226	The test (s) reported herein (unless otherwise indicated) have been performed in accordance the laboratory's scope of accreditation. This n may only be reproduced in full.	e with eport
Drury NZ	2247	ADDREDTED LABORATORY ADDROVED Signatory: Rob Ermens	
Project: Ballir	toy Park- Stage 5	(Lab Manager) IANZ Accreditation No:749 Date of Issue: 8/12/2015	
Sample Details			
Client Sample ID: Client Sample ID: Material: Sample Source: Site/Sampled From Date Sampled: Specification: Sampled By: Sampling Method: Date Tested: Technician: Sampling Endorsed Test Results	Ash Fill Ballintoy Park : Stage 5 Fill area 01/12/2015 Contract Specification Barrack Carle Not Advised - Not Accredited 03/12/2015 Barrack Carle		,
Description		Method Result Lin	nits
Solid Particle Densit History	y (t/m³)	NZS 4402:1986 Test 2.7.2 2.69 N Air Dried N Whole fraction	/A*` /A
	action		<u>/A</u>
		-	
		-	
		* *	
		· ·	

			Bay of Pler	ty Laboratory
Fulton Hogan			Popla Private Bag 12016, Telephone: Facsimile: www.fu 0800	r Lane, Te Puke Tauranga 3143 +64 7 542 9672 +64 7 542 2245 Itonhogan.com
	-		Report No: MAT:BO	P15S-02760
Material Test Report				Issue No: 1
Client: Paul Roberts			The test (s) reported herein (unles	ss otherwise
HEB Construction Ltd			indicated) have been performed in the laboratory's scope of accredit	n accordance with ation. This report
PO Box 226			may only be reproduced in full.	
D 0017	-		Algun	/
NZ		AUNEDITED EADORATORY	Approved Signatory: Rob Err	nens
Project: Ballintov Park- Stage 5			(Lab Manager) IANZ Accreditation No:749	
Samala Dataila				
		3 - 12 3		
Sample ID: BOP15S-02760 Client Sample ID:				
Material: Ash Fill				
Sample Source: Ballintoy Park Site/Sampled From: Stage 5 Fill area				
Date Sampled: 01/12/2015				
Sampled By: Barrack Carle				
Sampling Method: Not Advised - Not Accredited	4,	8		
Date rested.         03/12/2013           Technician:         Barrack Carle				
Sampling Endorsed?: No				
Test Results				
Description	Method		Result	Limits
Solid Particle Density (t/m³) History	NZS 4402:1986 Test 2.7.2		2.62 Air Dried	2 N/A* I N/A
Test Perfomed on Fraction			Whole Fractior	I N/A
				~
		3		
Comments				

			Bay of Plenty Laboratory
	ulton Hogan		Poplar Lane, Te Puke Private Bag 12016, Tauranga 3143 Telephone: +64 7 542 9672 Facsimile: +64 7 542 2245 www.fultonhogan.com 0800 LABORATORY
			Report No: ND:BOP15W1288
Nuclea	r Density Report		Issue No: 1
Client:	Paul Roberts HEB Construction Ltd PO Box 226		The test (s) reported herein (unless otherwise indicated) have been performed in accordance with the laboratory's scope of accreditation. This report may only be reproduced in full.
Draiset	Drury 2247 NZ		Approved Signatory: Rob Ermens (Lab Manager) IANZ Accreditation No:749
Project:	Ballintoy Park- Stage 5		Date of Issue: 16/12/2015
Testing De Site Tested: Tested By: Date Tested: Time Tested: Jaterial: Specification: Field Methods:	Fill Area Fill Area Barrack Carle 4/12/2015 10:00 Ash Fill Contract Specification NZS 4407:1991 Test 4.2.1	Compact Material Sam MDD Method: Max. Dry Den Min. Dry Dens Solid Density	<b>ion Target Details</b> ple ID: sity: sity (t/m³): Type:
Lab Methods:	NZS 4402:1986 Test 2.1		
Test Resu Site No	Its Northing Easting	Moisture (%)	Wet Density (t/m³) Dry Density (t/m³) Air
1	-37.74268 176.20133	30.0	(%) 1.63 1.25 15.4

Comments

Density measurements are not accredited due to being outside of NDM range of calibration. Solid Density of 2.66t/m3 as avareage from reports reference BOP15S-02760 & BOP15S-02761. GPS locations takern by client on site. Shear strength values determined by Shear Vane (NSGS guidelines - 2001) and are accredited. Results located on page 2.

## HEB, Ballintoy Ash Fill 04-12-15 - Shear Vane Shear Strength Results

	1	2	3	4	Shear Strength Ave
Test Location	kPa	kPa	kPa	kPa	kPa
1	206.4	200.5	205.4	206.4	204.9

					Bay of Plenty	Laboratory
	ulton	Hogan			Poplar La Private Bag 12016, Ta Telephone: +64 Facsimile: +64 www.fultor 0800 LA	ane, Te Puke uranga 3143 4 7 542 9672 4 7 542 2245 hogan.com BORATORY
					Report No: ND:BOP	15W1295
Nuclea	ar Density	Report				15506 110. 1
Client:	Paul Roberts HEB Construction PO Box 226	Ltd			The test (s) reported herein (unless of indicated) have been performed in acc the laboratory's scope of accreditation may only be reproduced in full.	herwise cordance with ı. This report
	Drury 2247 NZ			ACCREDITED LABORAT	Approved Signatory: Rob Ermen (Lab Manager)	S
Project:	Ballintoy Park- Sta	age 5			IANZ Accreditation No:749 Date of Issue: 16/12/2015	
Site Tested: Tested By: Date Tested: "ime Tested: aterial: Specification: Field Methods Lab Methods:	Ash Fill Area Barrack Carle 11/12/2015 08:00 Ash Fill Contract Specification S: NZS 4407:1991 Test NZS 4402:1986 Test	1 4.2.1 2.1	Mate MDD Max. Min. Solid	rial Sample ID: (no Method: Dry Density: Dry Density (t/m³): I Density Type:	ne)	
Test Resu	u <b>lts</b> ite No	Moisture (%)	We	t Density (t/m³)	Dry Density (t/m³)	Air Voids (%)
2 (Grid	1 J4 - Lift 1)	51.5		1.68	1.11	1.3
3 (Grid	1 J4 - Lift 2)	46.5		1.67	1.14	4.3
4 (Grid	d L6 - Lift 1)	45.0		1.68	1.16	4.4
5 (Grid	1 L6 - Lift 2)	44.5		1.70	1.18	3.4
6 (Grid	1 L4 - Lift 1)	47.0		1.72	1.17	1.0
7 (Grid	1 J2 - Lift 1)	42.0		1.69	1.19	5.2
8 (Grid	J J Z - Lift Z	40.0		1.01	1.10	18

Comments

Density measurements are not endorsed due to being outside of NDM range of calibration. Solid Density of 2.66t/m3 averaged from test reports reference BOP15S-02760 & BOP15S-02761. Shear strength values determined by Shear Vane (NSGS guidelines - 2001) and are accredited. Results located on page 2.

HEB, Ballintoy Ash Fill 11-12-15 - Shear Vane Shear Strength Results									
-	1	2	<b>m</b>	4	Shear Strength Ave				
Test Location	kPa	kPa	kPa	kPa	kPa				
2	162.1	162.1	162.1	162.1	162				
3	206.4	162.1	171.0	165.1	176				
4	176.9	205.4	206.4	206.4	199				
5	173.9	162.1	168.0	206.4	178				
6	206.4	206.4	206.4	206.4	206				
7	191.6	205.4	206.4	206.4	203				
8	185.7	182.8	206.4	206.4	195				
9	206.4	194.6	191.6	191.6	196				

Form No: 18988, Report No: ND:BOP15W1295

					Bay of Plen	ty Laboratory
	ulton	Hogan			Poplar Private Bag 12016, Telephone: - Facsimile: - www.fult 0800	Lane, Te Puke Tauranga 3143 ⊧64 7 542 9672 ⊧64 7 542 2245 tonhogan.com LABORATORY
					Report No: ND:BO	P15W1318
Nuclea	ar Densit	y Report			an the second se	Issue No: 1
Client:	Paul Roberts HEB Constructi PO Box 226	on Ltd			The test (s) reported herein (unless indicated) have been performed in the laboratory's scope of accredita may only be reproduced in full.	s otherwise accordance with tion. This report
	Drury 2247 NZ			ACCREDITED LABORATORY	Approved Signatory: Rob Erm (Lab Manager)	nens
Project:	Ballintoy Park-	Stage 5			IANZ Accreditation No:749 Date of Issue: 12/01/2016	
Testing D Site Tested: Tested By: Date Tested: *ime Tested: Material: Specification: Field Methods Lab Methods:	etails Ash Fill Area Barrack Carle 21/12/2015 15:00 Ash Fill Contract Specificat : NZS 4407:1991 Te NZS 4402:1986 Te	ion st 4.2.1 st 2.1	Compac Material Sam MDD Method Max. Dry Den Min. Dry Den Solid Density	tion Target nple ID: Exter I: * nsity: nsity (t/m³): y Type:	<b>Details</b> nal	
Test Resu	I <b>lts</b> ite No	Moisture (%)	Wet Densit	ty (t/m³)	Dry Density (t/m³)	Air Voids (%)
	10	42.5	1.70	)	1.19	4.7
	11	41.0	1.69	)	1.20	5.6
	12	41.5	1.74	ł	1.23	3.0
	13	44.5	1.66	3	1.15	5.6
	14	45.0	1.67	7	1.15	5.0
	15	40.5	1.75	5	1.24	3.0

### Comments

\* Test was conducted externally and is not accredited by this laboratory. Density measurements are not endorsed due to being outside of NDM range of calibration. GPS locations taken by client on site. Solid Density of 2.66t/m3 averaged from test reports reference BOP15S-02760 & BOP15S-02761. Shear strength values determined by Shear Vane (NSGS guidelines - 2001) and are accredited. Results located on page 2.

<u>neb, ballintoy Ash Fill 21-12-15 - Shear Vane Shear Strength Results</u>								
	<u>1</u>	2	3	4	Shear Strength Ave			
Test Location	kPa	kPa	kPa	kPa	kPa			
10	206.4	206.4	206.4	188.7	202			
11	206.4	168.0	206.4	141.5	181			
12	206.4	206.4	206.4	206.4	206			
13	206.4	206.4	191.6	206.4	203			
14	123.8	206.4	168.0	191.6	172			
15	206.4	206.4	206.4	206.4	205			

### HEB, Ballintoy Ash Fill 21-12-15 - Shear Vane Shear Strength Results

Page 2 of 2

					Bay of Plenty	Laboratory
	ultor	1 Hogan			Poplar La Private Bag 12016, Ta Telephone: +6 Facsimile: +6 www.fultor 0800 LA	ane, Te Puke uranga 3143 4 7 542 9672 4 7 542 2245 hhogan.com BORATORY
					Report No: ND:BOP	16W0021
Nuclea	ar Densi	ity Report				Issue No: 1
Client:	Paul Roberts HEB Constru- PO Box 226	ction Ltd			The test (s) reported herein (unless of indicated) have been performed in acc the laboratory's scope of accreditation may only be reproduced in full.	herwise cordance with n. This report
	Drury 2247 NZ			ACCREDITED LABORATORY	Approved Signatory: Rob Ermen (Lab Manager)	s
Project:	Ballintoy Park	- Stage 5			IANZ Accreditation No:749 Date of Issue: 20/01/2016	
Testing D Site Tested:	etails Ash Fill	REAL MADE TO BE AND A	Compa Material Sa	ample ID:	Details	
Tested By:	Barrack Carle		MDD Meth	od:		
Date Tested:	15/01/2016		Max. Dry D	Density:		
Time Tested:	15:30		Min. Dry D	ensity (t/m³):		
aterial:	Ash Fill		Solid Dens	sity Type:		
Specification:	Contract Specific	cation				
Field Methods	: NZS 4407:1991	Test 4.2.1				
Lab Methods:	NZS 4402:1986	Test 2.1				
Test Resu <sub>Si</sub>	J <b>its</b> ite No	Moisture (%)	Wet Den	sity (t/m³)	Dry Density (t/m³)	Air Voids (%)
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10	(RT 1)	38.0	1.	.75	1.27	3.8
10	(RT 1) 17	38.0 42.5	1.	.75 .68	1.27 1.18	3.8 5.7
	(RT 1) 17 18	38.0 42.5 39.5	1. 1. 1.	.75 .68 .75	1.27 1.18 1.25	3.8 5.7 3.7

1.76

1.21

**Comments** Density measurement on site 17 is not endorsed due to being outside of NDM range of calibration. Solid Density of 2.66t/m3 averaged from test reports reference BOP15S-02760 & BOP15S-02761. Shear strength values determined by Shear Vane (NSGS guidelines - 2001) and are accredited. Results located on page 2.

46.0

20

-1.3

	1	2	3	4	Shear Strength Ave	
Test Location	kPa	kPa	kPa	kPa	kPa	
16 (RT1)	194.6	206.4	206.4	197.5	201	
17	206.4	168.0	165.1	162.1	175	
18	150.3	194.6	168.0	135.6	162	
19	206.4	205.4	168.0	153.3	184	
20	191.6	206.4	205.4	206.4	203	

Bay of	Plenty	Laboratory
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Poplar Lane, Te Puke Private Bag 12016, Tauranga 3143 Telephone: +64 7 542 9672 Facsimile: +64 7 542 2245 www.fultonhogan.com 0800 LABORATORY

### Report No: ND:BOP16W0071 Issue No: 1 **Nuclear Density Report** The test (s) reported herein (unless otherwise indicated) have been performed in accordance with Client: Paul Roberts HEB Construction Ltd the laboratory's scope of accreditation. This report may only be reproduced in full. PO Box 226 IANZ Drury 2247 Approved Signatory: Rob Ermens NZ (Lab Manager) IANZ Accreditation No:749 **Project:** Ballintoy Park- Stage 5 Date of Issue: 3/02/2016 **Testing Details Compaction Target Details** Material Sample ID: Site Tested: Ash Fill Area MDD Method: Tested By: Barrack Carle Date Tested: 26/01/2016 Max. Dry Density: Time Tested: 15:45 Min. Dry Density (t/m<sup>3</sup>): .aterial: Ash Fill Solid Density Type: Specification: Contract Specification Field Methods: NZS 4407:1991 Test 4.2.1 **Test Results** Wet Density (t/m3) Site No Moisture (%) Dry Density (t/m<sup>3</sup>) Air Voids (%) 44.0 21 1.63 1.13 7.9 22 46.5 1.61 1.10 7.4

Comments

Density measurements are not IANZ accredited due to being outside of NDM range of calibration and no lab oven moisture contents being taken. Solid Density of 2.66t/m3 averaged from test reports reference BOP15S-02760 & BOP15S-02761. Shear strength values determined by Shear Vane (NSGS guidelines - 2001) and are accredited. Results located on page 2.

HEB,	Ballintoy	Ash Fill 26-0	<u> 1-16 - Shear</u>	Vane Shear	Strength Results

	1	2	3	4	Shear Strength Ave
Test Location	kPa	kPa	kPa	kPa	kPa
21	175.3	153.8	132.3	° 172.3	158
22	160.0	156.9	153.8	126.1	149

					Bay of Plenty I	aboratory
	<b>ulton</b> H	logan			Poplar La Private Bag 12016, Tau Telephone: +64 Facsimile: +64 www.fulton 0800 LAB	ne, Te Puke tranga 3143 7 542 9672 7 542 2245 hogan.com 30RATORY
					Report No: ND:BOP1	6W0072
Nuclea	r Density F	Report			ŀ	ssue No: 1
Client:	Paul Roberts HEB Construction Lto PO Box 226	1			The test (s) reported herein (unless oth indicated) have been performed in accu- the laboratory's scope of accreditation. may only be reproduced in full.	erwise ordance with This report
	Drury 2247 NZ			ACCREDITED LABORATORY	Approved Signatory: Rob Ermens (Lab Manager)	3
Project:	Ballintoy Park- Stage	5			ÌANZ Accreditátion No:749 Date of Issue: 3/02/2016	
Testing D Site Tested: Tested By: Date Tested: ime Tested: Material: Specification: Field Methods: Lab Methods:	etails Ash Fill Area Barrack Carle 29/01/2016 13:30 Ash Fill Contract Specification : NZS 4407:1991 Test 4.2. NZS 4402:1986 Test 2.1	1	Compact Material Sam MDD Method Max. Dry Der Min. Dry Den Solid Density	tion Target ple ID: : sity: sity (t/m³): <sup>y</sup> Type:	Details	
Test Resu <sup>Si</sup>	te No	Moisture (%)	Wet Densit	y (t/m³)	Dry Density (t/m³)	Air Voids (%)
	23	39.0	1.77	· · · · · · · · · · · · · · · · · · ·	1.27	3.0
	24	41.5	1.77		1.25	1.3
	25	41.5	1.72		1.22	3.4
	26	46.5	1.73		1.18	1.0

Relative compaction results and averages are not IANZ accredited. Solid Density of 2.66t/m3 averaged from test reports reference BOP15S-02760 & BOP15S-02761. Shear strength values determined by Shear Vane (NSGS guidelines - 2001) and are accredited. Results located on page 2.

	1	2	3	4	Shear Strength Ave
Test Location	kPa	kPa	kPa	, kPa	kPa
23	132.7	179.8	191.6	156.2	165
24	206.4	206.4	206.4	206.4	206
25	205.4	206.4	185.7	162.1	190
26	206.4	206.4	206.4	185.7	201

## HEB, Ballintoy Ash Fill 29-01-16 - Shear Vane Shear Strength Results

					Bay of Plenty	Laboratory		
	ulton H	ogan		Poplar Lane, Te Private Bag 12016, Tauranga Telephone: +64 7 542 Facsimile: +64 7 542 www.fultonhogan 0800 LABORA <sup>-</sup>				
					Report No: ND:BOP	16W0133		
Nuclea	ar Density R	leport		Issue No: 2 This report replaces all previous issues of report no 'ND:BOP16W0133'.				
Client:	Paul Roberts HEB Construction Ltd PO Box 226				The test (s) reported herein (unless of indicated) have been performed in act the laboratory's scope of accreditation may only be reproduced in full.	herwise cordance with . This report		
	Drury 2247 NZ				Approved Signatory: Rob Ermen (Lab Manager)	S		
Project:	Ballintoy Park- Stage	5			JANZ Accreditation No:749 Date of Issue: 24/02/2016			
Tested By: Date Tested: Time Tested: Jaterial: Specification: Field Methods Lab Methods:	etails Ash fill area Rob Ermens 16/02/2016 13:30 Ash Fill Contract Specification : NZS 4407:2015 Test 4.2 NZS 4402:1986 Test 2.1		Compact Material Sam MDD Method Max. Dry Der Min. Dry Den Solid Density	tion larget l ple ID: Externa : * isity: sity (t/m³): Type:	<b>Jetails</b> a			
Test Resu	<b>ilts</b> ite No	Moisture (%)	Wet Densit	y (t/m³)	Dry Density (t/m³)	Air Voids (%)		
	27	42.0	1.76		1.24	1.0		
	28	36.0	1.74		1.28	5.7		
	29	53.5	1.68		1.10	-0.1		
	30	52.0	1.70		1.12	-0.1		
	31	41.5	1.78		1.26	0.7		
	32	41.5	1.67		1.18	6.8		
	33	42.5	1.71		1.20	4.0		
	34	49.5	1.60	The second	1.07	7.0		

**Comments** \* Test was conducted externally and is not accredited by this laboratory. Solid Density of 2.66t/m3 averaged from test reports reference BOP15S-02760 & BOP15S-02761. Shear strength values determined by Shear Vane (NSGS guidelines - 2001) and are accredited. Results located on page 2. Wet density measurements that fall below 1.72t/m3 are not accredited due to being outside of NDM range of calibration.

Page 1 of 2

TED, Damitoy Asir fin 10 02 10 Shear varie shear strength hesaits									
	1	2	3	4	Shear Strength Ave				
Test Location	kPa	kPa	kPa	kPa	kPa				
27	206.4	159.2	156.2	153.3	169				
28	194.6	179.8	123.8	112.0	153				
29	153.3	138.6	188.7	206.4	172				
30	141.5	156.2	188.7	147.4	158				
31	144.5	156.2	141.5	150.3	148				
32	179.8	206.4	206.4	191.6	196				
33	162.1	185.7	165.1	150.3	166				
34	203.4	203.4	185.7	153.3	186				

### HEB, Ballintoy Ash Fill 16-02-16 - Shear Vane Shear Strength Results

					Bay of Plenty	Laboratory	
	ulton	Hogan	Poplar Lane, Te Puke Private Bag 12016, Tauranga 3143 Telephone: +64 7 542 9672 Facsimile: +64 7 542 2245 www.fultonhogan.com 0800 LABORATORY				
					Report No: ND:BOP	16W0200	
Nuclea	r Densit	ty Report			1	ssue No: 1	
Client:	Paul Roberts HEB Construct PO Box 226	ion Ltd			The test (s) reported herein (unless off indicated) have been performed in acc the laboratory's scope of accreditation. may only be reproduced in full.	terwise ordance with This report	
	Drury 2247 NZ		4	ACCREDITED LABORATORY	Approved Signatory: Rob Ermen: (Lab Manager)	S	
Project:	Ballintoy Park-	Stage 5			IANZ Accreditation No:749 Date of Issue: 12/03/2016		
Testing D Site Tested: Tested By: Date Tested: Time Tested: Jaterial: Specification: Field Methods: Lab Methods:	etails Ash Fill Area Barrack Carle 3/03/2016 15:20 Ash Fill Contract Specifica NZS 4407:2015 Ti NZS 4402:1986 Ti	tion est 4.2 est 2.1	Compact Material Sam MDD Method: Max. Dry Den Min. Dry Dens Solid Density	ion Target <sup>ble ID:</sup> sity: sity (t/m³): Type:	Details		
Test Resu	l <b>its</b> te No	Moisture (%)	Wet Density	٬ (ť/m³)	Dry Density (t/m³)	Air Voids (%)	
	35	39.0	1.70		1.22	6.7	
	36	57.0	1.68		1.07	-1.4	
	37	47.5	1.70		1.16	1.4	

1.74

1.20

Comments

Solid Density of 2.66t/m3 averaged from test reports reference BOP15S-02760 & BOP15S-02761. Shear strength values determined by Shear Vane (NSGS guidelines - 2001) and are accredited. Results located on page 2. Wet density measurements that fall below 1.72t/m3 are not accredited due to being outside of NDM range of calibration.

45.0

38

0.9

HEB, Ballin	<u>3, Ballintoy Ash Fill 03–03–16 - Shear Vane Shear Strength Kesults</u>					
	1	2	3	4	Shear Strength Ave	
Test Location	kPa	kPa	kPa	kPa	kPa	
35	201.9	201.9	193.2	201.9	200	
36	170.2	167.3	175.9	201.9	179	
37	190.3	161.5	158.6	147,1	164	
38	201.9	187.5	155.7	164.4	177	

Page 2 of 2

					Bay of Plenty	Laboratory			
Fulton Hogan					Poplar Lane, Te Puke Private Bag 12016, Tauranga 3143 Telephone: +64 7 542 9672 Facsimile: +64 7 542 2245 www.fultonhogan.com 0800 LABORATORY				
					Report No: ND:BOP	16W0279			
Nuclea	r Density	v Report			I	ssue No: 1			
Client:	Paul Roberts HEB Construction PO Box 226	n Ltd			The test (s) reported herein (unless off indicated) have been performed in acc the laboratory's scope of accreditation. may only be reproduced in full.	nerwise ordance with . This report			
	Drury 2247 NZ			ACCREDITED LABORATORY	Approved Signatory: Rob Ermen: (Lab Manager)	S			
Project:	Ballintoy Park- St	age 5			IANZ Accreditation No:749 Date of Issue: 14/04/2016				
Testing D Site Tested: Tested By: Date Tested: Time Tested: Laterial: Specification: Field Methods: Lab Methods:	etails Ash Fill Area Barrack Carle 16/03/2016 10:20 Ash Fill Contract Specificatio NZS 4407:2015 Tes NZS 4402:1986 Tes	n 14.2 12.1	Compact Material Sam MDD Method Max. Dry Den Min. Dry Den Solid Density	tion Target ple ID: : sity: sity (t/m³): <sup>,</sup> Type:	Details				
Test Resu <sup>Si</sup>	<b>ilts</b> te No	Moisture (%)	Wet Densit	y (t/m³)	Dry Density (t/m³)	Air Voids (%)			
	39	59.0	1.56		0.98	5.2			
oon boroot of a second of the	40	56.0	1.53		0.98	8.3			
	41	49.5	1.54		1.03	10.4			

1.71

1.21

Solid Density of 2.66t/m3 averaged from test reports reference BOP15S-02760 & BOP15S-02761. Shear strength values determined by Shear Vane (NSGS guidelines - 2001) and are accredited. Results located on page 2. Density measurements are not accredited due to being outside of NDM range of calibration.

41.0

42

4.8

<u>HED, Damintoy Ash Fill 10-05-10 - Shear Vane Shear Strength Results</u>					
	1	2	3	4	Shear Strength Ave
Test Location	kPa	kPa	kРа	kPa_	kPa
39	144.2	164.4	144.2	201.9	164
40	161.5	201.9	201.9	201.9	192
41	201.9	201.9	158.6	173.0	184
42	170.2	190,3	201.9	187.5	187

Client Project No. Project Site Address

Hugh Green Group Limited TGA2016\_0121 Ballintoy Park Subdivision Stage 5, Welcome Bay 26 & 28 Ballintoy Park Drive, Welcome Bay, Tauranga



		-	Ballintoy Park S	tage 5 - Sur	nmary of Earthfill Test D	Data		_
Geotechnical Engineer	Test Number	Date	Shear Vane (kPa)	Pass/Fail	Air Voids (%)	Pass/Fail	Notes	Retest Pass/Fail
	1	4/12/2015	205	Pass	15	Fail	See Test 16 for Retest	
	2	11/12/2015	162	Pass	1.3	Pass		
	3	11/12/2015	176	Pass	4.3	Pass		
	4	11/12/2015	199	Pass	4.4	Pass		
	5	11/12/2015	178	Pass	3.4	Pass		
	6	11/12/2015	206	Pass	1.0	Pass		
	7	11/12/2015	203	Pass	5.2	Pass		
	8	11/12/2015	195	Pass	11	Pass		
	9	11/12/2015	196	Pass	1.8	Pass		
	10	21/12/2015	202	Pass	4.7	Pass		
	11	21/12/2015	181	Pass	5.6	Pass		
	12	21/12/2015	206	Pass	3.0	Pass		
	13	21/12/2015	203	Pass	5.6	Pass		
	14	21/12/2015	172	Pass	5.0	Pass		
	15	21/12/2015	206	Pass	3.0	Pass		
	16	15/01/2016	201	Pass	3.8	Pass	Retest of Test 1	Retest Pass
	17	15/01/2016	175	Pass	5.7	Pass		
	18	15/01/2016	162	Pass	3.7	Pass		
	19	15/01/2016	184	Pass	2.5	Pass		
	20	15/01/2016	203	Pass	-1.3	Pass		
	21	15/01/2016	158	Pass	7.9	Pass		
	22	15/01/2016	149	Pass	7.4	Pass		
	23	29/01/2016	165	Pass	3.0	Pass		
	24	29/01/2016	206	Pass	1.3	Pass		
	25	29/01/2016	190	Pass	3.4	Pass		
	26	29/01/2016	201	Pass	1.0	Pass		
	27	16/02/2016	169	Pass	1.0	Pass		
	28	16/02/2016	153	Pass	5.7	Pass		
	29	16/02/2016	172	Pass	-0.1	Pass		
	30	16/02/2016	158	Pass	-0.1	Pass		
	31	16/02/2016	148	Pass	0.7	Pass		
	32	16/02/2016	196	Pass	6.8	Pass		
	33	16/02/2016	166	Pass	4.0	Pass		
	34	16/02/2016	186	Pass	7.0	Pass		
	35	16/03/2016	200	Pass	6.7	Pass		
	36	16/03/2016	179	Pass	-1.4	Pass		
	37	16/03/2016	164	Pass	1.4	Pass		
	38	16/03/2016	177	Pass	0.9	Pass		
	39	16/03/2016	164	Pass	5.2	Pass		
	40	16/03/2016	192	Pass	83	Pass		
	40	16/03/2016	184	Pass	10	Pass		
	41	16/03/2016	187	Pass	4.8	Pass		
	72	10,03,2010	107	1 435	4.0	1 435		
				1		1		

# Appendix D: CMW Post Construction Borehole Records
# CMW Geosciences - SOIL (Field Logging Guide)

COARSE

coarse

20

Gravel

medium

6

### SEQUENCE OF TERMS

GRAIN SIZE CRITERIA

Boulders

200

Cobbles

60

TYPE

Size Range (mm)

Fine: Soil type - Colour - Structure - Strength - Moisture - Bedding - Plasticity - Sensitivity - Origin/Geological Unit - Comments Coarse: Soil Type - Colour - Structure - Grading - Strength/Relative Density - Moisture - Origin/Geological Unit - Comments

fine

2 0.6 Sand

coarse

nedium

0.2

fine

0.06



SHADE and COL	OUR TERMS
Term	Abbreviation
Light	lt
Dark	dk
pink	pk
red	rd
orange	or
yellow	yl
brown	br
green	grn
blue	blu
white	wh
grey	gr
black	bl

Graphic Symbol			**** **** ****
PROPORTIONAL 1	FERMS DEFINITION (COARSE SOILS)		
Fraction	Term	% of Soil Mass	Example
Major	() [UPPER CASE]	≥50 [major constituents]	GRAVEL
Subordinate	()y [lower case]	20 - 50	Sandy
	with some	1 2 - 20	with some sand
Minor	with minor	5 - 1 2	with minor sand
	with trace of (or slightly)	< 5	with trace of sand (slightly sandy)

	Major divisions		Soil symbol	Soil name	ORGANIC SOILS / DESCRIPTORS				
		1 50/	GW	well graded gravel, fine to coarse gravel	Term	Description			
	gravel >50% of coarse	clean gravel <5% smaller 0.075mm	GP	poorly graded gravel		Surficial organic soil layer that may contain			
	fraction > 2mm		GM	silty gravel	Topsoil	greater depth, having been buried by geological			
Coarse grained soils more than		gravel with >1 2% fines	GC	clayey gravel		processes or man-made fill, and should be termed a buried topsoil.			
65% >0.06mm		clean sand	SW	well-graded sand, fine to coarse sand		Contains finely divided organic matter: may			
	sand ≥50% of coarse		SP	poorly graded sand	Organic clay, silt or sand	have distinctive smell; may stain; may oxidise			
	fraction <2mm	sand with >1 2%	SM	silty sand		Consists predominantly of plant remains			
		11100	SC	clayey sand		<i>Firm:</i> Fibres already compressed together			
	silt and clay liquid limit	inorganic	ML	silt	Post	<i>Spongy:</i> Very compressible and open structure <i>Plastic:</i> Can be moulded in hand			
	<50	orgonia	CL	clay of low plasticity	i eat	and smears in fingers <i>Fibrous:</i> Plant			
Fine grained soils 35% or		organic	OL	organic silt		strenght <i>Amorphous:</i> No recognisable			
more <0.06mm		inorganic	МН	silt of high plasticity		Fine partly decomposed roots, normally found			
	silt and clay liquid limit ≥50		СН	clay of high plasticity	Rootlets	in the upper part of a soil profile or in a			
		organic	ОН	organic clay		redeposited soil (e.g. colluvium of fill)			
	Highly Organic Soils		Pt	peat	Carbonaceous	Discrete particles of hardened (carbonised) plant material.			

FINE

Silt

0.002

CLAY

ORGANIC

Organic Soil

DENSITY INDEX (RELATIVE DENSITY) TERMS													
DESCRIPTIVE TERM	Density Index (RD)	SPT "N" value (blows / 300mm)	Dynamic Cone (blows / 100mm)	Abbreviation									
Very Dense	> 85	> 50	> 1 7	VD									
Dense	65- 85	30 - 50	7 - 1 7	D									
Medium dense	35 - 65	1 0 - 30	3 - 7	MD									
Loose	1 5 - 35	4 - 1 0	1 - 3	L									
Very loose	loose <15 <4 0-2 VL												
Note: No correlation is implied between Standard Penetration Test (SPT) and Dynamic Cone Test values. SPT "N" values are uncorrected. Dynamic Cone Penetrometer (Scala)													

## CONSISTENCY TERMS FOR COHESIVE SOILS

Descriptive Term	Undrained Shear Strength (kPa)	Diagnostic Features	Abbreviation
Very soft	< 1 2	Easily exudes between fingers when squeezed	VS
Soft	1 2 - 25	Easily indented by fingers	S
Firm	25 - 50	Indented by strong finger pressure and can be indented by thumb pressure	F
Stiff	50 - 1 00	Cannot be indented by thumb pressure	St
Very Stiff	1 00 - 200	Can be indented by thumb nail	Vst
Hard	200 - 500	Difficult to indent by thumb nail	н

## CMW Geosciences - SOIL (Field Logging Guide)

### SEQUENCE OF TERMS

Fine: Soil type - Colour - Structure - Strength - Moisture - Bedding - Plasticity - Sensitivity - Origin/Geological Unit - Comments Coarse: Soil Type - Colour - Structure - Grading - Strength/Relative Density - Moisture - Origin/Geological Unit - Comments



PLASTICITY (	CLAYS & SILTS)	GRADING ( GRAVELS & SANDS)							
Term	Description	Term	Description						
High plasticity	Can be mouled or deformed over a wide range of moisture contents without cracking or showing any tendancy to volume change	Well Graded	Good representation of all particle size ranges from largest to smallest						
			Limited representation of grain sizes - further divided into:						
Laura da statu	When moulded can be crumbled in the fingers; may show quick or dilatant	Poorly	Uniformly graded	Most particles about the same size					
Low plasticity	behaviour	Graded	Gap graded	Absence of one or more intermediate sizes					







HAND AUGER BOREHOLE - HA01 Client: Hugh Green Group Limited												
	Proje	ct: Ba	linto	y Pa	rk Stage 5							
	Site A Proje	ddres	s: W TGA	elco 201	me Bay 6_0121				C	N		Geosciences
	Date:	12/07	/201	6	-				Chap	man 1.2	Morto	on Woodward
	Borer Logge	ed by:	AMF	on: L H	ot 1 Position:	Elev	vatio	n:		1.23	5	Sheet 1 of 1
	Chec	ked by	/: LP	М	Survey Source:	Dat	um:	[				
Unit	oundwater	RL (m)	)epth (m)	aphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional	Moisture Condition	onsistency/ lative Density	Shear Strengths (kPa) Peak (Residual)	Dynamic Penetror (Blow/100		Cone neter 0 mm)	Comments
	δ			Ū	comments OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.		S a		5	10 1	5 20	
=			-									-
Topsc			-					V-43(9)				
	_		-		MH: Clayey SILT: some sand, pale brown, medium to high							
			-		plasticity, sensitive, sand is fine grained.	м		V->200(27)				
			- - 1 -				St to VSt	V-178(31)				
Ē	▼						-	V-133(26)				
			-									
			-			w		V-71(23)				
			-									
			-					V > 200(40)				
			2-		Borehole terminated at 2.000 m			V->200(40)				
			-									
			-									
			-									
			-									
			-									
			3 -									
			-									
			-									
			-									
			-									
			-									
			4 -									
			-									
			-									
			-									
			-									
			-									
			5 -									
Т	ermina	ation r	easc	n: T	arget Depth Reached.	1	I	I				
F	Remai	ˈks: Sl	near	vane	e no. 1911.							
				-	This report is based on the attached field description for soil and rock	, New	Zeal	and, Geotechnical	Societ	ty Inc	2005	

	HAND AUGER BOREHOLE - HA02											
	Clien <sup>®</sup> Proje	t: Hug ct: Bal	h Gre linto	een ( y Pai	Group Limited rk Stage 5							
	Site A	ddres	s: W		me Bay						AV	(NZ) Ltd
	Date:	12/07	/201	6	0_0121				Cha	apmai	n Mortor	Woodward
	Bore	nole Lo ed by:	ocati AMF	on: L	ot 2 Position	Flev	vatio	n.		1:2	25	Sheet 1 of 1
	Chec	ked by	/: LP	M	Survey Source:	Dat	um:	···.				
Unit	Groundwater	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dy Pe (Bl	nami enetro ow/10 10	c Cone ometer 00 mm) 15 20	Comments
opsoil					OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.							
					MH: Clayey SILT: some sand, pale orange- brown, medium to high plasticity, moderately sensitive to sensitive, sand is fine grained.	-		V-186(40)				
								V-121(16)				
			- - 1 -		contains some fine to medium sand.	м	Vst to H	V-154(30)				
₪								V->200(50)				
								V-117(23)				
	_		2 —		Borehole terminated at 2.000 m			-V-153(37)				
			4   4		Borehole terminated at 2.000 m							
T 	ermina Rema	ation r rks: G	easo roun	on: T dwat	arget Depth Reached. er not encountered. Shear vane no. 1911.							
	This report is based on the attached field description for soil and rock, New Zealand, Geotechnical Society Inc 2005.											

	HAND AUGER BOREHOLE - HA03												
	CI Pr	ient ojec	: Hugl ct: Bal	h Gre linto	een ( y Pai	Group Limited rk Stage 5							
	Si	te A	ddres	s: W		me Bay							(NZ) Ltd
	Da	ate:	12/07	/201	6	5_0121				Cha	apmai	n Morto	on Woodward
	Bo	oreh	ole Lo	ocatio	on: L	ot 3 Position	Flev	vatio	n.		1:2	25	Sheet 1 of 1
	Cł	neck	ked by	/: LP	M	Survey Source:	Dat	um:					
LInit		Groundwater	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dy P (B	/nami enetro low/10	c Cone ometer )0 mm) 15 20	Comments
lioso				-		OL: TOPSOIL- Organic SILT: dark brown- black, minor rootlets.							-
	!					ML: Clayey SILT: some sand, pale orange- brown, medium to high plasticity, moderately sensitive to sensitive, sand is fine to medium grained.			V-64(17)				
									V-129(21)				
				1 -			м	Vst to H	V-143(23)				
									V->200(40)				
									V->200(40)				
				2 —		Parabala terminated at 2 000 m			V-150(29)				
				4		Borehole terminated at 2.000 m							
٦	ern Rei	nina mar	ation r ks: Gi	easo rouno	on: Ta dwat	arget Depth Reached. er not encountered. Shear vane no. 1911.							
	This report is based on the attached field description for soil and rock, New Zealand, Geotechnical Society Inc 2005.												

	HAND AUGER BOREHOLE - HA04												
	Cl Pr	ient ojec	: Hugl ct: Bal	h Gr linto	een ( y Pa	Group Limited rk Stage 5							
	Si	te A	ddres	s: W		me Bay				C			(NZ) Ltd
	Da	ate:	12/07	/201	6	0_0121				Chap	man Mo	orton	Woodward
	Bo	oreh	ole Lo	ocati	on: L	ot 4 Position:	Flev	vatio	n.		1:25		Sheet 1 of 1
	CI	heck	ked by	/: LP	M	Survey Source:	Dat	um:					
- Init	5	Groundwater	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dyna Pen (Blov 5	amic Co netromet w/100 m 10 15 2	ine ier im) 20	Comments
				-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.							_
Tons	-			-		MH: Clayey SILT: some sand, pale orange- brown, medium to high plasticity, moderately sensitive to sensitive, sand is fine to medium grained.			V->200(43)				
				-				Vst	V->200(40)				
				- - 1 —			м	to H	V-126(23)				- - - - -
	-			-					V-183(40)				
				-					-V-80(21)				
				-				St to VSt					
	_			2 -		Borehole terminated at 2.000 m			V-194(24)				
				3									
				-									
				4									
				-									
				-									
				-									
_	_			5 -									
-	Ferr	nina	tion r	easc	n: T	arget Depth Reached.							
	Re	mar	ks: Gi	oun	dwat	er not encountered. Shear vane no. 1911.							
					-	This report is based on the attached field description for soil and rock	, Nev	v Zeal	and, Geotechnical	Societ	y Inc 20	05.	

	HAND AUGER BOREHOLE - HA05												
	Clie Proj	nt: Hug ect: Ba	h Gr Ilinto	een y Pa	Group Limited rk Stage 5								
	Site Proj	Addres ect No:	ss: W	/elco A201	me Bay 6  0121							W	Geosciences
	Date	e: 12/07	7/20 <sup>-</sup>	16 ion: I					Ch	apn	nan 1•76	Morto	n Woodward
	Log	ged by:	AM	H	Position:	Elevation:							Sheet 1 of 1
	Che ៦	cked b	y: LF	M ص	Survey Source: Material Description	Dat	um: . ≱					0	
Unit	troundwat	RL (m)	Depth (m)	Sraphic Lo	Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional	Moisture Condition	Consistency, telative Densi	Shear Strengths (kPa) Peak (Residual)	(E	Pene Blow	1110 etror 1/100	neter ) mm)	Comments
	0				OL: TOPSOIL- Organic SILT: dark brown- black, minor rootlets.		~						-
Topsc													
					ML: Sandy SILT: some sand, brown- orange, low plasticity, sensitive, sand is fine to coarse grained.		St to	V-168(14)					
			-				VSt	1 70(47)					
					ML: Clayey SILT: some sand, pale orange- brown, low to medium plasticity, moderately sensitive to sensitive, sand is fine to medium grained.			V-79(17)					
			1 -	×× ××	SM: Silty SAND: pale brown, poorly graded, fine to medium	м		V-57(29)					
ger As				× ×									
Young				××			L to						-
				××			MD						
					SW: SAND: minor silt, pale brown- grey, well graded, fine to coarse grained.								
				× ×	ML Sandy SILT pale grey non plastic to low plasticity			-					-
			2 -	(	me. Galay Sich, pare grey, non plastic to low plasticity,		St	1/-90(29)					
					Borehole terminated at 2.000 m			V-30(23)					
				-									
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			3-	-									
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Т	armi	hation -	5-	 חרי חר	arget Denth Reached						·l		
	200		roun	dwo	ter not encountered. Shear vane no. 1011								
	Remarks: Groundwater not encountered. Shear vane no. 1911.												

	HAND AUGER BOREHOLE - HA06										
C   F	Client Proje	: Hugl ct: Bal	h Gr linto	een ( y Pai	Group Limited rk Stage 5						
5	Site A	ddres	s: W	elco	me Bay					(NZ) Ltd	
	Date:	12/07	/201	6	0_0121				Chapman Morton	Woodward	
E		ole Lo	ocati	on: L	ot 6 Position	Flev	vatio	n.	1:25	Sheet 1 of 1	
0	Check	ked by	/: LP	M	Survey Source:	Dat	um:	····			
	water	я Е	(u	c Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding;	ure tion	ency/ Density	Shear Strengths	Dynamic Cone Penetrometer		
5	sround	RL (	Depth	Sraphi	plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional	Moist Cond	Consist telative	(kPa) Peak (Residual)	(Blow/100 mm)	Comments	
soil	0				OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.		Ľ.				
Top			-		MH: Clayey SILT: trace sand, orange- brown, medium to high	-				-	
			-	$(\times \times)$	plasticity, moderately sensitive to sensitive, sand is fine to medium grained.			V-164(14)			
			-					1 4 50 (40)			
			-					V-150(40)		-	
			-					\/_133(30)		-	
r Ash			1 -			м	St to VSt	V-100(00)		-	
ounge			-					V-143(25)			
2			-								
			-							-	
			-					V-113(29)		-	
			-	$\frac{1}{2}$	ML: Sandy SILT: pale brown, low plasticity, moderately sensitive,	-				-	
			2 -	(	sand is fine grained.			V-79(33)			
			-		Borenole terminated at 2.000 m						
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			5 -								
Те	rmina	ation r	easc	n: T	arget Depth Reached.	I	I	1			
R	emar	ks: Gi	roun	dwat	er not encountered. Shear vane no. 1911.						
	This report is based on the attached field description for soil and rock, New Zealand, Geotechnical Society Inc 2005.										

	HA	ND	Α	UC	SER BOREHOLE - HA07								
	Clien <sup>®</sup> Proje	t: Hug ct: Bal	n Gro linto	een ( y Pa	Group Limited rk Stage 5							_	
	Site A Proie	ddres	s: W TGA	elco	me Bay 6. 0121						$\mathbf{Y}$	M	Geosciences
	Date:	12/07	/201	6					Cha	apma	n Mo	rton	Woodward
	Borel Logg	nole Lo ed by:	ocati AMH	on: L H	ot 7 Position:	Elev	vatio	n:		1:	25		Sheet 1 of 1
	Chec	ked by	: LP	M	Survey Source:	Dat	um:						
Unit	Groundwate	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dy P (B	/nam enetr low/1	ic Cor omete 00 mi 15 2	ne er m) 0	Comments
soil			-		OL: TOPSOIL- Organic SILT: dark brown- black, minor rootlets.								
Tops			-					1/2200(64)					
			-		MH: Clayey SILT: minor sand, orange- brown, medium to high plasticity, sand is fine to medium grained.			V->200(0 <del>4</del> )					
								V->200(57)					
			- - - 1			м	Vst to H	V->200(24)					
E			-					V-183(31)					
								V->200(57)					
			-										
	-		2 —		Borehole terminated at 2.000 m			V-200(39)		_			
			-										
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			- 3 —										-
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			5 —										-
Т	ermina	ation r	easc	n: T	arget Depth Reached.	1	I	I	<u> </u>				
	Rema	rks: G	oun	dwat	er not encountered. Shear vane no. 1911.								
					This report is based on the attached field description for soil and rock	, New	/ Zeal	and, Geotechnical	Soc	iety lı	nc 200	05.	

	HA	ND	A	UC	SER BOREHOLE - HA08								
	Proje	ct: Bal	linto	y Pa	rk Stage 5						_	_	
	Site A Proje	ddres	s: W TGA	elco 201	me Bay 6_0121				C	N	$\langle \rangle$		Geosciences
	Date: Boreł	12/07 nole Lo	/201 ocati	6 on: L	.ot 8				Chap	man 1:2	Mort 5	ton	Woodward Sheet 1 of 1
	Logg	ed by:	AMF	H	Position:	Elev	vatio	n:					
	uec afe		/: LP	INI Co	Material Description	Dat	um:	Shoar Strongths	Dyn	amic	Con	е	
Unit	roundw	RL (m	Depth (	iraphic	plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional	Moistur Conditio	Consisten elative De	(kPa) Peak (Residual)	Per (Blo	w/100	netei ) mm	r 1)	Comments
soil	U		_	6	comments OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.		Ξ.Ψ.	1			5 20	<u> </u>	
Top	_		-		MH: Clayey SILT: minor sand, pale orange- brown, medium to high plasticity, insensitive to moderately sensitive, sand is fine to coarse grained.	_		V-154(57)					
			-					V->200(49)					
			- - - - 1 —			м	Vst	V-126(40)					
E			-					V->200(107)					
					ML: Sandy SILT: trace clay, pale grey, low plasticity, moderately sensitive to sensitive, sand is fine to coarse grained, pumiceous.			V->200(36)					
			-		high plasticity, insensitive to moderately sensitive, sand is fine to coarse grained.								
			2		Borehole terminated at 2.000 m			-V->200(50)					
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Te	ermina	ation r	easc	n: T	arget Depth Reached.	-	•					1	
F	Remai	rks: G	roun	dwat	er not encountered. Shear vane no. 1911.								
				-	This report is based on the attached field description for soil and rock	k, Nev	v Zeal	land, Geotechnical	Socie	ty Inc	200	5.	

	HA	ND	A	UC	SER BOREHOLE - HA09								
	Proje	:: Hug ct: Bal	n Gr llinto	een ( y Pa	Group Limited rk Stage 5								
	Site A Proie	ddres	s: W TGA	/elco	me Bay 6_0121				C		$\Lambda$	M	Geosciences
	Date:	08/08	8/201	6					Cha	pmar	n Mo	rton	Woodward
-	Borer Logge	ole Lo ed by:	LPN	on: L 1	Position:	Elev	vatio	n:		1:2	.5		Sheet 1 of 1
	Chec	ked by	/: LP	M	Survey Source:	Dat	um:	1					
Unit	Groundwate	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dyi Pe (Blo 5	namic enetro ow/10 10	Cor mete 0 mi 15 2	ne er m)	Comments
soil			-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.								
Tops			-					V = 000(74)					-
			-		ML: Clayey SILT: some sand, pale brown, medium plasticity, sand is fine to medium grained.			V->208(71)					-
			-					V 154(67)					
			-					V-10+(07)					
			-					V-158(52)					
			1 -			м	Vst to H						-
≣			-					V->208(64)					
			-										
			-					V · · · · · · · · · · · · · · · · · · ·					
			-					V->208(73)					-
			-										
	-		2 -		Borehole terminated at 2.000 m			V-161(46)					-
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			3 -										
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T	ermina	ation r	easo	on: T	arget Depth Reached.								
F	Remai	rks: G	roun	dwat	er not encountered. Shear vane no. 1861.								
				-	This report is based on the attached field description for soil and rock	, New	/ Zeal	and, Geotechnical	Socie	ety In	c 200	05.	

	Η	IA	ND	Α	UC	GER BOREHOLE - HA10							
	CI Pr	ient oiec	: Hugl ct: Bal	h Gro linto	een ( v Pai	Group Limited rk Stage 5							
	Si	te A	ddres	s: W	elcoi	me Bay				ſ			(NZ) Ltd
	Pr Da	ojec ate:	ct No: 12/07	TGA 201/	42010 6	6_0121				Cha	pman	Morto	n Woodward
	Bo	oreh	ole Lo	ocati	on: L	ot 10					1:2	5	Sheet 1 of 1
	LC Cł	bgge heck	ed by: ked by	LPN /: LP	M	Position: Survey Source:	Elev Dat	vatio um:	n:				
		vater	(c)	(m)	Log	Material Description Soil: USC; Soil type; colour; structure; strenath; moisture; beddina;	on o	ncy/ ensity	Shear Strengths	Dyr	namio	Cone	
Uni:		vpuno.	RL (r	Jepth	raphic	plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional	Moistu Conditi	Consiste	(kPa) Peak (Residual)	(Blo	ow/10	0 mm)	Comments
		້ອ			Ū	comments OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.		Rec		5	10	15 20	_
Tops	-			-									
				-		ML: Clayey SILT: some sand, pale brown, medium plasticity, moderately sensitive, sand is fine to medium grained.			V-175(79)				
				-									
				-					V->208(79)				
				-									
				-				Vst	V->208(82)				
				1-			м	to H					
				-					V-202(88)				
				-									-
				-					V >209(64)				-
				-					V-~200(04)				-
				-									-
	_			2 —		Borehole terminated at 2.000 m			V->208(94)		_		
				-									
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Г	err	nina	ntion r	0 	n. T	arget Depth Reached							
'			ko: O		dwo+	ar not anonuntered. Shear years as 1981							
	i de	mar	лэ. GI	oun	uwal			_		_			
						This report is based on the attached field description for soil and rock	, Nev	/ Zeal	land, Geotechnical	Socie	ety Ind	2005.	

	HA	ND	A	UG	SER BOREHOLE - HA11								
	Proje	ct: Ba	n Gr linto	een ( y Pai	rk Stage 5							_	
	Site A Proje	ddres	s: W TGA	elco 201	me Bay 6_0121				C				Geosciences
	Date: Boreł	12/07 ole Lo	/201 ocati	6 on: L	.ot 11				Cha	ipmar 1:2	1 Mor 1 <b>5</b>	ton	Woodward Sheet 1 of 1
		ed by:		1	Position:	Elev	vatio	n:					
Unit	Broundwater	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional	Moisture	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dy Pe (Bl	namic enetro ow/10	Con mete 0 mn	ne er n)	Comments
oi			-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.		Ľ.		Ĭ			_	
Tops			-					V( > 208(04)					
			-		ML: Clayey SILT: some sand, pale brown, mottled grey, medium plasticity, moderately sensitive, sand is fine to medium grained.			V->200(94)					
								V-202(76)					
			- - - 1 -			м	Vst to H	V->208(67)					
Ē			-					V-188(85)					
			-					V->208(86)					
			-										
			2 -		Borehole terminated at 2.000 m			V->208(85)					-
			-										
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			5 -										
Te	 ermina	ation r	easc	n: T	arget Depth Reached.								
F	lemai	ˈks: G	roun	dwat	er not encountered. Shear vane no. 1861.		_					_	
					I his report is based on the attached field description for soil and rock	k, Nev	/ Zeal	and, Geotechnical	Soci	ety Ind	c 200	5.	

	H.	A	ND		UC	GER BOREHOLE - HA12					
	Pro	ojec e Ao	t: Bal ddres	llintc s: W	y Pa /elco	rk Stage 5 me Bay					
	Pro Dat	ojec te:	t No: 12/07	TG/ //201	4201 16	6_0121				Chapman Mo	1 Orton Woodward
	Boi	reh	ole Lo	ocat	ion: L	Lot 12		tia		1:25	Sheet 1 of 1
	Ch	gge eck	a by: ad by	LP1 /: LF	vi PM	Survey Source:	Dat	vatio um:	n:		
l Init	Groundwater	GIOULIUWALEI	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dynamic Co Penetrome (Blow/100 m 5 10 15	one eter mm) Comments 20
Tonsoil						OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.	-		V-191(52)		
						plasticity, insensitive to moderately sensitive, sand is fine to medium grained.			V->208(82)		
				1 -			м	Vst to H	V->208(97)		
Ē									V->208(88)		
									V->208(118)		
				2 -		Borehole terminated at 2.000 m			-V->208(97)		
				3 -							
				-							
				4 -							
				F							
	- orm	line	tion r		<u>ר</u> יתר	arget Depth Reached					
	Ren	narl	ks: G	roun	idwat	er not encountered. Shear vane no. 1861.					
						This report is based on the attached field description for soil and rock	k, Nev	/ Zeal	and, Geotechnical	Society Inc 20	005.

	ŀ	<b>IA</b>	ND	A	UC	SER BOREHOLE - HA13									
	P	rojec	t: Bal	linto	y Pa	rk Stage 5									
	Si Pi	ite A rojec	ddres ct No:	s: W TGA	/elco \201	me Bay 6_0121					7	V	$\left  \right ^{\prime}$	N	Geosciences
	D	ate: oreh	12/07	/201 ocati	l6 on·l	ot 13				Cha	apm 1	an № :25	Nort	on W	oodward
	Lo	ogge	ed by:	LPN	Λ	Position:	Elev	vatio	n:						
		heck	ked by	/: LP	M g	Survey Source: Material Description	Dat	um: ∖_≩		יח	wnar	nic (	<u>`one</u>	_	
- tici		Groundwa	RL (m)	Depth (m	Graphic Lo	Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency Relative Dens	Shear Strengths (kPa) Peak (Residual)	(B	low/	trom 100	mm 20	)	Comments
	5	0		-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.				H					
Lond	-			-					V 4 44 (00)						
				-		ML: Clayey SILT: some sand, pale brown, mottled orange, medium plasticity, sand is fine to medium grained.			V-141(88)						-
				-					V->208(67)						-
				-											
				-				Vst	V->208(49)						-
	•						IVI	to H							-
				-					V->208(76)						
				-											
				-					V->208(100)						
				-											-
	_			2 -		Borehole terminated at 2 000 m			V->208(67)						
				-											
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		mir	tion	5 -		arget Depth Depended									
	D-	mee		eas(	л. I dwo+	aryer Depili Reduited.									
	ке	mar	ks: Gi	oun	uwat	er not encountered. Snear vane no. 1861.				0			000	_	
						This report is based on the attached field description for soil and rock	k, New	v Zeal	and, Geotechnical	Soc	iety	Inc 2	2005	ō.	

	HA	ND	) A	UC	SER BOREHOLE - HA14							
	Client Proje	:: Hug ct: Bal	h Gr Ilinto	een ( v Pa	Group Limited rk Stage 5							
	Site A	ddres	s: W	/elco	me Bay				C		V	(NZ) Ltd
	Proje Date:	ct NO: 12/07	۲ <i>G/</i> 7/201	4201 16	6_0121				Chap	man M	lortor	Woodward
	Boreh	ole L	ocati	ion: L	ot 14		tia			1:25		Sheet 1 of 1
	Logge Checl	ed by: ked by	LPN y: LF	/I PM	Survey Source:	Dat	vatio um:	n:				
	ater	-	Ê	Log	Material Description	e E	icy/ ensity	Shear Strengths	Dyna	amic C	one	
Unit	wpund	RL (m	epth (	aphic	plasticity; sensitivity; additional comments Rock: Weathering: colour: fabric: rock name: strength: additional	Moistur Conditic	onsister ative De	(kPa) Peak (Residual)	(Blov	etrom v/100	eter mm)	Comments
	Gro		Δ	Ö	comments		Rei		5	10 15	20	
soil					OE. TO SOLE Organic SIET. dark brown, minor rookets.							-
Top								V->208(58)				-
-					ML: Clayey SILT: pale brown, low to medium plasticity,		Vet					-
Ash			-		moderately sensitive.		to H	V-166(49)				
nger /												
You					ML: Clayey SILT: some sand, pale grey, low plasticity, moderately sensitive, sand is medium grained.			V-151(55)				
ų	_		1 -		SP: SAND: pale grey, poorly graded, fine grained.	м		-		+	_	
shu As							L to	V-118(49)				
Rotoe							MD					
				× × × × >	ML: Clayey SILT: pale brown, medium plasticity, moderately sensitive to sensitive			-				
n Ash							Vet	V-144(64)				
milto							to H					
Ha												
			2 -		Borehole terminated at 2.000 m			V->208(30)				
			:	-								-
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Te	ermina	ation r	easo	 on: Т	arget Depth Reached.							
	2emar	ke C	roun	dw2t	rer not encountered. Shear vane no. 1861							
'	Cillal	N3. U	Juli	uwal		-	-		_	r.		
				-	This report is based on the attached field description for soil and rock	, Nev	/ Zeal	and, Geotechnical	Societ	y Inc 2	2005.	

	HA	ND	A	UG	SER BOREHOLE - HA15					
F	Proje	:: Hug ct: Ba	n Gre llinto	een ( y Pai	Group Limited				<b>•</b>	
S	Site A	ddres	s: W		me Bay				CMV	(NZ) Ltd
	Date:	12/07	/201	6	5_0121				Chapman Mortor	Woodward
E	Boreh	nole Lo	ocati	on: L	ot 15	Flox	(atio	n.	1:25	Sheet 1 of 1
	Check	ked by	/: LP	M	Survey Source:	Date	um:			
ij	water	m)	(m)	c Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding;	ure tion	ency/ Density	Shear Strengths	Dynamic Cone Penetrometer	
5	iround	RL (	Depth	Sraphi	plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional	Moist Condi	Consist telative I	(kPa) Peak (Residual)	(Blow/100 mm)	Comments
soil	G				OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.		2		5 10 15 20	
Top			-		MI - Clayov SII T- pale brown, low to modium plasticity	м				
			-		NE. Gayey SIEL pale blown, low to medium plasticity.			V-UTP		
			-							
			-					V-UTP		
			-							
Ash			1-				н	V-UTP		
'uder			-			D				
No.			-					V-UTP		
			-							
			-					V-UTP		-
			-							
			-							
			2 -		Borehole terminated at 2.000 m			V-UTP		
			-							
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			-							
			5 -							
Te	rmina	ation r	easo	n: T	arget Depth Reached.					
R	emar	rks: G	roun	dwat	er not encountered. Shear vane no. 1861.					
				٦	This report is based on the attached field description for soil and rock	, New	Zeal	land, Geotechnical	Society Inc 2005.	

ł	ΗA	ND	Α	UC	SER BOREHOLE - HA16							
F	Client Projec	:: Hug ct: Bal	h Gr Ilinto	een ( v Pa	Group Limited rk Stage 5							
S	Site A	ddres	s: W	/elco	me Bay				C	A		(NZ) Ltd
	ate:	21 NO: 12/07	7G7 7/201	42010 16	6_0121				Chap	oman	Mortor	Woodward
E	Boreh	ole Lo	ocati	ion: L	ot 16		(atio	~		1:2	5	Sheet 1 of 1
	bgge Checl	ed by. ked by	LPN /: LF	ν PM	Survey Source:	Dat	um:	11.				
	vater	(ר	(m)	Log	Material Description Soil: USC: Soil type: colour: structure: strength: moisture: bedding:	e on	ncy/ ensity	Shear Strengths	Dyn	amic	Cone	
Unit	vpuno	RL (n	epth	aphic	plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional	Moistu Conditi	onsiste lative D	(kPa) Peak (Residual)	(Blo	w/100	) mm)	Comments
	ē			Ū	comments OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.		Re C		5	10 1	5 20	
liosdc			-			м						-
-			-		ML: Clavey SILT: pale brown- grey, low plasticity, moderately		-	V-64(27)				-
			-		sensitive.							
			-					V-79(33)				-
			-									-
Ash			-				St to VSt	V-73(27)				
nger /			1-			M to W						
You			-					V-151(49)				
			-									
			-									
			-	$\times \times \times$				V-144(49)				
			-	$(\times \times)$	SP: SAND: pale grey, poorly graded, medium to coarse grained.		L to	-				
R			2 -		Perchala terminated at 2 000 m	м	MD	V-137(49)				
			-	-	Borenole terminated at 2.000 m							
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-			5 -									
Tei	mina	ation r	easo	n: T	arget Depth Reached.	I	I	<u> </u>	<u> </u>			<u> </u>
R	emar	ks: G	roun	dwat	er not encountered. Shear vane no. 1861. RA stratigra	phic	code	e denotes Rotoe	ehu A	\sh.		
				-	- This report is based on the attached field description for soil and rock	, New	/ Zeal	and, Geotechnical	Socie	ty Inc	2005.	

	HA	ND	) A	UC	SER BOREHOLE - HA17							
C	Client Proje	t: Hug ct: Ba	h Gr Ilinto	een ( y Pa	Group Limited rk Stage 5							
E S	Site A Proie	ddres	s: W TGA	/elco A201	me Bay 6_0121				C			Geosciences
	Date:	12/07	7/201	16					Chap	- man M 1.25	Morton	Woodward
	ogge	ed by:	LPN	юп: L Л	Position:	Elev	/atio	n:		1.20		Sheet 1 of 1
0	Checl	ked by	y: LF	M	Survey Source:	Dat	um:					
Init	dwate	(m)	th (m)	nic Lo	Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity: sensitivity: additional comments	isture	istency/ e Densit	Shear Strengths (kPa)	Dyna Pen (Ploy	etrom	Cone leter	Comments
	Grour	RL	Dep	Grap	Rock: Weathering; colour; fabric; rock name; strength; additional comments	QÑ	Cons Relativ	Peak (Residual)	5	10 15	20	
			-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.							-
opsoil			-			м		V-137(37)				-
			-									
					ML: Clayey SILT: some sand, pale brown, low plasticity, moderately sensitive to sensitive, sand is fine to medium grained.		-	V-106(30)				
			1 -				St to	V-106(20)				
unger Ash			-			M to W		V-172(79)				
λ			-									
			-	(IXX) XXX XIX				V-134(46)				
			-	$\times$								-
			2 -					V-88(33)				-
				-	Borehole terminated at 2.000 m							
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			5 -									
Те	 rmina	ation r	easo	) Dn: T	arget Depth Reached.							
R	emar	ˈks: G	roun	dwat	er not encountered. Shear vane no. 1861.							
				-	This report is based on the attached field description for soil and rock	k, Nev	/ Zeal	and, Geotechnical	Societ	y Inc 2	2005.	

	HA	ND	Α	UC	SER BOREHOLE - HA18							
(   F	Client Proje	t: Hug ct: Bal	h Gr Ilinto	een ( y Pa	Group Limited rk Stage 5							
	Site A	ddres	s: W	elco	me Bay				C			
	Date:	12/07	7/201	6	0_0121				Chap	pman	Mortor	Woodward
E	Boreh	nole Lo	ocati	on: L	ot 18	Flor	vatio	n:		1:2	5	Sheet 1 of 1
(	Chec	ked by	/: LP	°M	Survey Source:	Dat	um:	11.				
Unit	broundwater	RL (m)	Depth (m)	Sraphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional	Moisture Condition	Consistency/ telative Density	Shear Strengths (kPa) Peak (Residual)	Dyr Pei (Blo	namic netro ow/10	Cone meter 0 mm)	Comments
			-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.				Ĥ	+		
Topso			-									
					ML: Clayey SILT: pale brown, low to medium plasticity, moderately sensitive to sensitive.			V-185(64)				
			-	X X X X X X X X X X X X X X X X X X X				V->208(46)				
ų			- - - 1 -			м	Vst	V-144(64)				
ounger As							IU H	V-161(64)				
			-									
			-					V-130(64)				
			-	X X X X X X X X								
			2 -					-V-109(46)				
			-		Borenole terminated at 2.000 m							
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Та	rmin	ation -	5 -		arget Denth Reached					_		
	ome		cast	л. I dwo+	anger Deptin Neached.							
R	emal	KS. G	oun	uwat			. –	land Oratic to the	0		0005	
				-	I his report is based on the attached field description for soil and rock	, Nev	v Zea	and, Geotechnical	Socie	ety Ind	2005.	

	HAND AUGER BOREHOLE - HA19 Client: Hugh Green Group Limited Project: Ballintov Park Stage 5											
	Client Proje	:: Hug ct: Ba	h Gr Ilinto	een ( y Pai	Group Limited rk Stage 5				<b>—</b> — — —			
	Site A	ddres	s: W	/elcoi	me Bay				CMV	(NZ) Ltd		
	Date:	12/07	7/201	16	0_0121				Chapman Mortor	Woodward		
	Boreh	ole Lo	ocati	ion: L	ot 19	Flo	vatio	n.	1:25	Sheet 1 of 1		
(	Chec	ked by	<u>/: LF</u>	PM	Survey Source:	Dat	um:					
Unit	Groundwater	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dynamic Cone Penetrometer (Blow/100 mm) 5 10 15 20	Comments		
soil	0		-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.							
Top	-				ML: Clayey SILT: pale orange- brown, low to medium plasticity, moderately sensitive.			V-177(49)				
			-		contains some medium to coarse sand.			V-144(64)				
ounger Ash			1-			м	St to VSt	V-94(33)		- - - - - -		
X			-					V-109(67)				
			-					V-109(52)				
RA			-		SP: SAND: pale grey, poorly graded, fine grained.							
			2 -		Borehole terminated at 2.000 m			V->208(40)				
			-	-								
			-									
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			3 -	-								
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			-									
Те	Termination reason: Target Depth Reached.											
R	emar	ˈks: G	roun	dwat	er not encountered. Shear vane no. 1861. RA stratigra	phic	code	e denotes Roto	ehu Ash.			
					This report is based on the attached field description for soil and rock	k, Nev	/ Zeal	land, Geotechnical	Society Inc 2005.			

	HAND AUGER BOREHOLE - HA20 Client: Hugh Green Group Limited										
F	Client Projec	: Hugl ct: Bal	h Gr linto	een ( y Pa	Group Limited rk Stage 5						
5	Site A	ddres	s: W	/elco	me Bay					(NZ) Ltd	
	Date:	21 NO: 12/07	7G7 7/201	4201 16	6_0121				Chapman Mort	on Woodward	
E	Boreh	iole Lo	ocati	ion: L	ot 20		tia		1:25	Sheet 1 of 1	
	Logge Checl	ed by: ked by	LPN /: LF	/I PM	Survey Source:	Dat	vatio um:	n:			
Jnit	ndwater	(ш) -	th (m)	hic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments	isture Idition	istency/ e Density	Shear Strengths (kPa)	Dynamic Cone Penetrometer	Comments	
	Groui	RI	Dep	Grap	Rock: Weathering; colour; fabric; rock name; strength; additional comments	₿Ō	Cons Relativ	Peak (Residual)	5 10 15 20	,	
i			-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.					-	
Tops											
			-		ML: Clayey SILT: pale brown, low to medium plasticity, moderately sensitive to sensitive.			V-196(73)			
			-					V-158(64)			
			-					V-100(04)			
								V-151(33)			
r Ash			1 -		ML: Clayey SILT: some sand, pale brown, low to medium plasticity, insensitive to moderately sensitive sand is fine to	м	VSt			-1 $-1$	
ounge			-		medium grained.			V-136(55)			
2											
			-					V-141(71)			
			-					• 141(71)			
			2 -	-×_× >	Borehole terminated at 2.000 m			V-100(52)			
			-								
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			-	-							
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			-								
			5 -								
Те	rmina	ation r	easo	) n: T	arget Depth Reached.						
R	emar	ks: Gi	roun	dwat	er not encountered. Shear vane no. 1861.						
					This report is based on the attached field description for soil and rock	k, Nev	v Zea	land, Geotechnical	Society Inc 2005		

	HAND AUGER BOREHOLE - HA21 Client: Hugh Green Group Limited Project: Pallintay Park Stage 5												
	Client Proje	: Hugl ct: Bal	h Gr linto	een ( y Pai	Group Limited rk Stage 5								
	Site A	ddres	s: W	/elcoi	me Bay						M		(NZ) Ltd
	Proje Date:	ct No: 12/07	1GA 201/	42010 6	6_0121				Cha	ipma	an Mor	rton \	Woodward
	Boreh	ole Lo	ocati	on: L	ot 21					1:	25		Sheet 1 of 1
	_ogg∉ Checl	ed by: ked by	LPN /: LP	/ M	Position: Survey Source:	Elev	vatio um:	n:					
	ater	~	Ê	bg	Material Description		cy/ nsity	Shoor Strongtho	Dy	nam	ic Cor	ne	
Unit	Mpun	RL (m	epth (	aphic	plasticity; sensitivity; additional comments Rock: Weathering: colour: fabric: rock name: strength: additional	Moistur	insisten ttive De	(kPa)	Pe (Bl	enetr ow/1	omete 00 mr	er n)	Comments
	Gro	ш.	Ď	Gra	comments	-0	Rela R		5	10	15 20	0	
_			-		OL: TOPSOIL- Organic SILI: dark brown, minor rootiets.								-
opsoi			-					V-144(64)					
			-										
			-		ML: Clayey SILT: pale brown, low to medium plasticity, moderately sensitive			V->208(73)					
			-					1 200(10)					
			-					V->208(71)					
1			1 -			м	Vst to H	200(/1)	$\square$	+	+		-
r Ash			-					V->208(70)					-
ounge			-					1 200(10)					-
×			-	:									-
			-	$( \times				V-181(73)					-
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			-	$(\times \times \times)$									-
			2 -		Borehole terminated at 2.000 m			V-180(73)					
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_			5 -		and Death Deaths '								
le	rmina	ation r	easc	on: T	arget Depth Reached.								
R	emar	ks: Gi	roun	dwat	er not encountered. Shear vane no. 1861.								
				1	This report is based on the attached field description for soil and rock	, Nev	/ Zeal	and, Geotechnical	Socie	ety lı	nc 200	)5.	

	HAND AUGER BOREHOLE - HA22 Client: Hugh Green Group Limited											
	Proje	ct: Bal	n Gr Ilinto	een ( y Pa	rk Stage 5							
	Site A Proje	ddres	s: W TGA	/elco \201	me Bay 6  0121				CMM	Geosciences		
	Date:	12/07	7/201	6	- 				Chapman Morton	Woodward		
	_ogge	ed by:	LPN	оп. L Л	Position:	Elev	vatio	n:	1.20	Sheet I of I		
	Chec	ked by	y: LP	M	Survey Source:	Dat	um:					
Unit	undwate	(m) אר	epth (m)	aphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Bock: Weathering: colour; fabric: rock name: strength; additional	Moisture Condition	insistency/ trive Density	Shear Strengths (kPa) Peak (Residual)	Dynamic Cone Penetrometer (Blow/100 mm)	Comments		
=	Ű		ā	Gr	comments		Rei		5 10 15 20			
Topso					OE. TOPSOIL- Organic SIET. dark brown, minor rootiets.							
			-		ML: Clayey SILT: some sand, pale brown, mottled grey, medium plasticity, moderately sensitive, sand is fine to medium grained.			V->208(49)				
			-					V-148(49)				
			-					V->208(67)				
			1-			М	Vst to H	V-188(88)				
			-					100(00)				
			-					V-172(70)				
			-									
			2 -		Borehole terminated at 2.000 m			V-188(55)				
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			-							-		
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Te	 rmina	ation r	easo	n: T	arget Depth Reached.							
R	emai	rks: G	roun	dwat	er not encountered. Shear vane no. 1861.							
				-	This report is based on the attached field description for soil and rock	k, Nev	v Zea	land, Geotechnical	Society Inc 2005.			

ł	HAND AUGER BOREHOLE - HA23 Client: Hugh Green Group Limited										
C	Client Projec	: Hugl ct: Bal	h Gro linto	een ( v Pai	Group Limited rk Stage 5						
S	Site A	ddres	s: W	/elcoi	me Bay				CM	(NZ) Ltd	
	ate:	21 NO: 12/07	7G7 /201	42016 6	6_0121				Chapman Morton	Woodward	
B	Boreh	iole Lo	ocati	on: L	ot 23		(atio		1:25	Sheet 1 of 1	
	ogge Check	ed by: ked by	LPIV /: LP	M	Survey Source:	Dat	vatio um:	n:			
	vater	(	(L	Log	Material Description Soil: USC: Soil type: colour: structure: strength: moisture: bedding:	e Du	ncy/ ensity	Shear Strengths	Dynamic Cone		
Unit	wpunc	RL (n	epth (	aphic	plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional	Moistu Conditi	onsister ative De	(kPa) Peak (Residual)	(Blow/100 mm)	Comments	
Ji	Ğ			উ	comments OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.		2 Rel C		5 10 15 20		
Topso			-							-	
			-	$(\times \times $	ML: Clayey SILT: pale brown, low to medium plasticity, moderately sensitive to sensitive.			V->208(52)		-	
			-							-	
			-					V->208(49)			
			-								
sh			-				Vst	V->208(46)			
ger A:			1			М	to H				
Youn			-					V->208(61)		-	
			-							-	
			-					\/ <sub>-&gt;208(76)</sub>			
			-					V-200(70)		-	
			-							-	
			2 -	× <u>×</u>	Borehole terminated at 2.000 m			V-137(52)		-	
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			-								
			5 -								
Ter	mina	ation r	easc	n: T	arget Depth Reached.						
Re	emar	ks: Gi	roun	dwat	er not encountered. Shear vane no. 1861.						
				٦	This report is based on the attached field description for soil and rock	, Nev	/ Zeal	and, Geotechnical	Society Inc 2005.		

	HAND AUGER BOREHOLE - HA24 Client: Hugh Green Group Limited											
F	Client Projec	: Hugi ct: Bal	n Gr linto	een ( y Pai	Group Limited rk Stage 5				-			
5	Site A	ddres	s: W		me Bay					(NZ) Ltd		
	Date:	12/07	/201	6	0_0121				Chapman Morton	Woodward		
E		ole Lo	DCati	on: L 1	ot 24 Position	Flev	/atio	n:	1:25	Sheet 1 of 1		
0	Check	ked by	/: LP	M	Survey Source:	Dati	um:	····	1			
Unit	Groundwater	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dynamic Cone Penetrometer (Blow/100 mm) 5 10 15 20	Comments		
psoil	_		-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.							
Tot			-		ML: Clayey SILT: some sand, pale orange- brown, low to medium plasticity, insensitive to moderately sensitive, sand is fine grained.	-		V->208(46)				
			-					V-137(58)				
unger Ash			1 -			м	Vst to H	V-85(46)				
<u>۶</u>			-					V-175(94)				
			-					V-100(49)				
AS			-	<u> </u>	SP: SAND: pale grey, poorly graded, fine grained.	-	L to	-				
<b>–</b>			2 -		Borehole terminated at 2.000 m	-		V->208(40)				
			-							-		
			-							-		
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Те	Termination reason: Target Depth Reached.											
R	emar	ks: Gi	oun	dwat	er not encountered. Shear vane no. 1861. RA stratigra	phic	code	e denotes Roto	ehu Ash.			
				-	This report is based on the attached field description for soil and rock	, New	/ Zeal	land, Geotechnical	Society Inc 2005.			

	HAND AUGER BOREHOLE - HA25 Client: Hugh Green Group Limited											
	Projec Site A	ct: Bal ddres	llintc s: V	y Pa /elco	rk Stage 5 me Bay				C			
	⊃rojeo ⊃ate:	ct No: 12/07	TG/ //201	4201 16	6_0121				Chap	man	Morto	Geosciences
	Boreh	ole Lo	ocat	ion: L	ot 25	Flor	(atio	<u>n</u> .		1:25	5	Sheet 1 of 1
(	Check	ed by.	LP1 /: LF	PM	Survey Source:	Dat	um:					
Unit	Groundwater	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dyna Pen (Blov 5	amic ietror w/100	Cone neter ) mm) 5 20	Comments
psoil					OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.							-
Younger Ash T					ML: Clayey SILT: some sand, pale grey, low plasticity, moderately sensitive, sand is fine grained.		VSt	V-134(49)				
Rotoehu Ash					SP: SAND: pale grey, poorly graded, fine to medium grained.	-	L to MD	V-109(46)				
			1 -		ML: Clayey SILT: pale brown, low to medium plasticity, moderately sensitive.	м		v->208(58)	_			
Ash								V-193(79)				
Hamilton			-				Vst to H	V->208(88)				
			2 -		Porchala terminated at 2 000 m			V->208(73)				
				-	Borenole terminated at 2.000 m							-
			3-									-
			-									
			4 -						-			
				-								
			-	-								
<u> </u>			5 -									-
Те	Termination reason: Target Depth Reached.											
R	emar	ks: G	roun	idwat	er not encountered. Shear vane no. 1861.							
					This report is based on the attached field description for soil and rock	k, New	/ Zeal	and, Geotechnical	Societ	y Inc	2005.	

	HAND AUGER BOREHOLE - HA26 Client: Hugh Green Group Limited Project: Ballintoy Park Stage 5 Site Address: Welcome Bay Project No: TCA2016, 0121												
	Site Pro	e A ojec	ddres	s: W TGA	/elcoi \201(	me Bay 6_0121				C			Geosciences
	Boi	te: reh	ole Lo	ocati	on: L	.ot 26				Clia	1:2	5	Sheet 1 of 1
	Log	gge	ed by:		1	Position:	Elev	/atio	n:				
Unit	Coundwater		RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dyr Pe (Blo 5	namic enetro ow/10 10 1	Cone meter 0 mm) 5 20	Comments
Topsoil				-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.	M to W						
				-		ML: Clayey SILT: pale brown, low plasticity, moderately sensitive to sensitive.		-	V->208(37)				
									V->208(49)				
er Ash				1 -				Vst to H	V-161(33)				
Young				-			M		V-130(37)				
				-					V-208(64)				
				2 -		Rorabola terminated at 2,000 m			·V-UTP				
				3									
	erm	iina	ition r	5 -	оп. т	arget Denth Reached							
	Termination reason: Target Depth Reached. Remarks: Groundwater not encountered. Shear vane no. 1861. This report is based on the attached field description for soil and rock, New Zealand, Geotechnical Society Inc 2005.												

F F F	HA Client Proje Site A Proje Date:	Hug ct: Ba ddres ct No: 08/08	h Gr Ilinto ss: W TG/ 3/201	een y Pa /elco \201	GER BOREHOLE - HA27 Group Limited rk Stage 5 me Bay 6_0121				Chapman Morton V	Geosciences
E	Boreh	nole L	ocati	ion: L	ot 27				1:25	Sheet 1 of 1
	Logge Chec	ea by: ked b'	UPN V: LF	/I PM	Position: Survey Source:	Dat	/atio um:	n:		
Unit	Groundwater	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dynamic Cone Penetrometer (Blow/100 mm) 5 10 15 20	Comments
Topsoil					OL: TOPSOIL- Organic SIL1: dark brown, minor rootlets.	M to W		V->208(88)		
			-		ML: Clayey SILT: some sand, pale brown, mottled pink, medium to high plasticity, insensitive to moderately sensitive.	м		V 85(43)		
			-				St	V-00(43)		
Subgroup			1-		ML: Clayey SILT: pale brown, low plasticity, insensitive to moderately sensitive.			V-56(17)		
Matua			-			M to		V-58(33)		
			-					V-UTP		
	-		2 -		Borehole terminated at 2.000 m			V-UTP		
			3-							- - - - - - - - - - - - - - - - - - -
			5							
Te R	rmina emai	ation r 'ks: G	roun	on: T dwat	arget Depth Reached. er not encountered. Shear vane no. 1861. This report is based on the attached field description for soil and roc	k, New	Zeal	and, Geotechnical	Society Inc 2005.	

	HAND AUGER BOREHOLE - HA28 Client: Hugh Green Group Limited											
	Client Proje	:: Hug ct: Bal	h Gr llinto	een ( y Pai	Group Limited rk Stage 5				<b>—</b> — —			
	Site A Proie	ddres	s: W TGA	/elcoi \201	me Bay 6_0121				CMM	Geosciences		
	Date:	08/08	8/201	6	- at 29				Chapman Morton	Woodward		
-	Logge	ed by:	LPN	оп. L Л	Position:	Elev	/atio	n:	1.25	Sheet 1 01 1		
	Chec	ked by	/: LP	M	Survey Source:	Dat	um:					
Unit	Groundwater	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dynamic Cone Penetrometer (Blow/100 mm) 5 10 15 20	Comments		
osoil			-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.							
Top	_		-		ML: Clayey SILT: pale brown, low to medium plasticity, insensitive to moderately sensitive.			V-134(55)				
								V-199(73)				
jer Ash			1 -			м	VSt	V-123(64)				
Young			- - - - -					V-196(64)				
			-					V-144(64)				
			-							-		
	-		2 -	$\times \times$	Borehole terminated at 2.000 m			V-191(82)		-		
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Te	ermina	ation r	easc	Dn: T	arget Depth Reached.	L	L					
F	Remai	ˈks: G	roun	dwat	er not encountered. Shear vane no. 1861.				0			
					I his report is based on the attached field description for soil and rock	k, New	/ Zeal	land, Geotechnical	Society Inc 2005.			

	HAND AUGER BOREHOLE - HA29 Client: Hugh Green Group Limited										
F	Proje	ct: Bal	llinto	y Pa	rk Stage 5				<b>—</b> — —		
	Site A	ddres	s: W	elco	me Bay					(NZ) Ltd	
	Date:	08/08	3/201	۰2010 6	0_0121				Chapman Morton	Woodward	
E	Boreh	ole Lo	ocati	on: L	ot 29				1:25	Sheet 1 of 1	
	.ogge `hecl	ed by:		1	Position:	Ele	/atio	n:			
	fer		у. LI 	bc	Material Description		um. چ <u>ک</u>		Dynamic Cone		
Unit	Broundwa	RL (m)	Depth (m	<b>Sraphic</b> Lo	Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency Relative Dens	Shear Strengths (kPa) Peak (Residual)	Penetrometer (Blow/100 mm) 5 10 15 20	Comments	
	0		-		SP: SAND: pale grey, poorly graded, fine to medium grained.		ш. —				
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	-		-	$\sim \sim \sim$	ML: Clayey SILT: pale brown, low to medium plasticity,			_		-	
r Ash			-		moderately sensitive.		1.4-4	V-202(64)		-	
nngei			-	(XXX)			to H			-	
⊳			-	$(\times \times)$						-	
			2 -		Borehole terminated at 2.000 m			V-154(55)		-	
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			5 -								
Te	rmina	ation r	easc	n: T	arget Depth Reached.						
R	emar	ks: G	roun	dwat	er not encountered. Shear vane no. 1861.						
				-	This report is based on the attached field description for soil and rock	, New	/ Zeal	and, Geotechnical	Society Inc 2005.		

	HAND AUGER BOREHOLE - HA30 Client: Hugh Green Group Limited Project: Ballintoy Park Stage 5 Site Addresses Welsense Day											
F	Proje Site A	ct: Bal ddres	llinto s: W	y Pa /elco	rk Stage 5 me Bav							
F	Proje	ct No:	TG	4201	6_0121					Geosciences		
	Jate: Boreh	iole Lo	ocati	on: L	.ot29				1:25	Sheet 1 of 1		
L	logge	ed by:	LPN	1	Position:	Elev	atio	n:				
	inecı ق	kea by	/: LP	۱۷۱ B	Survey Source: Material Description	Dat	um:		Dynamic Cone			
Unit	Groundwa	RL (m)	Depth (m	Graphic Lo	Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency Relative Dens	Shear Strengths (kPa) Peak (Residual)	Penetrometer (Blow/100 mm) 5 10 15 20	Comments		
			-		SP: SAND: pale grey, poorly graded, fine to medium grained.							
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			2 -		SP: Gravelly SAND: pale grey, poorly graded, fine to medium grained, gravel is fine to medium grained and subangular to			-				
			-		Subrounded. Borehole terminated at 2.000 m							
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Те	rmina	ation r	easo	n: T	arget Depth Reached.	I	I	1	1			
R	emar	ks: G	roun	dwat	er not encountered. Shear vane no. 1861.							
				-	This report is based on the attached field description for soil and rock	, New	/ Zeal	and, Geotechnical	Society Inc 2005.			

HAND AUGER BOREHOLE - HA31												
	Client: Hugh Green Group Limited											
	Site	Site Address: Welcome Bay										
	Date	: 18/08	8/201	420 R	0_0121		Chapman Morton	Woodward				
	Bore	hole L	ocati	on: L	ot 31	n:	1:25	Sheet 1 of 1				
	Cheo	ked by	/: LP	°M	Survey Source:							
	vater	Ê	(E)	Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding;	on	ncy/ ensity	Shear Strengths (kPa) Peak (Residual)	Dynamic Cone			
Ini	\puno	RL (r	Jepth	raphic	plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional	Moistu Condit	Consiste lative D		(Blow/100 mm)	Comments		
	Ū			U	comments OL: TOPSOIL- Organic SILT: dark brown, low plasticity.		°₽°		5 10 15 20	<u> </u>		
- U.			-							-		
			-		moderately sensitive to sensitive.			V->208(64)		-		
			-							-		
			-	$(\times \times $				V->208(106)				
			-							-		
Ash			- - 1 -			м	Vst	V->208(61)		-		
nder			-				ЮП	V · 000(70)				
5			-					v->208(79)		-		
			-							-		
			-					V-188(61)		-		
			-									
			-	$\left( \begin{array}{c} \times \times \\ \times \times \end{array} \right)$				V( > 009(27)		-		
			2 -		Borehole terminated at 2.000 m			V->208(37)				
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	ermin	l ation r	easo	n: T	arget Depth Reached.							
	Rema	rks: G	roun	dwat	er not encountered. Shear vane no. 1861.							
				٦	This report is based on the attached field description for soil and rock	, New	/ Zeal	and, Geotechnical	Society Inc 2005.			
L									,			

HAND AUGER BOREHOLE - HA32												
	Client: Hugh Green Group Limited Project: Ballintoy Park Stage 5											
	Site Address: Welcome Bay Project No: TGA2016, 0121											Geosciences
	Date: 08/08/2016										Mortor	n Woodward
	Borehole Location: Lot 32       Logged by: LPM       Position:   Elevation:										5	Sheet 1 of 1
	Chec	ked by	y: LF	PM	Survey Source:	Dat	um:					
Unit	sroundwate	RL (m)	Depth (m)	Braphic Log	Material Description         Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments         Rock: Weathering; colour; fabric; rock name; strength; additional						Cone meter 0 mm)	Comments
ē			-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.				H	Ť		
Tops(			-			M to W						
			-		ML: Clayey SILT: pale brown, medium plasticity, moderately sensitive.			V->208(97)				
			-									
			-					V->208(73)				
			-					V( >209(70)				-
\sh			1 -				Vst to H	V-200(79)		_		
nger /			-			м		V-UTP				
Aou			-					-				
			-									-
			-					V->208(88)				-
			-									
			2 -		Develople terminated at 2 000 m			V-188(40)				
			-	-	Borenoie terminated at 2.000 m							
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Т	ermin	ation r	reaso	on: T	arget Depth Reached.	•	•		•			
F	Rema	rks: G	roun	dwat	er not encountered. Shear vane no. 1861.							
	This report is based on the attached field description for soil and rock, New Zealand, Geotechnical Society Inc 2005.											

HAND AUGER BOREHOLE - HA33											
(   F	Client Proje	:: Hug ct: Bal	h Gr Ilinto	een ( y Pa	Group Limited rk Stage 5						
5	Site Address: Welcome Bay										
F	Date:	Woodward									
E	Boreh	ole L	ocati	on: L	ot 14-15		1:25	Sheet 1 of 1			
	Logge Checl	ea by: ked by	LPN /: LF	/I PM	Position: Survey Source:	n:					
Unit	undwater	(m)	pth (m)	phic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments	Shear Strengths (kPa)	Dynamic Cone Penetrometer (Blow/100 mm)	Comments			
	Grot	Ľ.	Ğ	Gra	Rock: weathering; colour; fabric; rock name, strength; additional comments	20	Cor Relat	Peak (Residual)	5 10 15 20		
soil			-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.					-	
Top			-							-	
			-		ML: Clayey SILT: pale grey, non plastic to low plasticity, moderately sensitive.			V-011		-	
			-								
			-					V-01P		-	
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dno.			1 -			м	н	V-UTP			
Subgi			-							-	
latua			-					V-UTP		-	
≥			-							-	
			-					V->208(88)			
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	-		2 -		Borehole terminated at 2.000 m			V->208(43)			
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Те	rmina	ation r	easo	n: T	arget Depth Reached.	I	I		<u>                                     </u>		
R	emar	ks: G	roun	dwat	er not encountered. Shear vane no. 1861.						
				-	This report is based on the attached field description for soil and rock	, New	v Zeal	and, Geotechnical	Society Inc 2005.		

HAND AUGER BOREHOLE - HA34														
Client: Hugh Green Group Limited														
	Site Address: Welcome Bay											W	(NZ) Ltd	
	Project No: TGA2016_0121 Date: 08/08/2016										man Moi	rton W	oodward	
	Borehole Location: Lot 15-16										1:25		Sheet 1 of 1	_
	Checked by: LPM Survey Source: Datum:													
		vater	( <b>ب</b>	(m)	Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding;	re on	ncy/ ensity	Shear Strengths	Dynamic Cone				
, ici		Npuno	RL (n	epth	aphic	plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional	Moistu Conditi	onsiste lative D	(kPa) Peak (Residual)	(Blow	/100 mr	m)	Comments	
		ອັ			Ŭ XXX	comments OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.		C B		5 1	15 2	0		_
liosoc														-
	-					ML: Clavev SILT: some sand, pale grev, low plasticity.	м		V->208(33)					_
						moderately sensitive, sand is fine to medium grained.								-
									V->208(58)					-
						ML: Clayey SILT: pale brown, low plasticity, moderately								-
									V->208(52)					-
r Ach				1 -				н					-	_
	20								V->208(64)					_
5	2						M to W							_
														_
									V-UTP					-
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				2 -									_	_
				2	-	Borehole terminated at 2.000 m			VOII					-
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	[ Fern	nina	ation r	eas	on: T	arget Depth Reached.								-
	Rei	mar	ks <sup>.</sup> G	rour	ndwat	er not encountered. Shear vane no. 1861								
		mar		. 501				_		0		-		
						This report is based on the attached field description for soil and rock	, Nev	/ Zeal	land, Geotechnical	Society	/ Inc 200	05.		
	HA	ND	) A	UC	SER BOREHOLE - HA35									
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( F	Client	:: Hug	h Gr Ilinto	een ( v Pa	Group Limited									
3	Site A	ddres	s: W	/elco	me Bay				CAN					
F F	Proje	ct No:	TG/ 1/201	A2010	6_0121		Chapman Morto	Geosciences						
E	Boreh	ole L	ocati	on: L	ot 16-17		1:25	Sheet 1 of 1						
L		ed by:		1	Position:	Ele	vatio	n:						
	Jineci jaj		y. LP	۱۷۱ ور	Material Description	Dat	um. ⊾≩		Dynamic Cone					
Jnit	ndwai	(E) -	th (m	hic Lo	Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments	isture	istency e Dens	Shear Strengths (kPa)	Penetrometer (Blow/100 mm)	Comments				
	Grou	R	Dep	Grap	Rock: Weathering; colour; fabric; rock name; strength; additional comments	ĕS	Cons Relativ	Peak (Residual)	5 10 15 20					
ii			-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.									
Tops			-			м								
			-		ML: Clayey SILT: pale brown- grey, low plasticity, moderately			V-64(17)						
			-		Sensitive.									
			-	$\times \times \times$				V-61(17)						
			-							-				
<u>a</u>			-				E to	V-37(14)						
þgrou			1 -				St							
la Su.			-			W		V-UTP						
Matu			-	$(\times \times)$										
			-							-				
			-					V-46(17)						
			-							-				
				$(X \times X)$										
			2 -		Borehole terminated at 2.000 m			V-94(20)						
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			-											
			5 -											
Те	rmina	ation r	easo	on: T	arget Depth Reached.									
R	emar	ks: G	roun	dwat	er not encountered. Shear vane no. 1861.									
					This report is based on the attached field description for soil and rock	, New	/ Zeal	and, Geotechnical	Society Inc 2005.	·				

	HAND AUGER BOREHOLE - HA36														
	Client: Hugh Green Group Limited Project: Ballintoy Park Stage 5														
Project No: TGA2016_0121															
Date: 08/08/2016											apm <b>1</b>	ian I	Mort	ton Woodward	1 of 1
Borenoie Location: Lot 22           Logged by: LPM         Position:         Elevation:												.20		Sheet	
		hecl ច	ked by	/: LP	M م	Survey Source: Material Description	Dat	um: ⊾ ≱				min (	2000	_	
- ticel -	10	Groundwat	RL (m)	Depth (m	Graphic Lo	Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency Relative Dens	Shear Strengths (kPa) Peak (Residual)	Dynamic Cone Penetrometer (Blow/100 mm) 5 10 15 20		mmj 5 20	n) Commen	nts	
	5	0		-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.		_							
L C	ndn i			-					V 107(F0)						-
				-		MH: Clayey SILT: some sand, pale brown, medium to high plasticity, insensitive to moderately sensitive.			V-127(52)						-
									V-112(64)						
				- - - - 1 —			м	Vst	V-112(52)						
				-				to H	V-175(82)						
				-											-
				-					V-UTP						-
				-											-
				-					V > 000/C4)						-
				2 -		Borehole terminated at 2.000 m			V->208(64)						-
				-											-
				-											-
				-											-
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				4 -	-										
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				-											-
			4	5 -		Terret Death Deaths '							1		
	ier	mina	ation r	easo	on: I	arger Depth Reached.									
	Re	emar	ks: G	roun	dwat	er not encountered. Shear vane no. 1861.									
					•	This report is based on the attached field description for soil and rock	k, New	/ Zeal	and, Geotechnical	Soc	iety	Inc	2005	5.	

	HAND AUGER BOREHOLE - HA37											
	Client: Hugh Green Group Limited Project: Ballintoy Park Stage 5											
	Site Address: Welcome Bay Project No: TGA2016_0121											
	Date:	08/08	8/201	Chapman	Mortor	Woodward						
	∃orer _ogg€	ole Lo ed by:	LPN	on: L 1	n:	1:2	5	Sheet 1 of 1				
	Chec	ked by	/: LP	M	Survey Source:	1			[			
Unit	Groundwater	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dynamic Penetro (Blow/10 5 10 1	Cone meter 0 mm) 5 20	Comments	
<u>i</u>			-		OL: TOPSOIL- Organic SILT: dark brown, minor rootlets.							
Tops			-									
			-		ML: Clayey SILT: some sand, pale brown, mottled grey, moderately sensitive, sand is fine to medium grained.			V-130(58)				
			-					V-112(49)				
			- - - - - 1 -			м	Vst	V-120(49)			-	
E			- - - -				to H	V-175(71)				
			-									
								V-UTP				
			-									
			2		Borehole terminated at 2.000 m			V-188(73)				
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			3 -									
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			5 -									
Te	rmina	ation r	easc	n: T	arget Depth Reached.							
F	lemar	ˈks: G	roun	dwat	er not encountered. Shear vane no. 1861.							
	This report is based on the attached field description for soil and rock, New Zealand, Geotechnical Society Inc 2005.											

HAND AUGER BOREHOLE - HA38 Client: Hugh Green Group Limited												
	Project: Ballintoy Park Stage 5											
	Site A Proje	Addres	ss: W TG/	/elco A201	CMM	Geosciences						
	Date:	12/08	3/201	16 ion: I	et 20				Chapman Morton	Woodward		
	Logge	ed by:		ион. L Л	1.20	Sheet I OF I						
	Chec	ked by	y: LF	PM	Survey Source:							
Unit	Groundwate	RL (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture Condition	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dynamic Cone Penetrometer (Blow/100 mm) 5 10 15 20	Comments		
YA					ML: Clayey SILT: some sand, pale brown, medium plasticity, sand is fine grained. Borehole terminated at 2.600 m	M	MD to D					
			-									
-			5 -	]								
Te	ermina	ation r	reaso	on: T	arget Depth Reached.	•						
F	Remai	rks: G	roun	dwat	er not encountered.							
	This report is based on the attached field description for soil and rock, New Zealand, Geotechnical Society Inc 2005.											

	HA Client Proje Site A Proje	t: Hug ct: Bal ddres ct No: 12/08	h Gr llinto s: W TGA	UC een ( y Pa (elco (201) 6	GER BOREHOLE - HA39 Group Limited rk Stage 5 me Bay 6_0121					(NZ) Ltd Geosciences ton Woodward	
	Boreł	nole L	ocati	on: L		1:25	Sheet 1 of 1				
		ed by:		1 • N <i>A</i>	n:						
Unit	Groundwater	(m) RE (m)	Depth (m)	Graphic Log	Material Description Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments Rock: Weathering; colour; fabric; rock name; strength; additional comments	Moisture	Consistency/ Relative Density	Shear Strengths (kPa) Peak (Residual)	Dynamic Con Penetromete (Blow/100 mn 5 10 15 20	e r n) Comments	
			1-		SP: SAND: some gravel, pale brown, poorly graded, fine to medium grained, gravel is fine grained and subangular to subrounded.		MD to D D to VD			1.3m: DCP Bouncing.	
			2			М					
ΥA			-		ML: Clayey SILT: pale brown, low to medium plasticity.					-	
			-		Borehole terminated at 2.800 m						
Te	rmina	ation r	3 	pn: T	ārget Depth Reached.						
F	Remai	rks: G	roun	dwat	er not encountered. YA stratigraphic code denotes You	naer	Ash				
	Remarks: Groundwater not encountered. YA stratigraphic code denotes Younger Ash. This report is based on the attached field description for soil and rock, New Zealand, Geotechnical Society Inc 2005.										

	HAND AUGER BOREHOLE - HA40											
	Client: Hugh Green Group Limited Project: Ballintoy Park Stage 5											
	Site Address: Welcome Bay											
Project No: TGA2016_0121 Date: 18/08/2016 Chapman											W Geosciences	
Borehole Location: Lot 29											Sheet 1 of 1	
Logged by: LPM Position: Elevation: Datum:												
	Ife		<u>د</u>	bo	Material Description		vit.		Dynamic	Cone		
Unit	ewpu	L (m)	oth (n	hic L	Soil: USC; Soil type; colour; structure; strength; moisture; bedding; plasticity; sensitivity; additional comments	oisture	sistenc ve Den	Shear Strengths (kPa)	Penetro (Blow/10	meter 0 mm)	Comments	
	Grou	Я	Dep	Grap	Rock: Weathering; colour; fabric; rock name; strength; additional comments	žö	Con Relati	Peak (Residual)	5 10	15 20		
TS					OL: TOPSOIL- Organic SILT: dark brown, low plasticity.						-	
-	-		-		SP: SAND: some gravel, pale grey, poorly graded, fine to							
			-		medium grained, gravel is fine to medium grained and subangular to subrounded.							
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			-				D to					
			1 -			м	VD					
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			-								1.3m: DCP Bouncing.	
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			2 —	×××××	Borehole terminated at 2.000 m						_	
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	<u> </u>		5 —									
Te	rmina	ation r	easo	n: T	arget Depth Reached.							
R	lemai	rks: Gi	oun	dwat	er not encountered.							
				-	This report is based on the attached field description for soil and rock	, New	/ Zeal	and, Geotechnical	Society Ind	2005.		