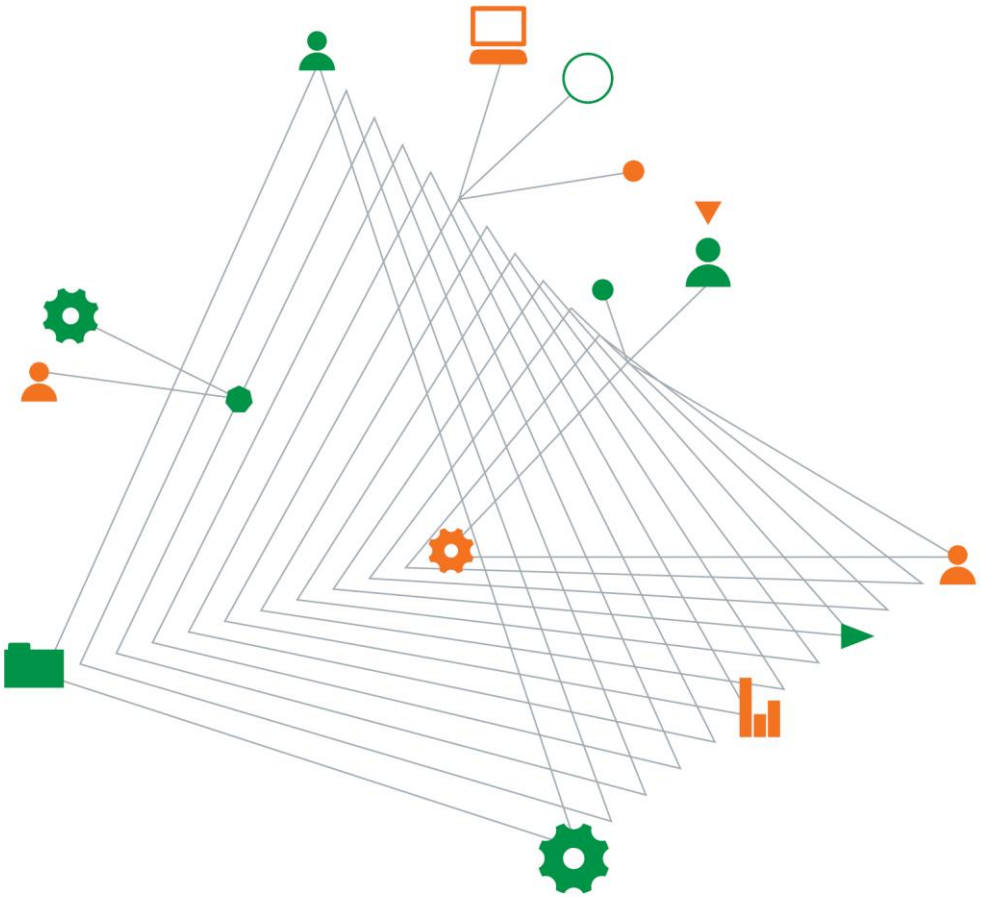
Hugh Green Limited

Donegal Stud Residential Subdivision Stage 11D at and Stage 12, Flat Bush

Geotechnical Completion Report
GENZAUCK16856AE

25 September 2020



Experience comes to life when it is powered by expertise

Donegal Stud Residential Subdivision Stage 11D and Stage 12, Flat Bush

Prepared for:
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Donegal Stud
C/- Harrison Grierson Consultants Limited
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25 September 2020

Our Reference: GENZAUCK16856AE

RE: Geotechnical Completion Report for Residential Subdivision at Donegal Stud Stage 11D at Drumconnell Drive and Stage 12 at Tir Conaill Drive, Flat Bush, Auckland

This Geotechnical Completion Report presents all supporting geotechnical data, our Suitability Statement, and the Harrison Grierson Consultants Limited as-built plan set in relation to land development works recently completed at the above location.

It has been prepared in accordance with instructions received from Harrison Grierson Consultants Limited and forms part of the documentation required by Auckland Council to achieve certification under Section 224(c) of the Resource Management Act.

If you have any queries or you require any further clarification on any aspects of this report, please do not hesitate to contact the undersigned.

For and on behalf of Coffey

Ray Berry
Associate Engineering Geologist

Quality information

Revision history

Revision	Description	Date	Author	Reviewer	Signatory
Rev. 0	Draft 01	09/09/2020	RT	PM	RB
Rev. 0	Final	25/09/2020	RT	PM	RB

Distribution

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Final	1	Original	Coffey Services (NZ) Limited	25/09/2020

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1. Introduction and Description of Subdivision

This Geotechnical Completion Report (GCR) has been prepared for Hugh Green Limited as part of the documentation required to be submitted to the Auckland Council following residential subdivisional development.

It contains our Suitability Statement, relevant test data, and the Harrison Grierson Consultants Limited (HGCL) as-built plan set relating to Stage 11D and Stage 12 of the Donegal Stud Residential Subdivision at Flat Bush in Auckland, as follows:

Table 1: Harrison Grierson Consultants Limited As-Built Plans

Title	Reference No.	Date
Finished Contours As-Built Plan	142875-AB200-Rev B	31 August 2020
Cut and Fill As-Built Plan	142875-AB220-REV A	07 August 2020
Overall Drainage As-Built Plans	142875-AB450 to 452-REV A and B	01 September 2020

This report covers the construction period between mid-November 2019 and September 2020 and it is intended to be used for certification purposes regarding:

- 88 residential lots numbered Lots 1 to 83 and 178 to 182;
- 1 superlot numbered, Lot 39;
- The extension of Tir Conaill Avenue from the culvert road crossing;
- 6 new or extended roads named, Charlestown Drive, Dungloe Avenue, Drumaness Road, Downpatrick Drive, Cloonlyon Drive, Drumbouy Drive;
- 4 joint own access lane (JOAL numbered); 200, 201, 202 and 203; and,
- 8 new recreational reserves, numbered 400 to 408.

Stage 11D is bounded by Drumconnel Drive to the south and Repihana Road to its north, in which both developed areas are occupied by residential housing. To the west of the stage lies a recreation reserve area which is proceeded by Donegal Stud Stage 12 development.

The Donegal Stud Stage 12 development is bounded by Tir Connel Drive and Donegal Stud Stage 10 to the south and to the north is the previously developed Stage 9 which is occupied by recently developed residential housing.

The residential lots in Stage 11D and Stage 12 both lie at a generally flat gradient and have been partly or totally affected by cuts and/ or fills completed as part of the Donegal Stud Earthworks Stages 10 and 11. As part of bulk earthworks, cuts of up to 3.0m have occurred within Stage 11D and cuts of up to 6.0m and fills of up to 4.0m have been completed within Stage 12. These works are shown on the Hugh Green Limited Overall Cut and Fill Contour Plan referenced 142875-12-AB220.

2. Related Reports

Geotechnical Reports prepared on the subject land by this consultancy include:

- Geotechnical Investigation Report on Donegal Stud Stage 8 Residential Subdivision, reference GENZAUCK16403AA, dated 18 December 2014;
- Plan Review for Proposed Earthworks supporting the development of Donegal Stud Stage 8, reference GENZAUCK16403AC-AA, dated 22 July 2015;
- Geotechnical Completion Report on Donegal Stud Stage 8, reference GENZAUCK16403AC, dated 6 December 2016; and
- Geotechnical Investigation Report on Proposed Donegal Stud Stage 10 Residential Subdivision, 62 Thomas Road, Flat Bush, reference GENZAUCK16856AB, dated 11 May 2017
- Geotechnical Completion Report on Donegal Stud Stage 10A Residential Subdivision, 62 Thomas Road, Flat Bush, reference GENZAUCK16856AB, dated 24 September 2018; and
- Geotechnical Completion Report on Donegal Stud Stage 10B Residential Subdivision, 62 Thomas Road, Flat Bush, reference GENZAUCK16856AB, dated 9 August 2019.

  The conclusions and recommendations of the above documents (where relevant) have been referenced as part of the preparation of this report.

3. Earthworks Operations

3.1. Plant

The main items of plant used by the subdivision contractor, Dempsey Wood Civil Limited were:

- 2 x Motor Scrapers;
- 5 x Bulldozers with Scoops;
- 1 x Bulldozer;
- 3 x Dump Trucks;
- 5 x Excavators;
- 1 x Tractor with Scoop;
- 1 x Tractor with Discs;
- 2 x Tractors;
- 2 x Front End Loaders;
- 1 x Water Truck;
- 2 x Sheep Foot Compactors;
- 1 x Pad Foot Compactor;
- 1 x Grader; and

- 2 x Vibrating Drum Rollers.

3.2. Construction Programme

Bulk earthworks to construct the area defined as Stage 12 has been undertaken in two phases. The majority of the works were undertaken during the development of Donegal Stud Stages 10A and 10B between November 2017 to November 2019. The earthworks undertaken during this time was mostly centred on mucking out installing underfill drainage and then backfilling existing gully's and watercourses. All earthworks conducted during this period of time was reported on and certified with Stages 10A and 10B Geotechnical Completion Reports and will not be reiterated in this report.

Recent works to construct Donegal Stud Stages 11D and 12 residential subdivision involved bulk earthworks construction over the period between November 2019 and September 2020. A summary of the chronology of the construction events follows:

November 2019:

- Silt pond excavation in northern portion of site adjacent to Drumbuoy drive. Muck out of gully watercourse which feeds into silt pond;
- Removal of stockpile next to Transpower transformer platform and inspection of material at base of stockpile;

December 2019:

- Continuation of gully muck out of watercourse that leads to silt pond;
- Gully in Lot 403 is mucked out and an underfill drain comprised of a punched drain coil fully surrounded by drainage metal and fully wrapped with Bidim A19 cloth is placed along the centreline of the gully before being backfilled with compacted clay fill;
- Connect new drainage lines to existing underfill drains located at various points along the northern boundary of the site;

January 2020:

- Completion of silt pond and back fill of excavated water course.

February 2020;

- Inspection of ground conditions below stockpiles completed;
- Road construction commences and bulk earthworks are concentrated in Stage 13;

September 2020:

- Transpower pylon removed and area beneath and surrounding pylon (Lots 31 to 34) is cut to subgrade level:
- Cut in Lots 31 to 34 reveals organic material which is then removed (undercut) and replaced with non-organic material sourced from the pylon cut and other stockpiles near the location.

4. Quality Assurance and Controls

4.1. Construction Observations

During the earthworks operation engineering inspections were undertaken on a regular basis to assess compliance with NZS 4431 and our project specific recommendations and specifications. Project specific inspections were required on Stage 11D and Stage 12 in relation to the following activities:

- Topsoil stripping;
- Road and lot undercuts;
- Removal of existing stockpiles;
- Gully areas prior to the placement of fill materials to ascertain that all mullock and soft inorganic subsoils had been satisfactorily removed;
- Removal of pre-existing uncontrolled fill placed to form pond bunds or to cover gully flanks;
- Placement of underfill drainage in the bases of gullies;
- Silt pond stripping and subsequent preparation prior to backfilling to ensure that all soft unsuitable material had been removed; and
- Observation of bulk cut to fill operations.

4.2. Earth Fill Quality Control Criteria

Due to the varying soil types being used as filling, the compaction control criteria of minimum allowable shear strength and maximum allowable air voids were mainly used for quality assurance purposes.

Specification details were as follows:

Table 2: Minimum Shear Strength and Maximum Air Voids Method

(a)	Air Voids Percentage	
	(As defined in NZS 4402)	
	General Fill	
	Average value less than	10%
	Maximum single value	12%
(b)	Undrained Shear Strength	
	(Measured by Pilcon shear vane - calibrated using NZGS 2001 method)	
	General fill	
	Average value not less than	140 kPa
	Minimum single value	120 kPa

Note: The average value shall be determined over any ten consecutive tests

4.3. Quality Assurance Testing

Regular insitu density, shear strength and water content tests were carried out on all areas of the filling at or in excess of the frequency recommended by NZS 4431. All test results are IANZ (International Accreditation New Zealand) endorsed and are presented in Appendix C (Earth Fill Testing).

Failed tests were relayed to the site foreman and/or his staff, and the affected areas of fill were re-worked and tested as necessary. In each case, further testing was carried out until compliance with the above standards was achieved.

5. Project Evaluation

5.1. Bearing Capacity and Settlement of Building Foundations

Following the completion of earthworks operations, we returned to the site during July 2020 and drilled a series of hand auger boreholes at appropriate natural ground locations in order to evaluate likely foundation options for future residential building development. Typical topsoil depths on each lot were also assessed at this time.

Based on the findings our boreholes we have assessed that at current subgrade levels, all cut, filled and undisturbed natural ground has a geotechnical ultimate bearing capacity of 300 kPa within the zone of influence of conventional shallow residential building foundations.

Where a geotechnical ultimate bearing capacity greater than 300 kPa is required, further site-specific investigation and design of foundations should be carried out prior to Building Consent application.

It should be noted that NZS 3604 only allows a maximum backfill depth of 600mm over the building platform of a dwelling unless an Engineering design solution is proposed, on account of the risk of induced consolidation of the subsoils caused by the weight of the backfill.

5.2. Expansive Soils

3 no. sets of shrink swell index tests were carried out on samples selected from within the zone of likely influence of shallow building foundations in Stage 11D (1 no. test) and Stage 12 (2 no. tests).

These tests were carried out in accordance with NZS 4402, "Methods of Testing Soils for Civil Engineering Purposes" test section 2 and were primarily intended to assess the Expansive Classes of the site materials as defined in AS 2870, "Residential Slabs and Footings – Construction".

All test results are IANZ (International Accreditation New Zealand) endorsed and full details are included in Appendix B.

The AS 2870 expansive site class for this subdivision is assessed to be M (moderate), and is based on the laboratory results together with our visual-tactile assessment and local knowledge. Specific design alternatives for this expansive site class are presented in the following Suitability Statement.

Further testing to confirm the site specific expansivity classification at each lot within the subdivision is recommended.

On some expansive clay sites if cast on-grade floor slab construction takes place during a long dry summer, exposed building platform soils may dry out and become highly desiccated.

Over time the presence of the floor slab will cause capillary rise of moisture to the underside of the damp proof course and potentially expansive dry ground may wet up and swell, causing floor slab uplift. The effect may be very slight in some cases and extreme in others, especially if free water can reach the central underside of the slab as could occur if any subsoil drainage is discharged beneath the slab or an under-slab water pipe leaks.

Floor slab uplift usually remains unnoticed in carpeted homes, but can cause distress on tile floors and in garages where cracks are more apparent. It may also rack upper storeys if non-load bearing ground floor walls are lifted and act as struts. Further, it may cause drainage problems on flat roofed houses where gutter gradients may be reversed.

Thorough soaking (in the form of low flow sprinklers for an extended period rather than flooding of the surface with a hose only once is recommended to allow for infiltration into the soil) of the exposed

building platform area a few days before hardfill placement can help to reduce this potential problem. Careful detailing of construction joints in brittle building elements can also be of benefit. Alternatively, removal and replacement of the desiccated surface layers is recommended.

5.3. Fill Induced Settlement

As a result of our pre-fill inspections and quality control testing, we are of the opinion that induced differential settlements beneath or within the certified filling due to its imposed weight should be insignificant with respect to conventional NZS 3604 residential building developments.

5.4. Vegetation Cover

Wherever practical on sloping land beyond building platform areas, all existing grass cover should be maintained and even supplemented with new plantings. Any vegetation cleared beyond the immediate area of building platforms for temporary construction purposes should be replanted as soon as possible.

The contribution of appropriate vegetation cover to sediment and erosion control should not be underestimated.

5.5. Stormwater Controls

It is important on all lots that due care is paid to the design and construction of appropriate stormwater disposal systems. These systems should serve to collect all runoff from roofs, driveways and paved areas, together with discharges from retaining wall drains and other subsoil drains and should connect directly into the public stormwater drainage network.

5.6. Service Trenches

As is normal on all subdivisions, building developments involving foundations within the 45-degree zone of influence from pipe inverts will require engineering input.

Many of the lots are known to have service trenches within their boundaries as shown on the appended Stormwater and Wastewater as-built plans. The resulting limitations are discussed in the Suitability Statement below. Stormwater and wastewater drainage as-built details are depicted on Hugh Green drawings 148275-12-AB450 to 148275-12-AB452.

5.7. Road Subgrades

Dynamic Cone Penetrometer (DCP) Tests were undertaken at regular intervals along the trimmed road subgrades across Stage 11D and Stage 12. The test results were subsequently forwarded to HCGL for pavement design validation purposes.

5.8. Underfill Drains

During the development of Stage 10A and Stage 10B (2017 - 2019), a series of perforated drain coils were placed in the mucked-out gully inverts extending into area defined as Stage 12. These drains were installed to tap groundwater seepage prior to filling, as required by NZS 4431. The majority of the work required to remediate these gullies, particularly on the western side of Stage 12, was completed and certified with Stages 10A and 10B.

Although not shown on the as-built drawings (particularly on the western side of Stage 12), the drain coils were cut into the base of the gullies and then buried beneath at least 2 to 4m depth of

engineered fill. Therefore, they are considered to be of low risk to conventional shallow building foundations (for light weight timber framed buildings), especially raft solutions where building loads are spread uniformly across the floor slab.

In the event of any service trenches or deep foundation solutions being constructed in the 45-degree zone of influence of these drains, they must be endorsed by a Chartered Professional Engineer familiar with the contents of this report to ensure they do not compromise the function of the drains.

5.9. Topsoil

Topsoil depths in likely building platform areas were checked by the drilling of a shallow borehole at the approximate centre of each lot. Our findings, which are indicative only and subject to variation at other locations, show that topsoil depths are likely range between 100mm and 300mm.

Site specific findings are presented in the Suitability Statement Summary (Table 3) in Section 6. However, we strongly recommend that lot purchasers complete their own checks of actual topsoil depths across their lot.

5.10. Contractor's Work

We have relied on the Contractor's work practices and assume 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 issued during the execution of the works;

(iv) The conditions of Resource, Earthworks and Building Consents where applicable;

(v) The relevant Coffey Geotechnics reports, recommendations and site instructions;

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

6. Statement of Professional Opinion as to the Suitability of Land for Building Development

I, Peter Marchant, of Coffey Services (NZ) Limited, Auckland, hereby confirm that:

1. I am a Chartered Professional Engineer experienced in the field of geotechnical engineering as defined in section 1.2.3 of NZS 4404 and was retained by the Developer as the Geotechnical Engineer on Stage 11D and Stage 12 of the Donegal Stud residential subdivision, Flat Bush.
2. The extent of preliminary investigations carried out to date are described in the Coffey Geotechnical Investigation Report, reference GENZAUCK16403AA, dated 18 December 2014. The conclusions and recommendations of that document have been re-evaluated during the preparation of this report.
3. In my professional opinion, not to be construed as a guarantee, I consider that:
   a. The earth fills shown on the appended Harrison Grierson Consultants Limited Cut to Fill As-Built Plans have been placed in compliance with NZS 4431 and related documents.
   b. A geotechnical ultimate bearing capacity of 300 kPa may be assumed for the design of shallow foundations on all lots.

      Where a geotechnical bearing capacity greater than 300 kPa is required, (i.e. outside the limits of NZS 3604, such as when piling is undertaken), further specific site investigation and design of foundations should be carried out prior to building consent application.

   c. The backfilling and compaction of material into the stormwater and sanitary sewer trenches on this subdivision has where possible been carried out to appropriate standards having regard for the prevailing ground conditions and associated compaction induced pipe loadings.

      Nevertheless, no building development should take place within the 45-degree zone of influence of drain inverts unless endorsed by specific site investigations, foundation designs and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics. This work will need to be undertaken to ensure that lateral stability and differential settlement issues are addressed and that building loads are transferred beyond the influence of the pipe and the trench backfill.

      This requirement is most likely to impact on areas adjacent to stormwater and/ or sanitary sewer lines that lie within the boundaries of Lots 1, 3, 4, 5, 10, 14, 17, 18, 23 to 46, 54 to 83 and 178 to 182. Hugh Green As-built drawings 142875-12-AB450 to 142875-12-AB452 should be referred to for the location of drainage lines on all lots.

   d. The function of the underfill drains on Lots 40 to 43, 53, 55 to 58, 71, 72, 75, 76 and 408 must not be impaired by any building development or landscaping works. In particular, any bored or driven piles must be positioned to avoid damaging these drains. The presence of all such drains should be recorded on Council's hazard register.
   e. The assessed AS 2870:2011 expansive site class for all lots in Stage 11D is M (moderate) and Stage 12 is M (moderate).
   f. Subject to the geotechnical recommendations and expansive soil assessment associated with 3(b), 3(c) 3(d) and 3(e) above:
      (i) The cut, filled and original ground within residential lot boundaries is generally suitable for residential buildings constructed in accordance with NZS 3604 (that incorporates specific foundation and associated structural design on account of the expansive soils site class) and related documents.
      (ii) On all lots foundation design may be carried out in accordance with AS 2870:2011 (Class M) or alternatively, a specific foundation and structural design may be undertaken by a Chartered Professional Engineer who should allow for expansive soil effects in the design. The minimum recommended foundation depth below cleared ground level

following topsoil removal and benching of building platform areas is 600mm for NZS3604 type strip and pad foundations.

4. Road subgrades have been formed having due regard for slope stability and settlement, although CBR values will likely vary between natural and filled ground as is to be expected

7. Limitations

The as-built plans and the professional opinion contained within this report are furnished to Auckland Council and Hugh Green Limited for their purposes alone on the express condition that they will not be relied upon by any other person. Prospective purchasers should still satisfy themselves as to any specific conditions pertaining to their particular land interest.

Table 3 appended summarises the status of each residential lot covered by the Suitability Statement, presented in this report.

For and on behalf of Coffey

Prepared By:

Ricky Thomson
Engineering Geologist

Reviewed and Authorised By:

Peter Marchant
Principal Geotechnical Engineer

Important information about your **Coffey** Report

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

Your report is based on project specific criteria

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

Subsurface conditions can change

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

Interpretation of factual data

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

Your report will only give preliminary recommendations

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

Your report is prepared for specific purposes and persons

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

Interpretation by other design professionals

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

Important information about your **Coffey** Report

Data should not be separated from the report*

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

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

Rely on Coffey for additional assistance

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

Responsibility

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

Table 3: Suitability Statement Summary

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870:2011 Class
1	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
2	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
3	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
4	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
5	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
6	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
7	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	150	300	M
8	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
9	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
10	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
11	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
12	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
13	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
14	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
15	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	150	300	M
16	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870:2011 Class
17	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
18	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
19	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
20	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
21	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
22	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
23	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
24	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm..	250	300	M
25	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
26	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm..	250	300	M
27	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm..	200	300	M
28	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
29	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm..	300	300	M

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870:2011 Class
30	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm..	300	300	M
31	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
32	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	100	300	M
33	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
34	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
35	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
36	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	>300	300	M
37	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	>300	300	M
38	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
39	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	259	300	M
40	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) Protection of the function of subsoil drains required (refer to clause (6.3 (d))	300	300	M

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870:2011 Class
	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.			
41	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) Protection of the function of subsoil drains required (refer to clause (6.3 (d)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
42	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) Protection of the function of subsoil drains required (refer to clause (6.3 (d)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
43	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) Protection of the function of subsoil drains required (refer to clause (6.3 (d)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
44	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	150	300	M
45	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
46	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
47	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	150	300	M
48	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
49	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
50	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
51	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
52	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M

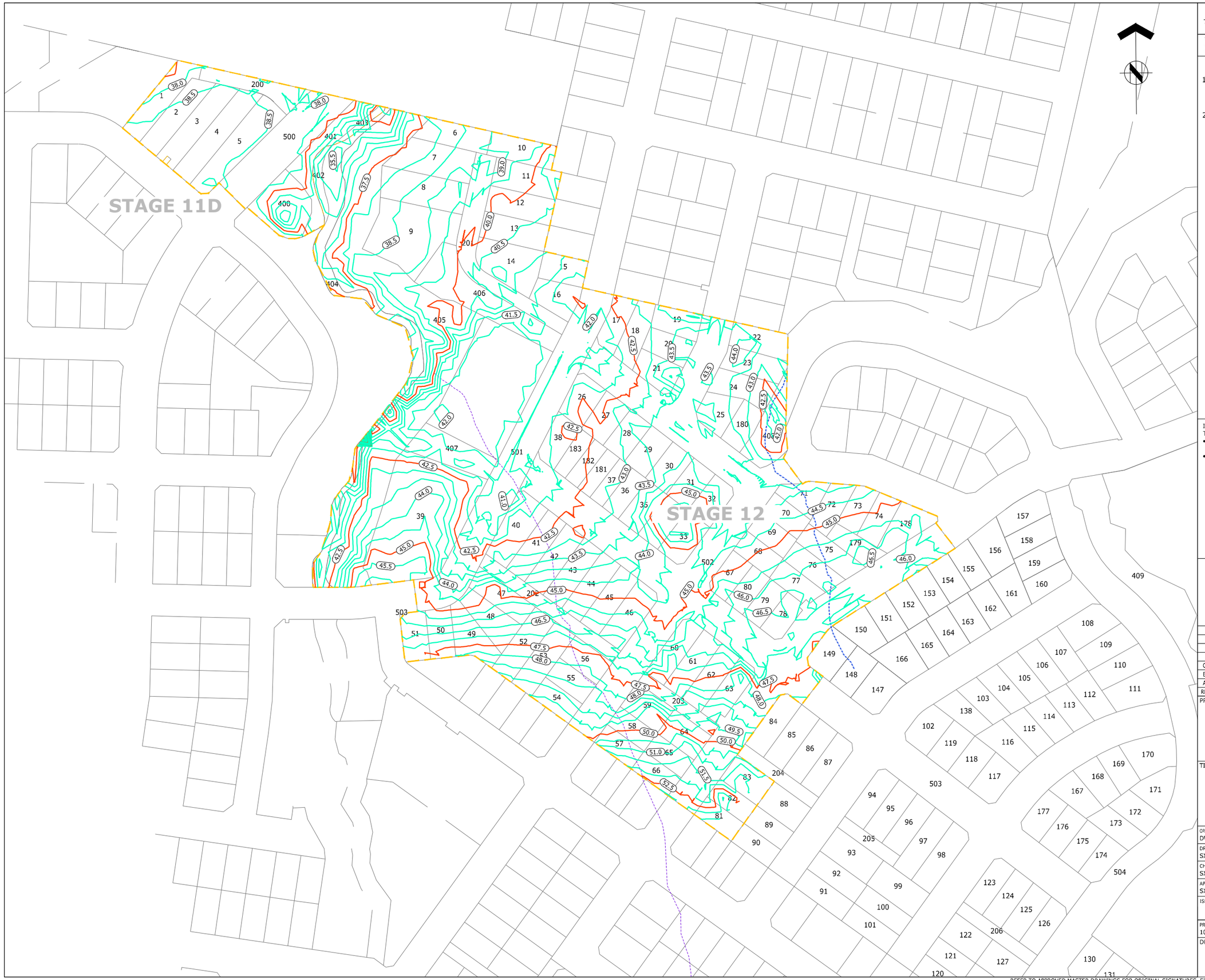
Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870:2011 Class
53	Protection of the function of subsoil drains required (refer to clause (6.3 (d)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
54	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
55	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) Protection of the function of subsoil drains required (refer to clause (6.3 (d)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
56	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) Protection of the function of subsoil drains required (refer to clause (6.3 (d)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
57	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) Protection of the function of subsoil drains required (refer to clause (6.3 (d)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
58	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) Protection of the function of subsoil drains required (refer to clause (6.3 (d)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
59	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
60	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	150	300	M
61	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870:2011 Class
62	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
63	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
64	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
65	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
66	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
67	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
68	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
69	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
70	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
71	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) Protection of the function of subsoil drains required (refer to clause (6.3 (d)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
72	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c))	250	300	M

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870:2011 Class
	Protection of the function of subsoil drains required (refer to clause (6.3 (d)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.			
73	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
74	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
75	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) Protection of the function of subsoil drains required (refer to clause (6.3 (d)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
76	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) Protection of the function of subsoil drains required (refer to clause (6.3 (d)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
77	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
78	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
79	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
80	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
81	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870:2011 Class
82	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
83	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
178	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
179	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
180	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
181	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
182	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
183	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
184	Sewer/ Stormwater line limitations apply (refer to Clause 6.3 (c)) AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M

Appendix A – Harrison Grierson Consultants Limited As-Built Plans



ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

NOTES:

1. ORIGIN OF LEVELS
   S 66 SO 48643
   RL 54.50m
2. ORIGIN OF COORDINATES
   S 66 SO 48643
   5905356.71mN
   1770941.22mE

LEGEND:

- 45 — CONTOUR MAJOR
- 44.5 — CONTOUR MINOR AT 0.5m INTERVALS
- 3x EXISTING 150Ø NOVAFLOW
- 1x 150Ø PERFORATED NOVAFLOW
- 1x 150Ø NON-PERFORATED NOVAFLOW
- EXTENT OF EARTHWORKS

ENGINEERING APPROVAL
ENG-60349136

I CERTIFY THAT THESE ASBUILT PLANS ARE AN ACCURATE RECORD OF THE WORKS UNDERTAKEN AND THAT:

- THE COORDINATES (X,Y) ARE IN TERMS OF NZTM ON NZGD (2000), AND ARE WITHIN ±50mm.
- THE LEVELS (Z) ARE IN TERMS OF THE AUCKLAND 1946 (MSL) LINZ DATUM (DOSLI DATUM), AND ARE WITHIN ±25mm.

Signed: .....
CHARTERED PROFESSIONAL ENGINEER

Date: 31.08.20

Name: SHANE JAMES KELLY
Phone: 09-917-5000

Email: s.kelly@harrisongrierson.com

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LEVEL 4, 96 ST GEORGES BAY ROAD
PARNELL AUCKLAND 1052
T +64 9 917 5000
W www.harrisongrierson.com

REF	REVISIONS	BY	DATE
C	UPDATED SURFACE	SXK	23.09.20
B	EXISTING NOVAFLOW ADDED	DDS	31.08.20
A	DRAFT AS-BUILT	SXK	06.08.20

PROJECT:

HUGH GREEN LIMITED
DONEGAL STAGE 11D/12
36 TIR CONAILL AVENUE, FLAT BUSH

TITLE:

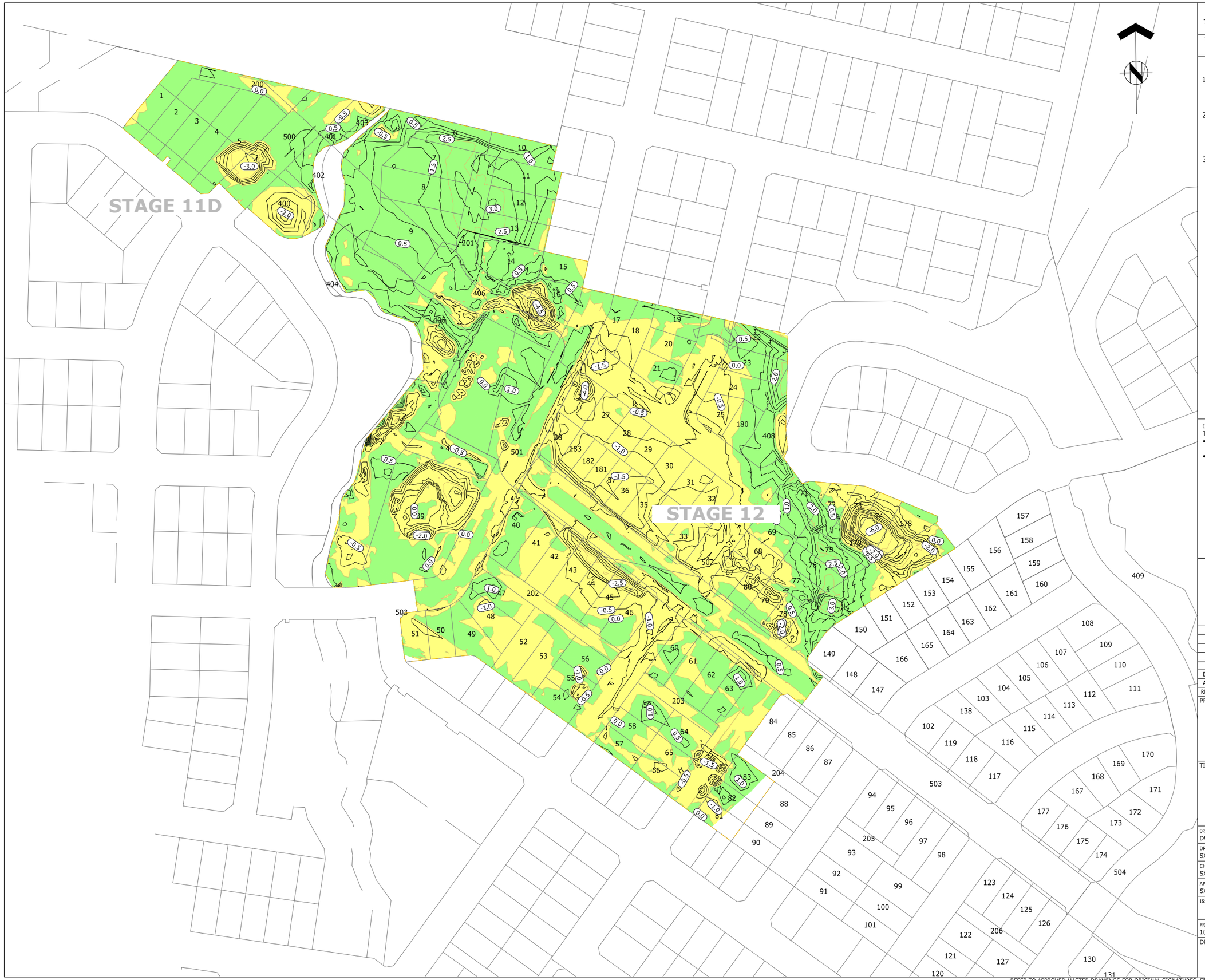
FINISHED CONTOURS
AS-BUILT PLAN

ORIGINATOR: DW	DATE: 08.2020	SIGNED:	PLOT BY: SXK
DRAWN: SXK	DATE: 08.2020	SIGNED:	PLOT DATE: 23.09.20
CHECKED: SXK	DATE: 08.2020	SIGNED:	SURVEY BY: DEMPSEY WOOD
APPROVED: SXK	DATE: 08.2020	SIGNED:	SURVEY DATE: 07.2020

ISSUE STATUS: AS-BUILT

PROJECT No: 1050-142875-01	SCALES: 1:1000-A1 1:2000-A3	A1
DRAWING No: 142875-12-AB200		REV C

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: NEWMARKET N:\1050\142875_A\CAD\AS-BUILTS\142875-12-AB200.DWG



ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

NOTES:

1. ORIGIN OF LEVELS
   S 66 SO 48643
   RL 54.50m
2. ORIGIN OF COORDINATES
   S 66 SO 48643
   5905356.71mN
   1770941.22mE
3. EARTHWORKS VOLUMES :
   AREA = 109781m²
   CUT VOLUME (UNADJUSTED) = 25,722m³
   FILL VOLUME (UNADJUSTED) = 25,947m³
   NET (UNADJUSTED) = 225m³ FILL

LEGEND:

CUT CONTOURS SHOWN AT 0.5m INVERVALS

FILL CONTOURS SHOWN AT 0.5m INVERVALS

EARTHWORK BOUNDARY

ENGINEERING APPROVAL
ENG-60349136

I CERTIFY THAT THESE ASBUILT PLANS ARE AN ACCURATE RECORD OF THE WORKS UNDERTAKEN AND THAT:

- THE COORDINATES (X,Y) ARE IN TERMS OF NZTM ON NZGD (2000), AND ARE WITHIN ±50mm.
- THE LEVELS (Z) ARE IN TERMS OF THE AUCKLAND 1946 (MSL) LINZ DATUM (DOSLI DATUM), AND ARE WITHIN ±25mm.

Signed: .....
CHARTERED PROFESSIONAL ENGINEER

Date: 06.08.20

Name: SHANE JAMES KELLY
Phone: 09-917-5000

Email: s.kelly@harrisongrierson.com

AUCKLAND OFFICE
LEVEL 4, 96 ST GEORGES BAY ROAD
PARNELL AUCKLAND 1052
T +64 9 917 5000
W www.harrisongrierson.com

REF	REVISIONS	BY	DATE
B	UPDATED SURFACE	SXK	23.09.20
A	DRAFT AS-BUILT	SXK	06.08.20

PROJECT:

HUGH GREEN LIMITED
DONEGAL STAGE 11D/12
36 TIR CONAILL AVENUE, FLAT BUSH

TITLE:

CUT AND FILL
AS-BUILT PLAN

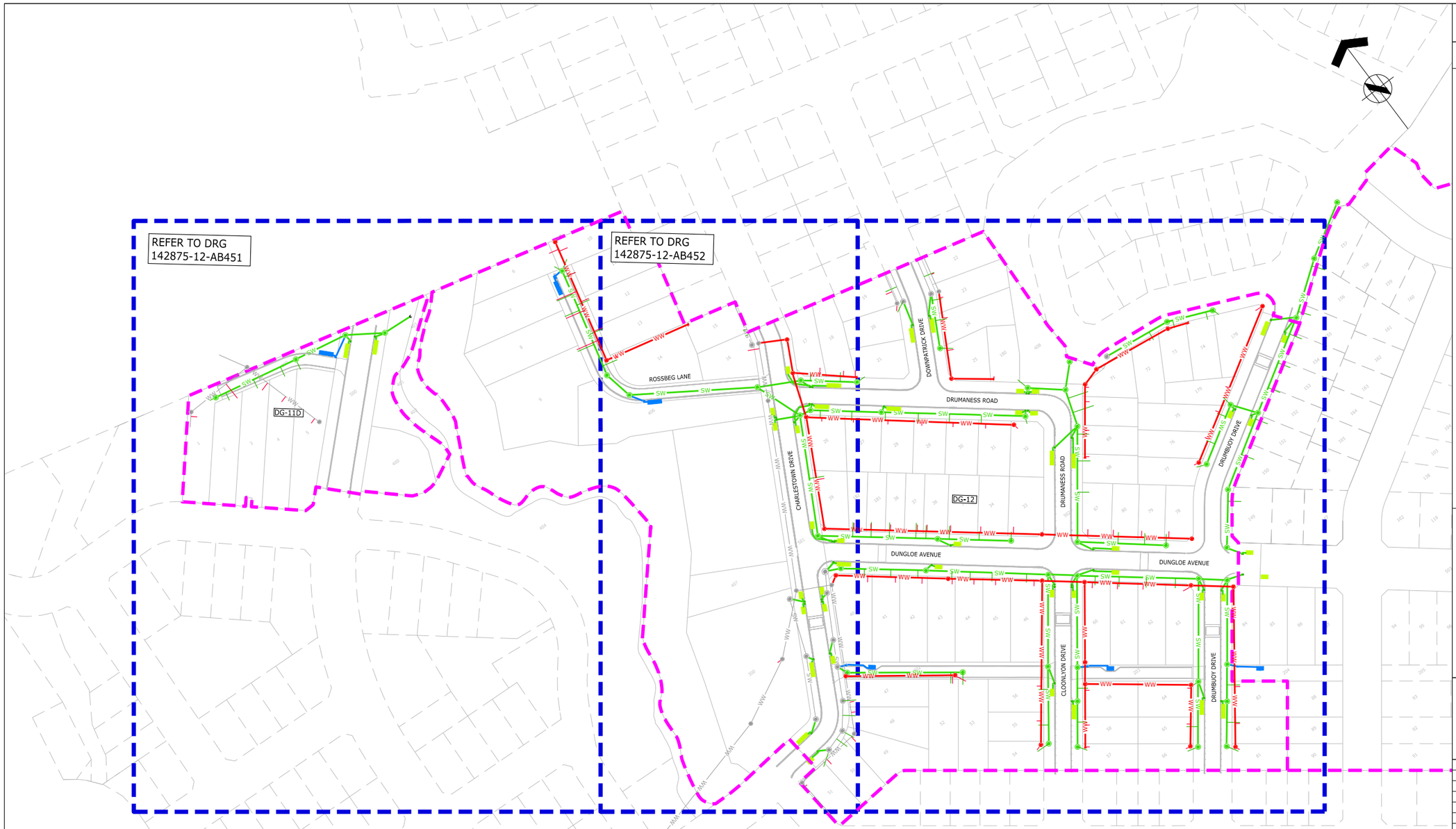
ORIGINATOR: DW	DATE: 08.2020	SIGNED:	PLOT BY: SXK
DRAWN: SXK	DATE: 08.2020	SIGNED:	PLOT DATE: 23.09.20
CHECKED: SXK	DATE: 08.2020	SIGNED:	SURVEY BY: DEMPSEY WOOD
APPROVED: SXK	DATE: 08.2020	SIGNED:	SURVEY DATE: 07.2020

ISSUE STATUS: AS-BUILT

PROJECT No: 1050-142875-01	SCALES: 1:1000-A1 1:2000-A3	A1

DRAWING No: 142875-12-AB220 REV B

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: NEWMARKET N:\1050\142875_A\CAD\AS-BUILTS\142875-12-AB220.DWG



LEGEND

- NEW PUBLIC STORMWATER LINE
- NEW PUBLIC MANHOLE
- NEW PRIVATE CESSPIT
- NEW PUBLIC CESSPIT
- NEW LOT CONNECTION
- EXISTING LOT CONNECTION
- EXISTING SW LINE, MH AND CP
- NEW RAINGARDEN (PUBLIC)
- NEW RAINGARDEN (PRIVATE)
- EXISTING RAINGARDEN
- STAGE BOUNDARY
- NEW PUBLIC WASTEWATER LINE
- EXISTING PUBLIC WASTEWATER LINE
- NEW LOT CONNECTION
- NEW PUBLIC MANHOLE
- EXISTING PUBLIC MANHOLE

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

NOTES:

1. ORIGIN OF LEVELS
   S 66 SO 48643
   RL 54.50m
2. ORIGIN OF COORDINATES
   S 66 SO 48643
   5905356.71mN
   1770941.22mE
3. ALL CONNECTIONS ARE DN 100 uPVC. CHAINAGE FOR CONNECTIONS ARE FROM DOWNSTREAM MANHOLE CENTRE.
4. ALL STORMWATER LINES ARE RCRRJ CLASS 2 UNLESS SHOWN OTHERWISE.
5. ALL CESSPIT LEADS ARE RCRRJ CLASS 4.
6. ALL NEW MANHOLES ARE DN 1050 RC UNLESS SHOWN OTHERWISE.
7. ALL WASTEWATER LINES ARE PVC-U SN16 UNLESS SHOWN OTHERWISE.
8. ALL NEW MANHOLES ARE DN 1050 RC UNLESS SHOWN OTHERWISE

ENGINEERING APPROVAL
ENG-60349136

I CERTIFY THAT THESE ASBUILT PLANS ARE AN ACCURATE RECORD OF THE WORKS UNDERTAKEN AND THAT:

- THE COORDINATES (X,Y) ARE IN TERMS OF NZTM ON NZGD (2000), AND ARE WITHIN ±50mm.
- THE LEVELS (Z) ARE IN TERMS OF THE AUCKLAND 1946 (MSL) LINZ DATUM (DOSLI DATUM), AND ARE WITHIN ±25mm.

Signed: .....
CHARTERED PROFESSIONAL ENGINEER

Date: .....

Name: SHANE JAMES KELLY

Phone: 09-917-5000

Email: s.kelly@harrisongrierson.com

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LEVEL 4, 96 ST GEORGES BAY ROAD
PARNELL AUCKLAND 1052
T +64 9 917 5000
W www.harrisongrierson.com

REF	REVISIONS	BY	DATE
C	AS-BUILT	DDS	24.09.20
B	AS-BUILT	DDS	01.09.20
A	AS-BUILT	DDS	31.08.20

PROJECT:

HUGH GREEN LIMITED
DONEGAL STUD
36 TIR CONAILL AVENUE, FLATBUSH

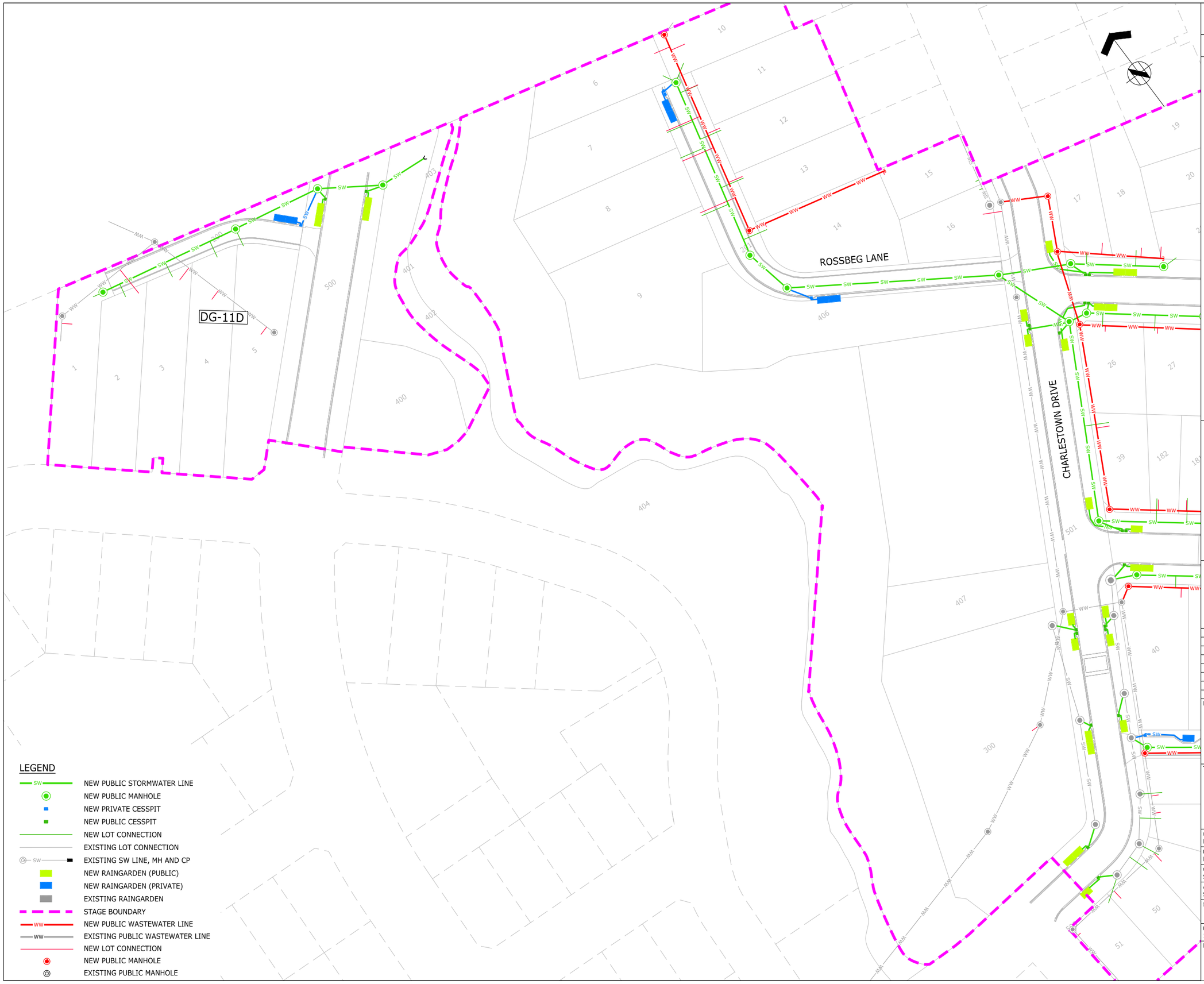
TITLE:

OVERALL DRAINAGE
AS-BUILT PLAN

ORIGINATOR: DW	DATE: 08.2020	SIGNED:	PLOT BY: DDS
DRAWN: DDS	DATE: 08.2020	SIGNED:	PLOT DATE: 24.09.20
CHECKED: SXK	DATE: 09.2020	SIGNED:	SURVEY BY: DEMPSEY WOOD
APPROVED: SXK	DATE: 09.2020	SIGNED:	SURVEY DATE: 08.2020

ISSUE STATUS: AS-BUILT

PROJECT No: 1050-142875-01	SCALES: 1:1000-A1 1:2000-A3	A1
DRAWING No: 142875-12-AB450		REV C



ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

NOTES:

1. ORIGIN OF LEVELS
   S 66 SO 48643
   RL 54.50m
2. ORIGIN OF COORDINATES
   S 66 SO 48643
   5905356.71mN
   1770941.22mE
3. ALL CONNECTIONS ARE DN 100 uPVC. CHAINAGE FOR CONNECTIONS ARE FROM DOWNSTREAM MANHOLE CENTRE.
4. ALL STORMWATER LINES ARE RCRRJ CLASS 2 UNLESS SHOWN OTHERWISE.
5. ALL CESSPIT LEADS ARE RCRRJ CLASS 4.
6. ALL NEW MANHOLES ARE DN 1050 RC UNLESS SHOWN OTHERWISE.
7. ALL WASTEWATER LINES ARE PVC-U SN16 UNLESS SHOWN OTHERWISE.
8. ALL NEW MANHOLES ARE DN 1050 RC UNLESS SHOWN OTHERWISE

ENGINEERING APPROVAL
ENG-60349136

I CERTIFY THAT THESE ASBUILT PLANS ARE AN ACCURATE RECORD OF THE WORKS UNDERTAKEN AND THAT:

- THE COORDINATES (X,Y) ARE IN TERMS OF NZTM ON NZGD (2000), AND ARE WITHIN ±50mm.
- THE LEVELS (Z) ARE IN TERMS OF THE AUCKLAND 1946 (MSL) LINZ DATUM (DOSLI DATUM), AND ARE WITHIN ±25mm.

Signed: .....
CHARTERED PROFESSIONAL ENGINEER

Date: .....

Name: SHANE JAMES KELLY

Phone: 09-917-5000

Email: s.kelly@harrisongrierson.com

AUCKLAND OFFICE
LEVEL 4, 96 ST GEORGES BAY ROAD
PARNELL AUCKLAND 1052
T +64 9 917 5000
W www.harrisongrierson.com

REF	REVISIONS	BY	DATE
B	AS-BUILT	DDS	24.09.20
A	AS-BUILT	DDS	31.08.20

PROJECT:

HUGH GREEN LIMITED
DONEGAL STUD
36 TIR CONAILL AVENUE, FLATBUSH

TITLE:

OVERALL DRAINAGE
AS-BUILT PLAN
SHEET 1 OF 2

ORIGINATOR: DW	DATE: 08.2020	SIGNED:	PLOT BY: DDS
DRAWN: DDS	DATE: 08.2020	SIGNED:	PLOT DATE: 24.09.20
CHECKED: SXK	DATE: 09.2020	SIGNED:	SURVEY BY: DEMPSEY WOOD
APPROVED: SXK	DATE: 09.2020	SIGNED:	SURVEY DATE: 08.2020

ISSUE STATUS: AS-BUILT

PROJECT No: 1050-142875-01	SCALES: 1:500-A1 1:1000-A3	A1
DRAWING No: 142875-12-AB451		REV B

ROSSBEG LANE

DOWNPATRICK DRIVE

DRUMANESS ROAD

CHARLESTOWN DRIVE

DRUMANESS ROAD

DRUMBUOY DRIVE

DG-12

DUNGLOE AVENUE

DUNGLOE AVENUE

CLOONLYON DRIVE

DRUMBUOY DRIVE

LEGEND

- NEW PUBLIC STORMWATER LINE
- NEW PUBLIC MANHOLE
- NEW PRIVATE CESSPIT
- NEW PUBLIC CESSPIT
- NEW LOT CONNECTION
- EXISTING LOT CONNECTION
- EXISTING SW LINE, MH AND CP
- NEW RAINGARDEN (PUBLIC)
- NEW RAINGARDEN (PRIVATE)
- EXISTING RAINGARDEN
- STAGE BOUNDARY
- NEW PUBLIC WASTEWATER LINE
- EXISTING PUBLIC WASTEWATER LINE
- NEW LOT CONNECTION
- NEW PUBLIC MANHOLE
- EXISTING PUBLIC MANHOLE

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

NOTES:

1. ORIGIN OF LEVELS
   S 66 SO 48643
   RL 54.50m
2. ORIGIN OF COORDINATES
   S 66 SO 48643
   5905356.71mN
   1770941.22mE
3. ALL CONNECTIONS ARE DN 100 uPVC. CHAINAGE FOR CONNECTIONS ARE FROM DOWNSTREAM MANHOLE CENTRE.
4. ALL STORMWATER LINES ARE RCRRJ CLASS 2 UNLESS SHOWN OTHERWISE.
5. ALL CESSPIT LEADS ARE RCRRJ CLASS 4.
6. ALL NEW MANHOLES ARE DN 1050 RC UNLESS SHOWN OTHERWISE.
7. ALL WASTEWATER LINES ARE PVC-U SN16 UNLESS SHOWN OTHERWISE.
8. ALL NEW MANHOLES ARE DN 1050 RC UNLESS SHOWN OTHERWISE

ENGINEERING APPROVAL
ENG-60349136

I CERTIFY THAT THESE ASBUILT PLANS ARE AN ACCURATE RECORD OF THE WORKS UNDERTAKEN AND THAT:

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- THE LEVELS (Z) ARE IN TERMS OF THE AUCKLAND 1946 (MSL) LINZ DATUM (DOSLI DATUM), AND ARE WITHIN ±25mm.

Signed: .....
CHARTERED PROFESSIONAL ENGINEER

Date: .....

Name: SHANE JAMES KELLY

Phone: 09-917-5000

Email: s.kelly@harrisongrierson.com

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PARNELL AUCKLAND 1052
T +64 9 917 5000
W www.harrisongrierson.com

REF	REVISIONS	BY	DATE
C	AS-BUILT	DDS	24.09.20
B	AS-BUILT	DDS	01.09.20
A	AS-BUILT	DDS	31.08.20

PROJECT:

HUGH GREEN LIMITED
DONEGAL STUD
36 TIR CONAILL AVENUE, FLATBUSH

TITLE:

OVERALL DRAINAGE
AS-BUILT PLAN
SHEET 2 OF 2

ORIGINATOR:	DATE: 08.2020	SIGNED:	PLOT BY: DDS
DRAWN: DDS	DATE: 08.2020	SIGNED:	PLOT DATE: 24.09.20
CHECKED: SXK	DATE: 09.2020	SIGNED:	SURVEY BY: DEMPSEY WOOD
APPROVED: SXK	DATE: 09.2020	SIGNED:	SURVEY DATE: 08.2020

ISSUE STATUS: AS-BUILT

PROJECT No: 1050-142875-01	SCALES: 1:500-A1 1:1000-A3	A1
DRAWING No: 142875-12-AB452		REV C

Appendix B – Classification Test Data

East Tamaki Laboratory

Paton Geotechnical Testing Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
, Manukau NZ 2163

Phone: 027 475 4011

Report No: SSI:ETAM20S-04458
Issue No: 1

Shrink Swell Index Report

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
Project No.:	773-ETAM01121AA
Project Name:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Lot No.:	- **TRN:** -

Approved Signatory: James McKelvey
(Senior Technician)

Date of Issue: 14/08/2020

Sample Details

Sample ID:	ETAM20S-04458	**Sampling Method:**	NZS4407: 2015 Part 2.4.8.3
Date Sampled:	6/08/2020	**Material:**	Undisturbed Soil
Date Submitted:	6/08/2020	**Source:**	In-Situ
Date Tested:	7/08/2020		
Project Location:	Greenam Drive, Flat Bush		
Sample Location:	Stage 11D, HA05, 0.4 m		
Borehole Number:	HA05		
Borehole Depth (m):	0.4 m		

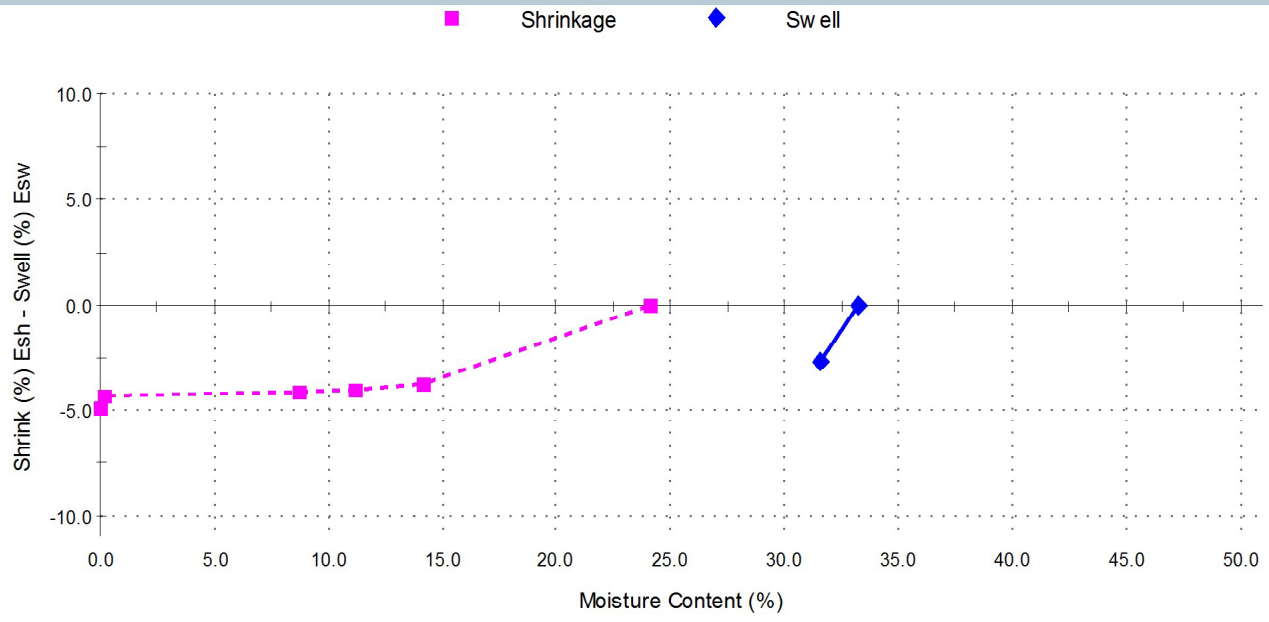
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-2.7
Moisture Content before (%):	33.2
Moisture Content after (%):	31.6
Est. Unc. Comp. Strength before (kPa):	50
Est. Unc. Comp. Strength after (kPa):	75

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	4.9
Shrinkage Moisture Content (%):	24.1
Est. inert material (%):	13%
Crumbling during shrinkage:	0.5%
Cracking during shrinkage:	3%

Shrink Swell



Shrink Swell Index - Iss (%): 2.7

Comments

Work Order: ETAM20W01278
Tested By: JM

East Tamaki Laboratory

Paton Geotechnical Testing Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
, Manukau NZ 2163

Phone: 027 475 4011

Report No: SSI:ETAM20S-04459
Issue No: 1

Shrink Swell Index Report

Client: Coffey Services (NZ) Limited (Auckland)
PO Box 8261, Symonds Street
Auckland 1150

Principal: Louis Smit
Project No.: 773-ETAM01121AA
Project Name: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Lot No.: - **TRN:** -

Approved Signatory: James McKelvey
(Senior Technician)

Date of Issue: 14/08/2020

Sample Details

Sample ID:	ETAM20S-04459	**Sampling Method:**	NZS4407: 2015 Part 2.4.8.3
Date Sampled:	6/08/2020	**Material:**	Undisturbed Soil
Date Submitted:	6/08/2020	**Source:**	In-Situ
Date Tested:	7/08/2020		
Project Location:	Greenam Drive, Flat Bush		
Sample Location:	Stage 12, HA23, 0.4 m		
Borehole Number:	HA23		
Borehole Depth (m):	0.4		

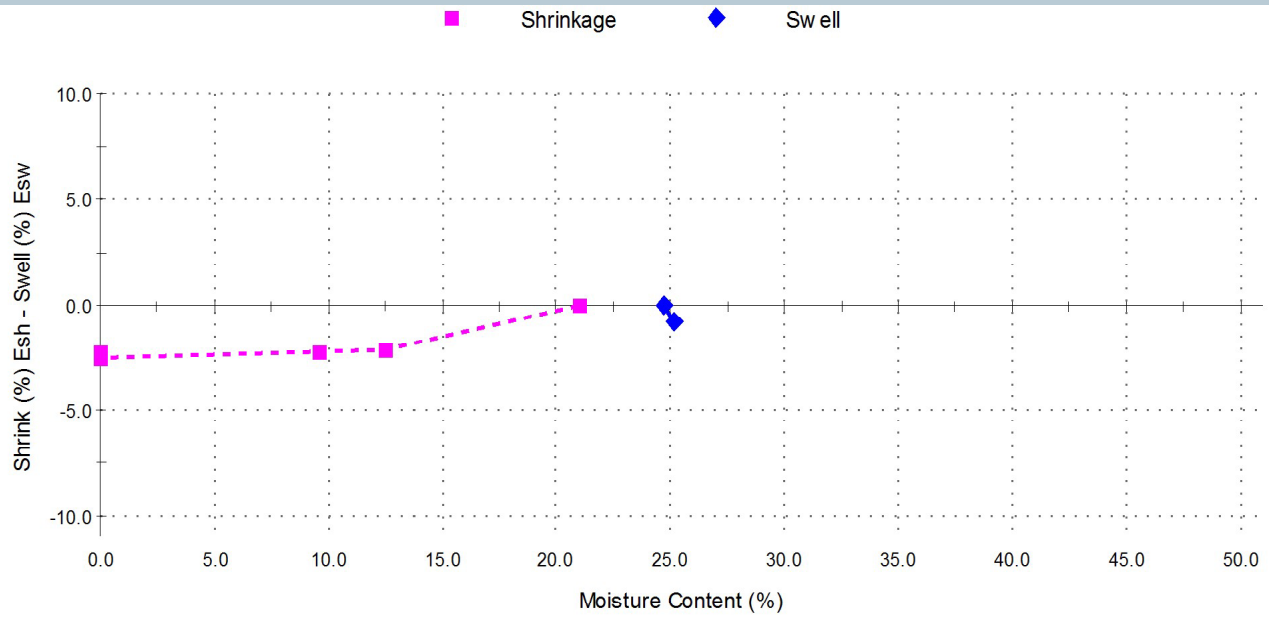
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.8
Moisture Content before (%):	24.7
Moisture Content after (%):	25.1
Est. Unc. Comp. Strength before (kPa):	225
Est. Unc. Comp. Strength after (kPa):	125

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	2.5
Shrinkage Moisture Content (%):	21.0
Est. inert material (%):	4%
Crumbling during shrinkage:	1%
Cracking during shrinkage:	2%

Shrink Swell



Shrink Swell Index - Iss (%): 1.4

Comments

Not accredited
Work Order: ETAM20W01278
Tested By: JM

East Tamaki Laboratory

Paton Geotechnical Testing Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
, Manukau NZ 2163

Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM20S-04460
Issue No: 1

Client: Coffey Services (NZ) Limited (Auckland)
PO Box 8261, Symonds Street
Auckland 1150

Principal: Louis Smit
Project No.: 773-ETAM01121AA
Project Name: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Lot No.: - **TRN:** -

Approved Signatory: James McKelvey
(Senior Technician)

Date of Issue: 14/08/2020

Sample Details

Sample ID:	ETAM20S-04460	**Sampling Method:**	NZS4407: 2015 Part 2.4.8.3
Date Sampled:	6/08/2020	**Material:**	Undisturbed Soil
Date Submitted:	6/08/2020	**Source:**	In-Situ
Date Tested:	7/08/2020		
Project Location:	Greenam Drive, Flat Bush		
Sample Location:	Stage 12, HA36, 0.4 m		
Borehole Number:	HA36		
Borehole Depth (m):	0.4 m		

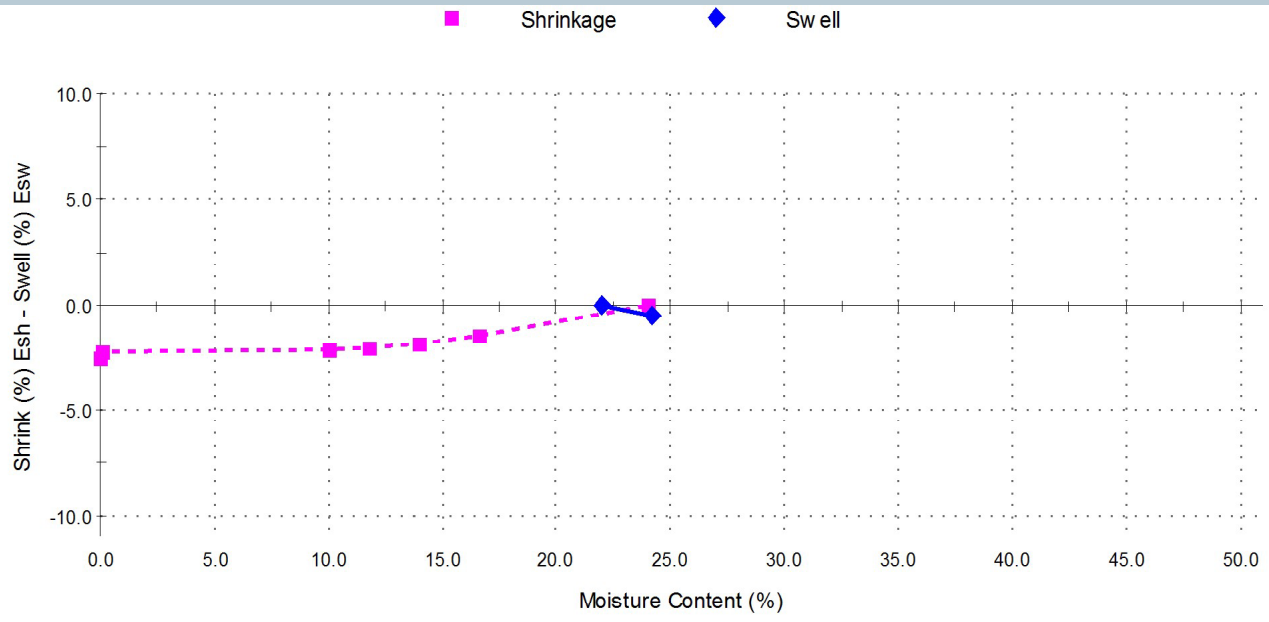
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.5
Moisture Content before (%):	22.0
Moisture Content after (%):	24.2
Est. Unc. Comp. Strength before (kPa):	450
Est. Unc. Comp. Strength after (kPa):	400

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	2.5
Shrinkage Moisture Content (%):	24.0
Est. inert material (%):	5%
Crumbling during shrinkage:	1%
Cracking during shrinkage:	5%

Shrink Swell



Shrink Swell Index - Iss (%): 1.4

Comments

Not accredited
Work Order: ETAM20W01278
Tested By: JM

Appendix C - Field Density Test Summary

East Tamaki Laboratory

Coffey Services (NZ) Limited

144a Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Earthworks Fill Report

Report No: EFIL:ETAM19W03867
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM19W03867

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Ray Berry
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 12/12/2019

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
9/12/2019	ETAM19W03867	TR	6	1.95	22.0	1.60	2.70	6	UTP	202	202	202	Stage 12	1770321	5905580	41.53	Silty CLAY	
9/12/2019	ETAM19W03867	TR	7	1.96	21.3	1.62	2.70	6	UTP	UTP	UTP	202	Stage 12	1770337	5905557	42.07	Silty CLAY	
9/12/2019	ETAM19W03867	TR	8	1.94	21.2	1.60	2.70	7	UTP	UTP	UTP	UTP	Stage 12	1770351	5905527	42.69	Silty CLAY	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

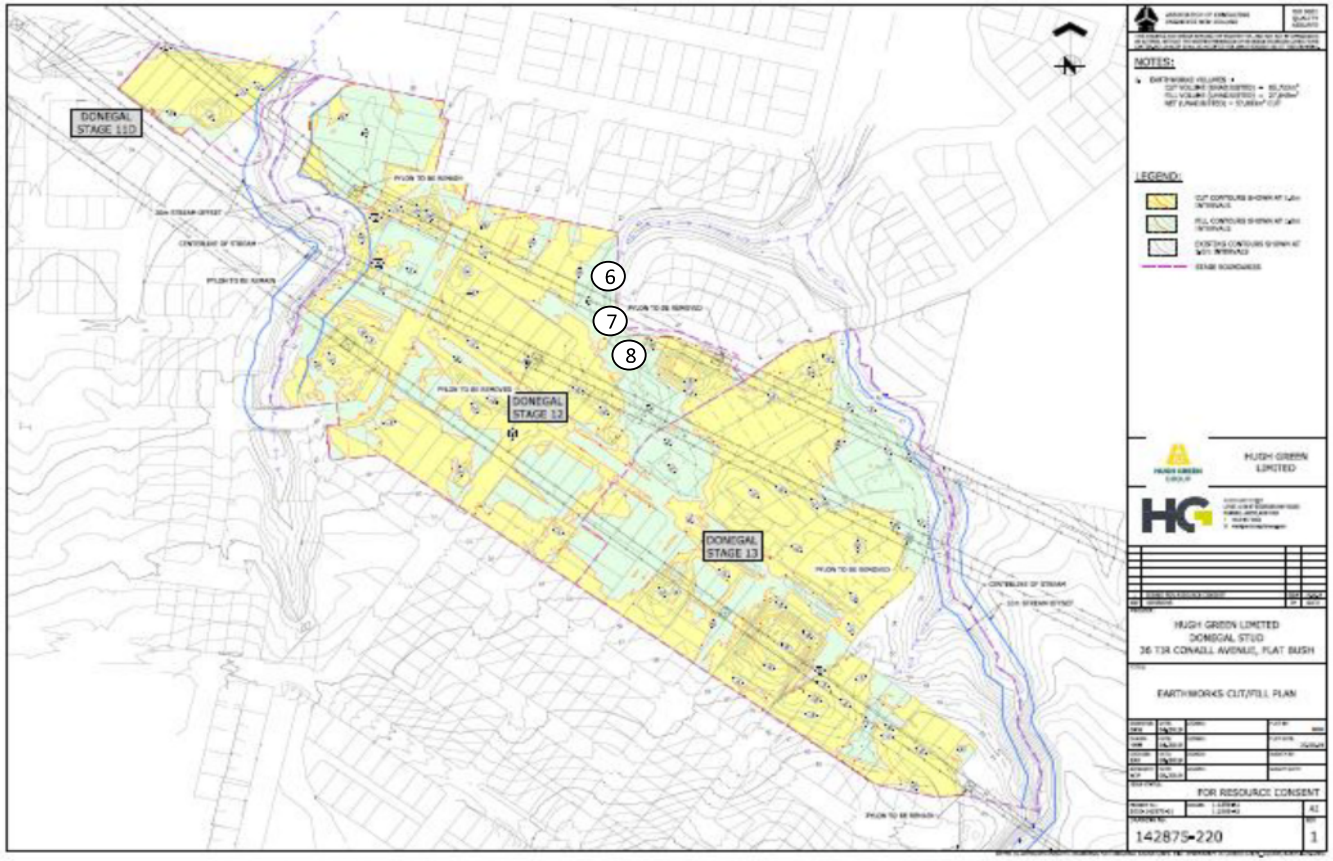
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM19W03867
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: TR

Date tested: 9/12/2019



Issue date: 050517

East Tamaki Laboratory

Coffey Services (NZ) Limited

144a Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Earthworks Fill Report

Report No: EFIL:ETAM19W03901
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM19W03901

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Ray Berry
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 17/12/2019

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
12/12/2019	ETAM19W03901	JJ	9	1.92	24.1	1.55	2.70	5	UTP	UTP	UTP	UTP	Gully Fill	1770338	5905560	-	Silty CLAY	0.9m to Finished Level
12/12/2019	ETAM19W03901	JJ	10	1.97	20.6	1.64	2.70	6	UTP	UTP	UTP	UTP	Gully Fill	1770345	5905537	-	Silty CLAY	1.2m to Finished Level
12/12/2019	ETAM19W03901	JJ	11	1.95	21.0	1.61	2.70	7	UTP	UTP	UTP	UTP	Gully Fill	1770349	5905529	-	Silty CLAY	1.6m to Finished Level
12/12/2019	ETAM19W03901	JJ	12	1.95	21.4	1.60	2.70	6	UTP	UTP	UTP	UTP	Gully Fill	1770360	5905497	-	Silty CLAY	2.0m to Finished Level
12/12/2019	ETAM19W03901	JJ	13	1.91	23.2	1.55	2.70	7	UTP	UTP	UTP	UTP	Gully Fill	1770370	5905463	-	Silty CLAY	3.0m to Finished Level

Form Number: R031N Issue Date: 20/09/2018

Comments:

Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

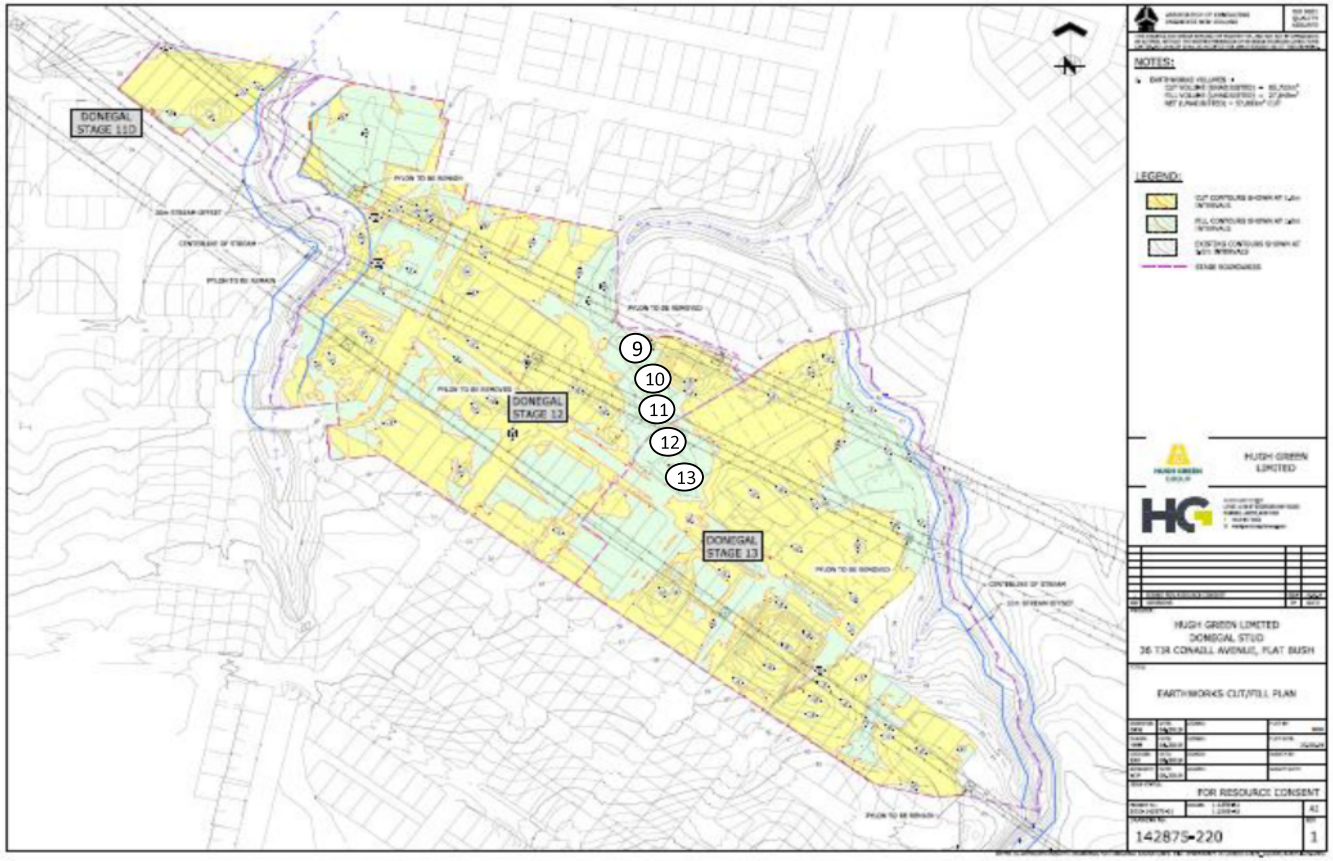
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM19W03901
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: JJ

Date tested: 12/12/2019



Issue date: 050517

East Tamaki Laboratory

Coffey Services (NZ) Limited

144a Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Earthworks Fill Report

Report No: EFIL:ETAM20W00010
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00010

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Ray Berry
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 9/01/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/01/2020	ETAM20W00010	TR	14	1.98	19.4	1.66	2.70	6	UTP	UTP	UTP	UTP	Gully 12B	1770357	5905501	-	Gravelly CLAY	~1.5m to Finished Level
7/01/2020	ETAM20W00010	TR	15	2.00	24.0	1.62	2.70	2	UTP	UTP	UTP	UTP	Gully 12B	1770366	5905464	-	Gravelly CLAY	~1.5m to Finished Level

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

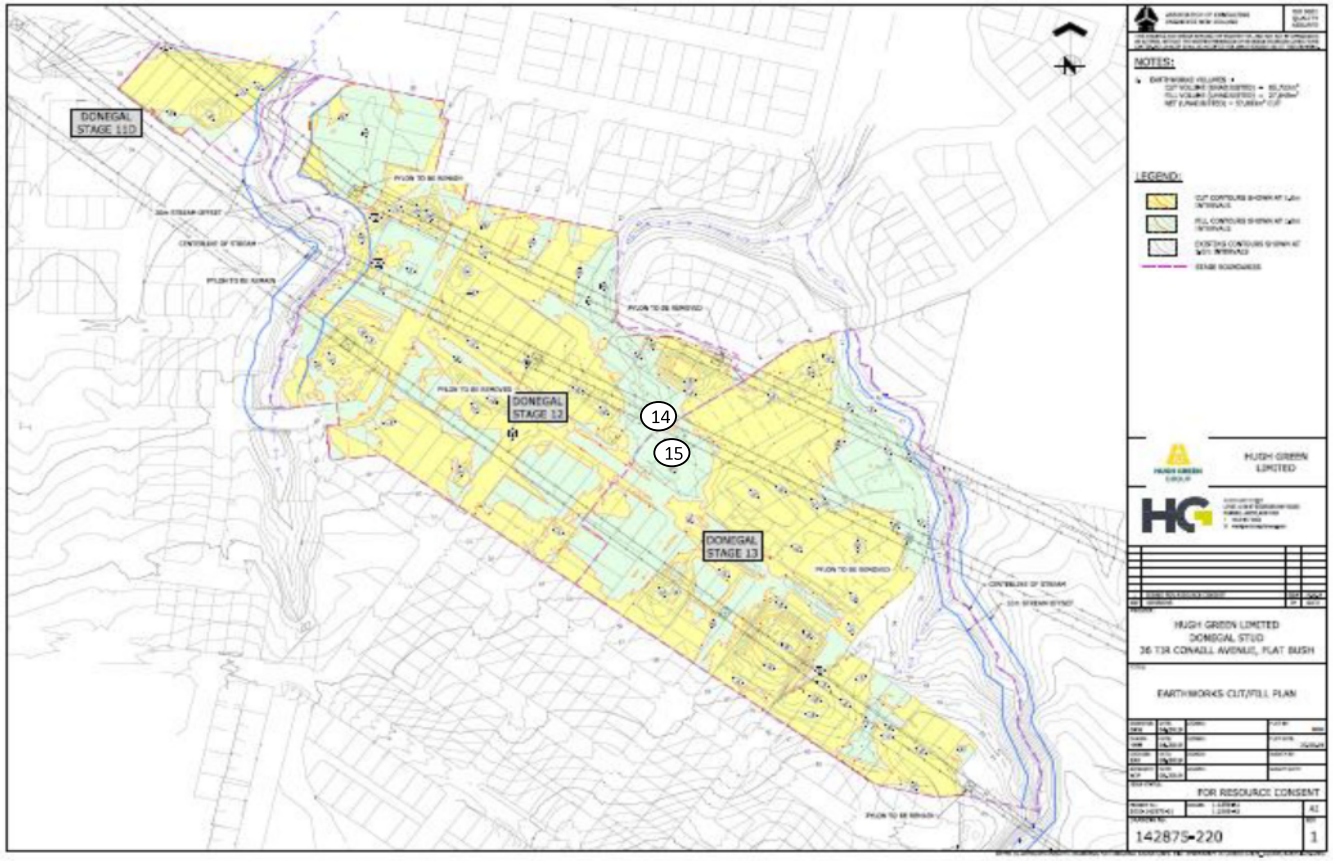
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00010
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: TR

Date tested: 7/01/2020



Issue date: 050517

East Tamaki Laboratory

Coffey Services (NZ) Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Earthworks Fill Report

Report No: EFIL:ETAM20W00061
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00061

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Ray Berry
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 22/01/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
13/01/2020	ETAM20W00061	LW	16	1.83	29.6	1.41	2.70	6	UTP	UTP	UTP	165	Fill Area	1770339	5905534	44.5	Clayey SILT	
13/01/2020	ETAM20W00061	LW	17	1.81	45.0	1.25	2.70	0	UTP	UTP	UTP	UTP	Fill Area	1770357	5905486	46.3	Clayey SILT	
13/01/2020	ETAM20W00061	LW	18	1.91	28.3	1.49	2.70	3	UTP	UTP	UTP	UTP	Fill Area	1770362	5905454	47.3	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

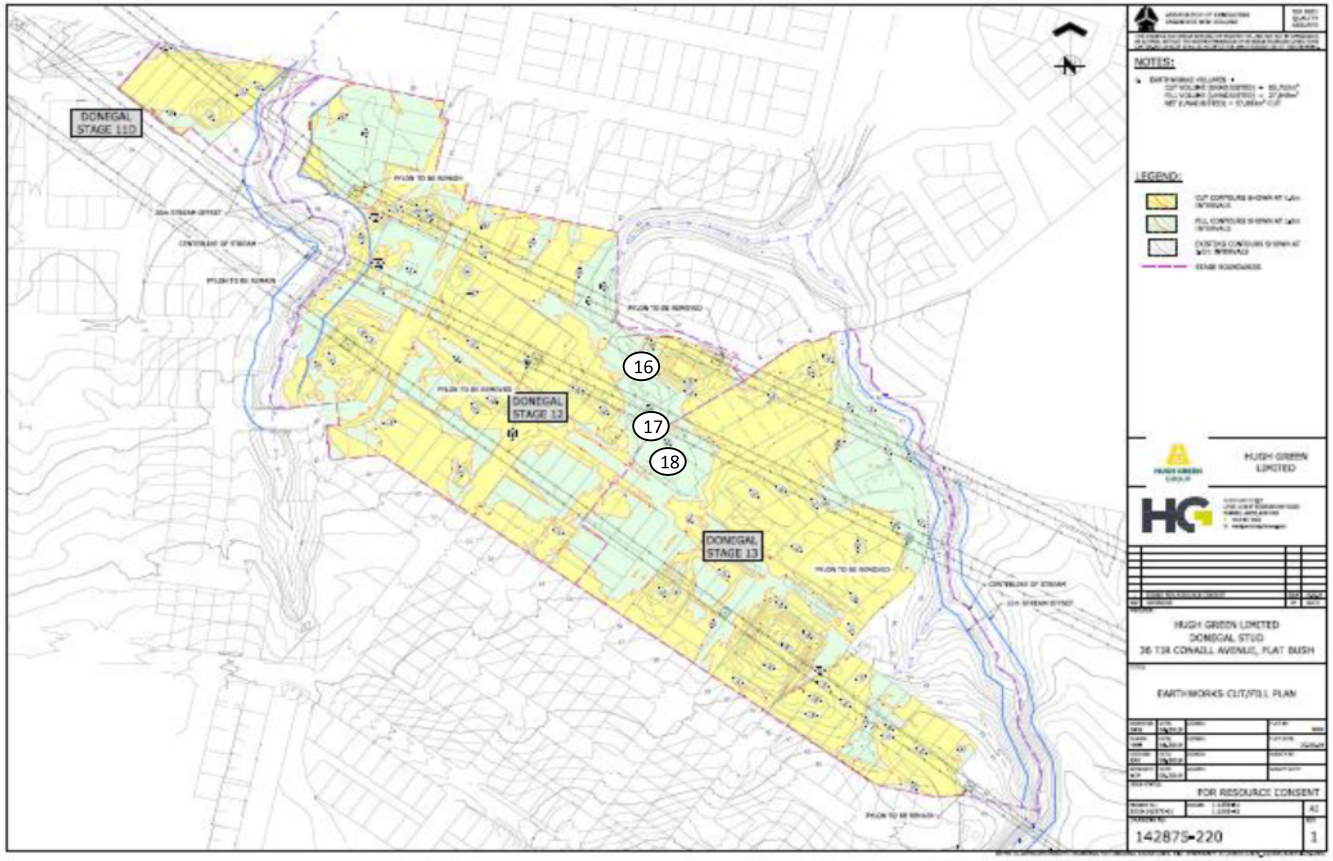
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00061
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: LW

Date tested: 13/01/2020



East Tamaki Laboratory

Coffey Services (NZ) Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Earthworks Fill Report

Report No: EFIL:ETAM20W00520
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00520

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 20/03/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
9/03/2020	ETAM20W00520	CP	19	1.83	24.8	1.46	2.70	9.4	UTP	UTP	UTP	UTP	Stage 13 Retaining Wall Undercut	413492	788747	37.330	Clayey SILT	CH 155, Centreline
9/03/2020	ETAM20W00520	CP	20	1.81	40.7	1.29	2.70	0.0	UTP	UTP	UTP	UTP	Stage 13 Retaining Wall Undercut	413505	788731	38.01	Clayey SILT	CH 178, Centreline

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed). Coordinates supplied by Vinesh.

Form Number: R031N Issue Date: 20/09/2018

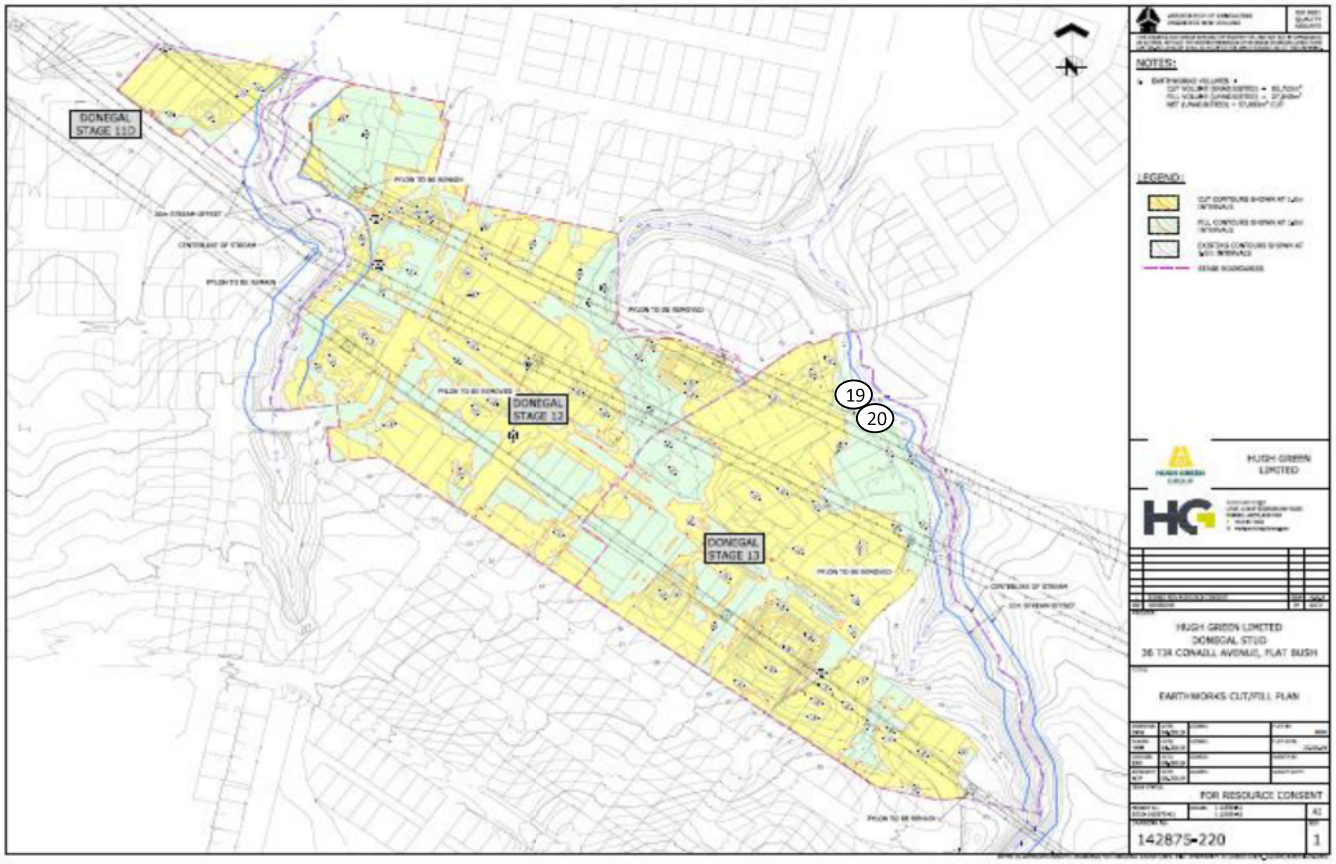
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00520
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: CP

Date tested: 9/03/2020



Issue date: 050517

East Tamaki Laboratory

Coffey Services (NZ) Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Earthworks Fill Report

Report No: EFIL:ETAM20W00531
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00531

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
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Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 20/03/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
10/03/2020	ETAM20W00531	CP	21	1.87	28.6	1.46	2.70	5	156	UTP	156	167	Stage 13 Retaining Wall Undercut	1770497	5905541	37.9	Silty CLAY	
10/03/2020	ETAM20W00531	CP	22	1.90	26.7	1.50	2.70	5	UTP	167	188+	UTP	Stage 13 Retaining Wall Undercut	1770506	5905521	38.2	Silty CLAY	
10/03/2020	ETAM20W00531	CP	23	1.81	30.0	1.39	2.70	7	UTP	UTP	UTP	UTP	Stage 13 Retaining Wall Undercut	1770511	5905501	38.9	Silty CLAY	Contains aggregate

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

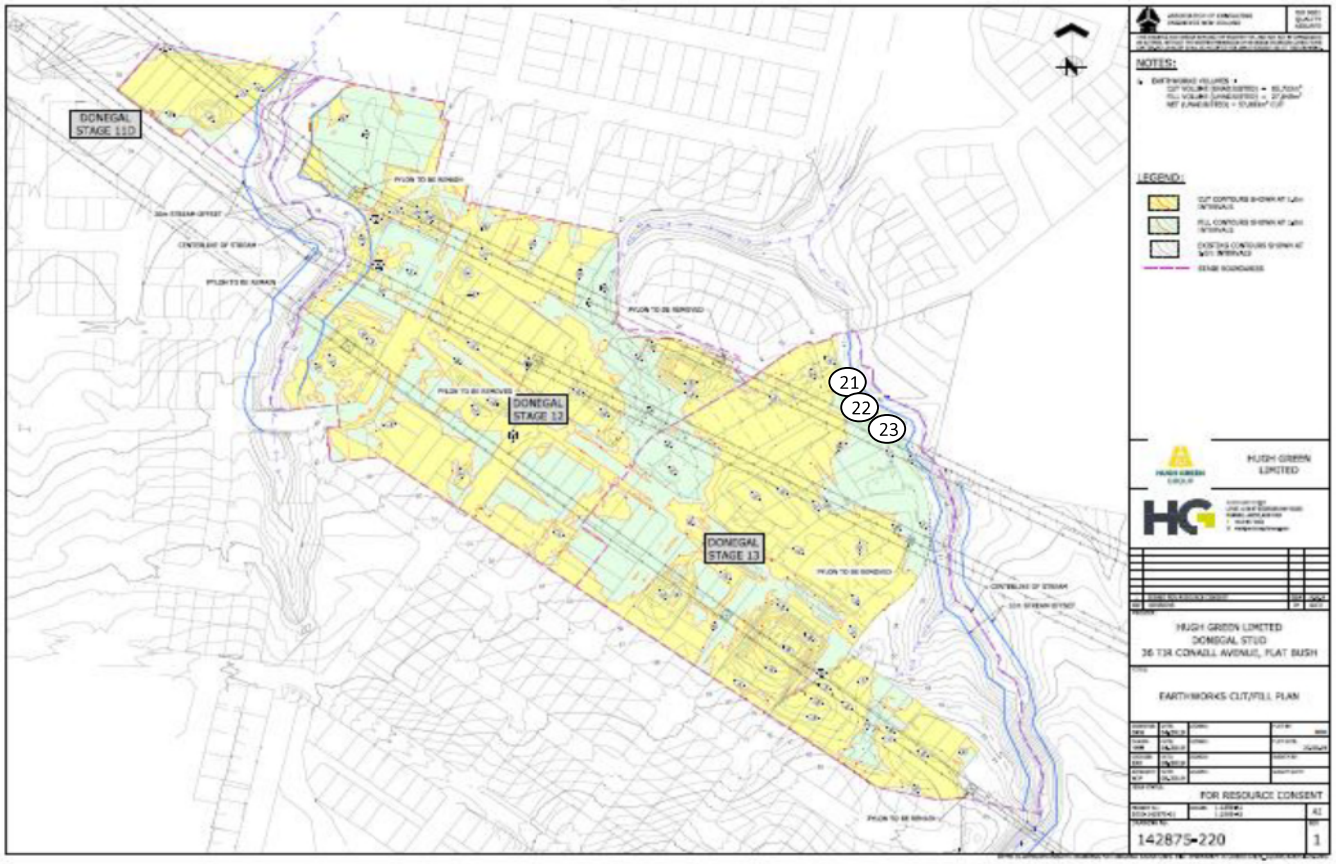
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00531
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: CP

Date tested: 10/03/2020



East Tamaki Laboratory

Coffey Services (NZ) Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Earthworks Fill Report

Report No: EFIL:ETAM20W00551
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00551

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 20/03/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
11/03/2020	ETAM20W00551	LW	24	1.91	24.8	1.53	2.70	5	UTP	UTP	UTP	UTP	Retaining Wall Fill	1770495	5905535	39.2	Clayey SILT	
11/03/2020	ETAM20W00551	LW	25	1.88	23.4	1.52	2.70	8	UTP	UTP	UTP	UTP	Retaining Wall Fill	1770503	5905521	39.04	Clayey SILT	
11/03/2020	ETAM20W00551	LW	26	1.87	27.7	1.47	2.70	5	UTP	UTP	UTP	UTP	Retaining Wall Fill	1770519	5905495	39.63	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

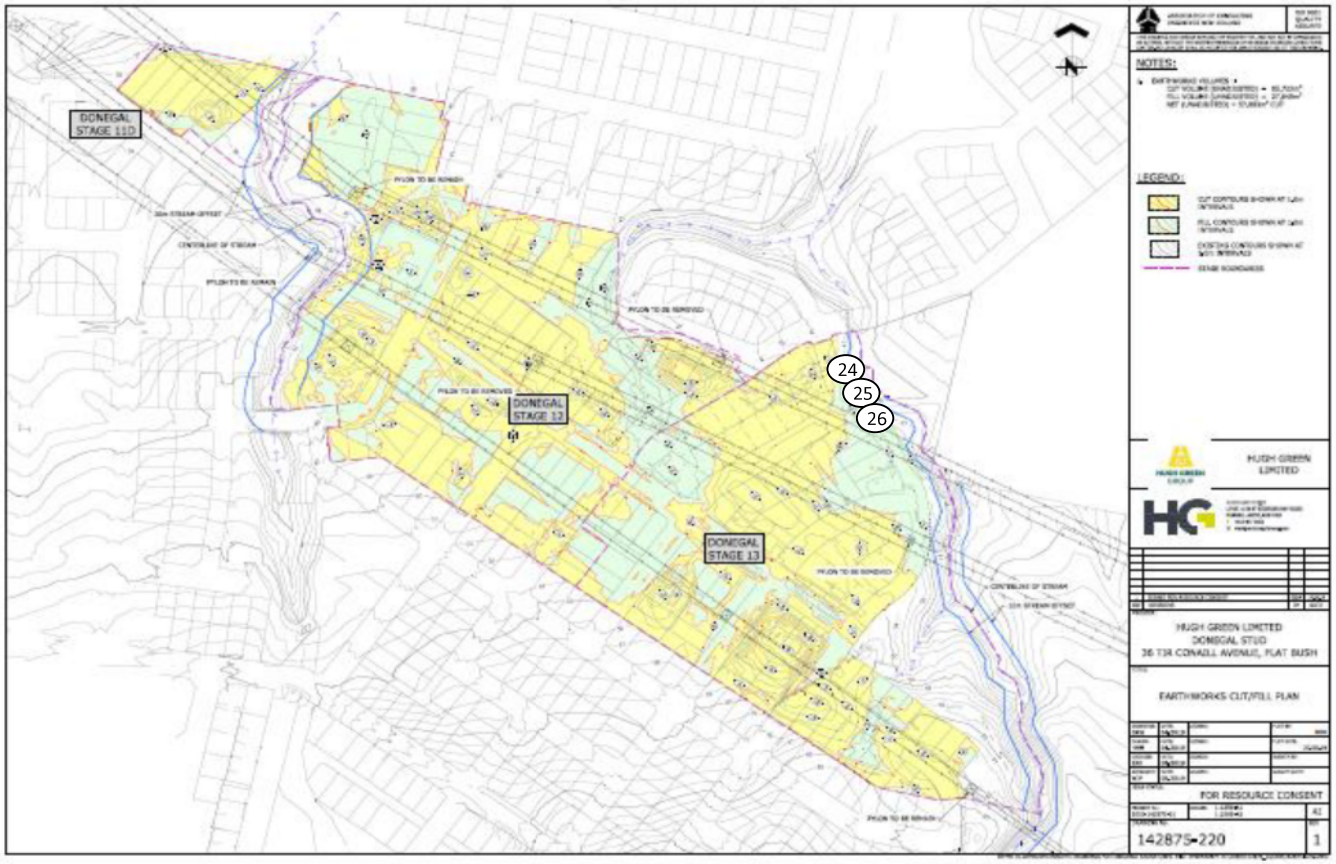
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00551
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: LW

Date tested: 11/03/2020



Issue date: 050517

East Tamaki Laboratory

Coffey Services (NZ) Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
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Earthworks Fill Report

Report No: EFIL:ETAM20W00561
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00561

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 24/03/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
12/03/2020	ETAM20W00561	LW	27	1.91	26.8	1.50	2.70	4	156	184+	UTP	UTP	Retaining Wall Fill	1770521	5905500	39.8	Clayey SILT	
12/03/2020	ETAM20W00561	LW	28	1.77	29.6	1.36	2.70	9	147	152	165	152	Retaining Wall Fill	1770499	5905535	39.9	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

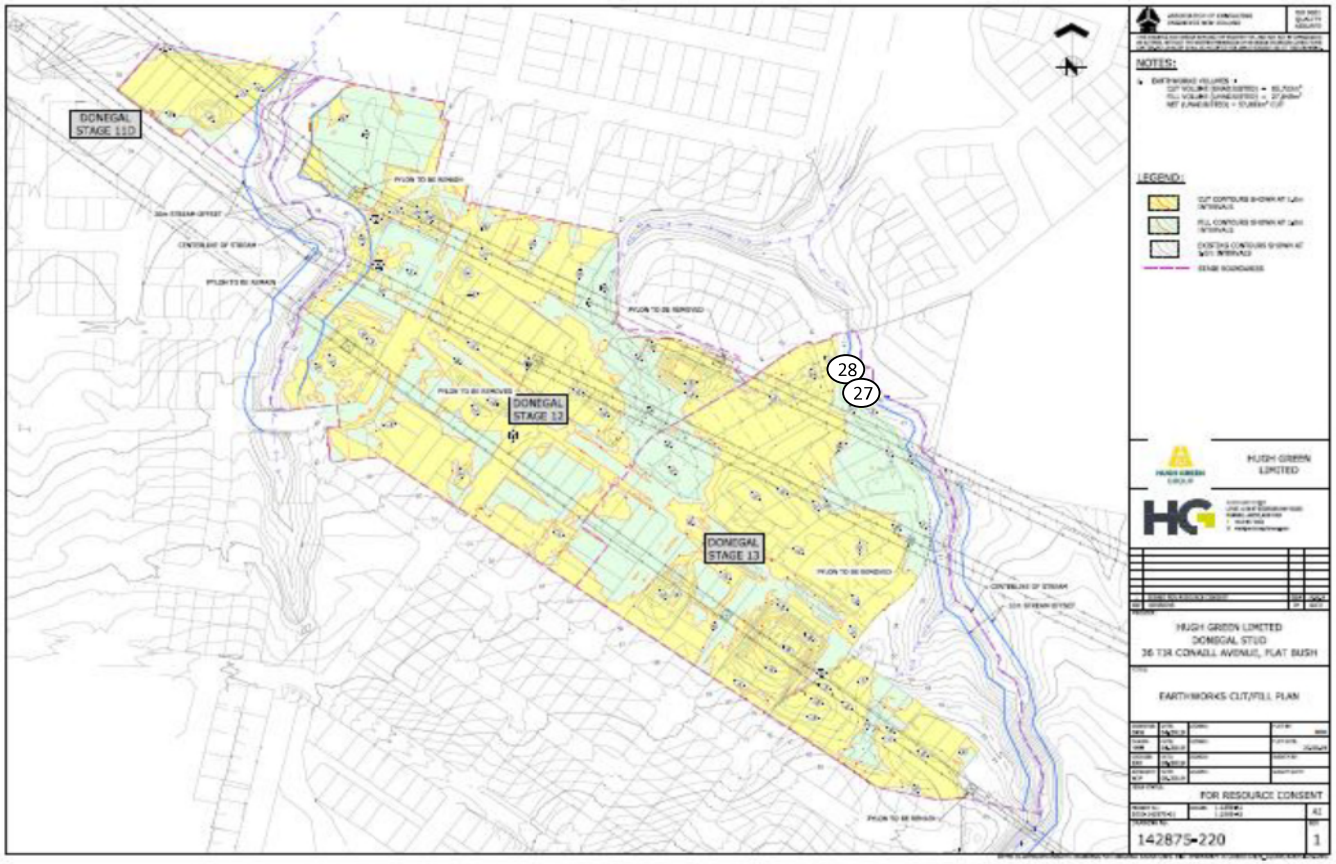
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00561
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: LW

Date tested: 12/03/2020



Issue date: 050517

East Tamaki Laboratory

Coffey Services (NZ) Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
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Earthworks Fill Report

Report No: EFIL:ETAM20W00566
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00566

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 24/03/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
13/03/2020	ETAM20W00566	MA	29	1.97	24.0	1.59	2.70	3	UTP	UTP	UTP	169	Retaining Wall Undercut	1770516	5905500	40.94	CLAY	
13/03/2020	ETAM20W00566	MA	30	1.98	25.7	1.57	2.70	1	UTP	UTP	158	175	Retaining Wall Undercut	1770499	5905539	40.93	CLAY	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

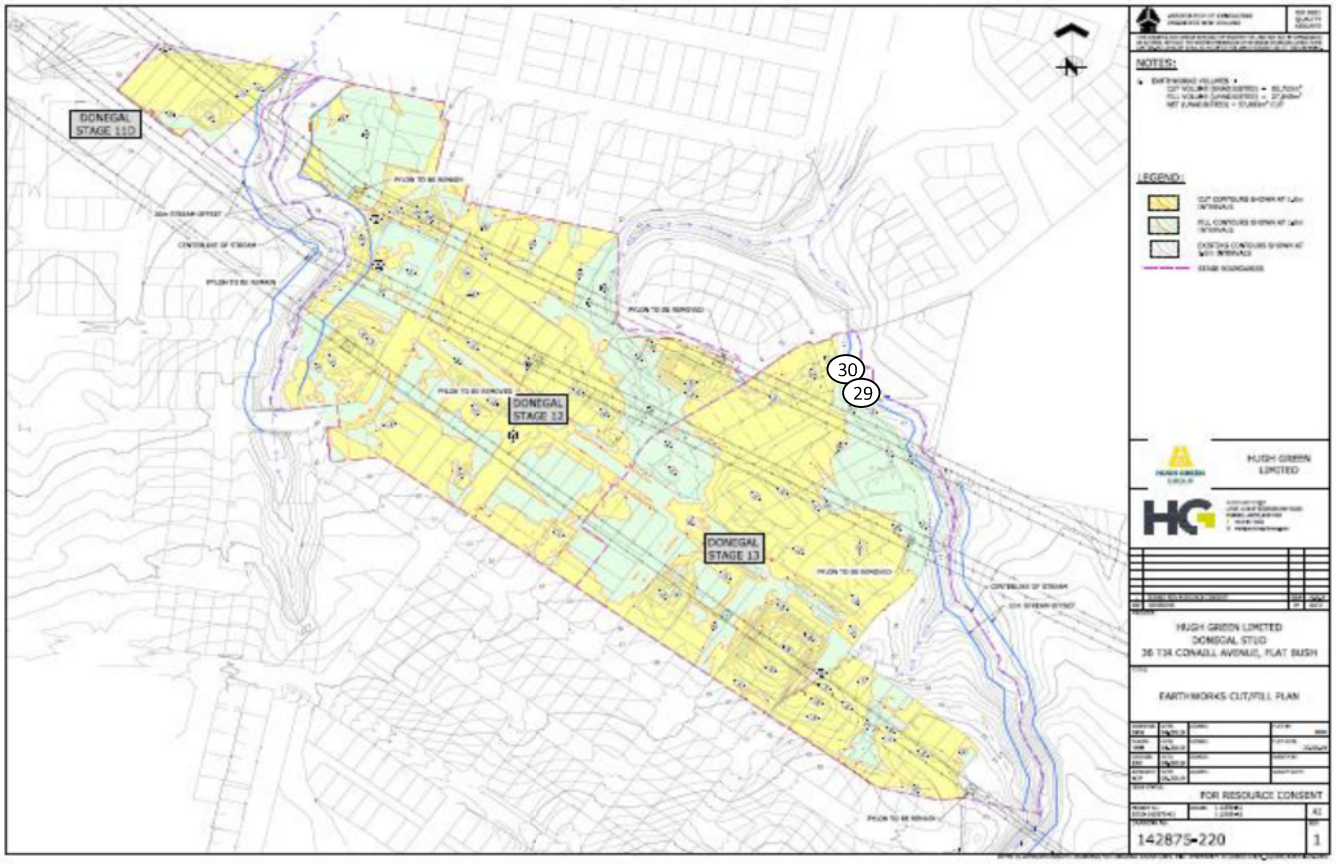
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00566
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: MA

Date tested: 13/03/2020



Issue date: 050517

East Tamaki Laboratory

Coffey Services (NZ) Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

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Fax: +64 9 272 3378

Earthworks Fill Report

Report No: EFIL:ETAM20W00605
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00605

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 24/03/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
18/03/2020	ETAM20W00605	SC	31	1.98	20.9	1.63	2.70	5	UTP	UTP	UTP	UTP	Bottom of Retaining Wall	1770498	5905536	41.38	Silty CLAY	At Finished Level
18/03/2020	ETAM20W00605	SC	32	1.94	20.8	1.60	2.70	7	UTP	UTP	UTP	UTP	Bottom of Retaining Wall	1770505	5905517	40.33	Silty CLAY	At Finished Level
18/03/2020	ETAM20W00605	SC	33	1.92	20.9	1.59	2.70	8	UTP	UTP	UTP	UTP	Bottom of Retaining Wall	1770520	5905496	41.28	Silty CLAY	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

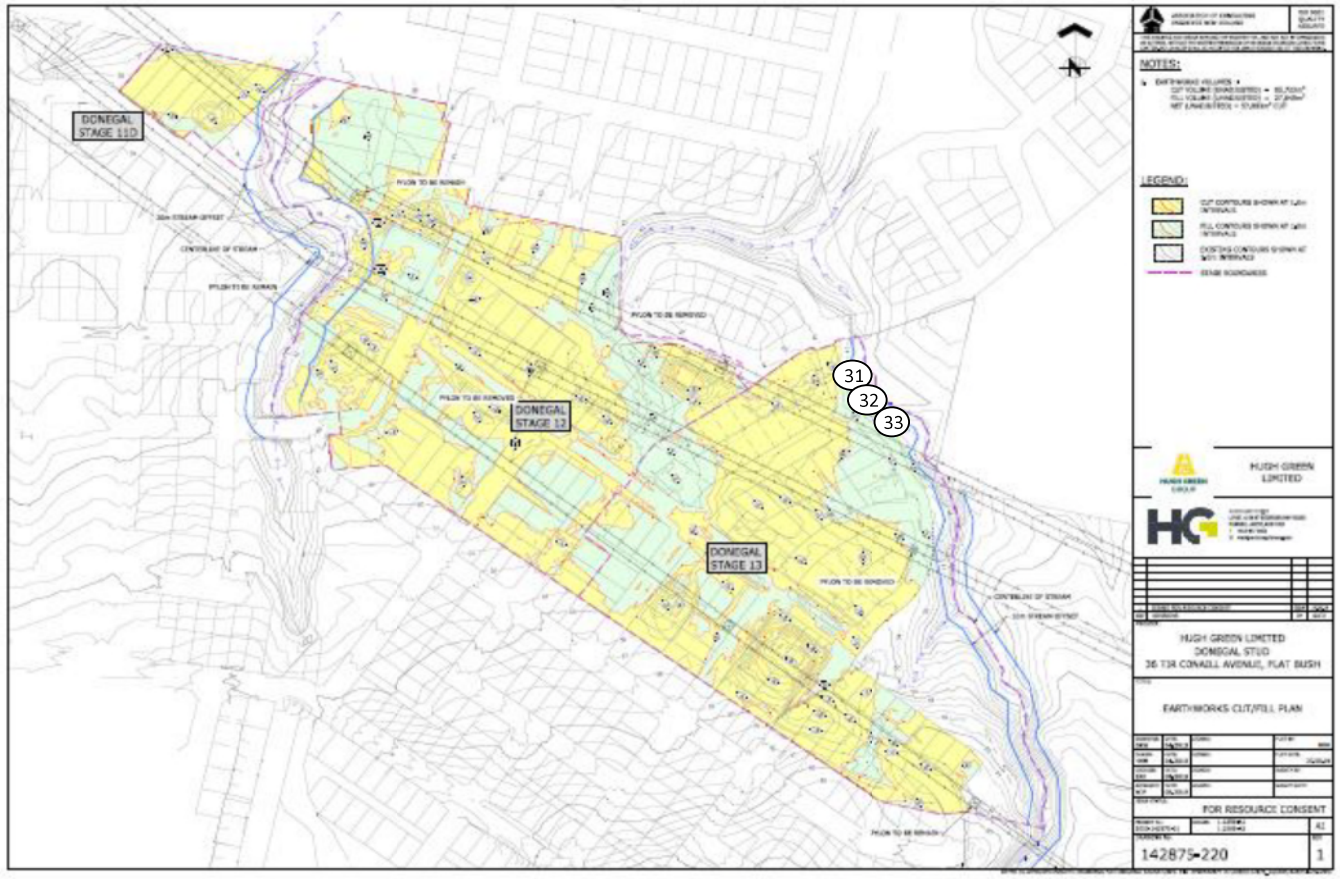
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00605
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: SC

Date tested: 18/03/2020



Issue date: 050517

East Tamaki Laboratory

Coffey Services (NZ) Limited

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PO Box 58877, Botany, Manukau NZ 2163

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Earthworks Fill Report

Report No: EFIL:ETAM20W00626
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00626

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 25/03/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
21/03/2020	ETAM20W00626	MP	34	1.80	30.9	1.37	2.70	7	219+	219+	219+	187	Retaining Wall Undercut	1770497	5905540	42.8	Silty CLAY	
21/03/2020	ETAM20W00626	MP	35	1.89	26.3	1.50	2.70	5	219+	UTP	UTP	UTP	Retaining Wall Undercut	1770503	5905514	42.4	Silty CLAY	Test no. 37 could not be plotted in the Site plan
21/03/2020	ETAM20W00626	MP	36	1.81	29.0	1.40	2.70	7	UTP	UTP	UTP	UTP	Retaining Wall Undercut	1770520	5905497	43.0	Silty CLAY	
21/03/2020	ETAM20W00626	MP	37	1.87	23.6	1.51	2.70	8	UTP	UTP	UTP	UTP	Stage 14	1770729	5905277	54.84	Silty CLAY	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

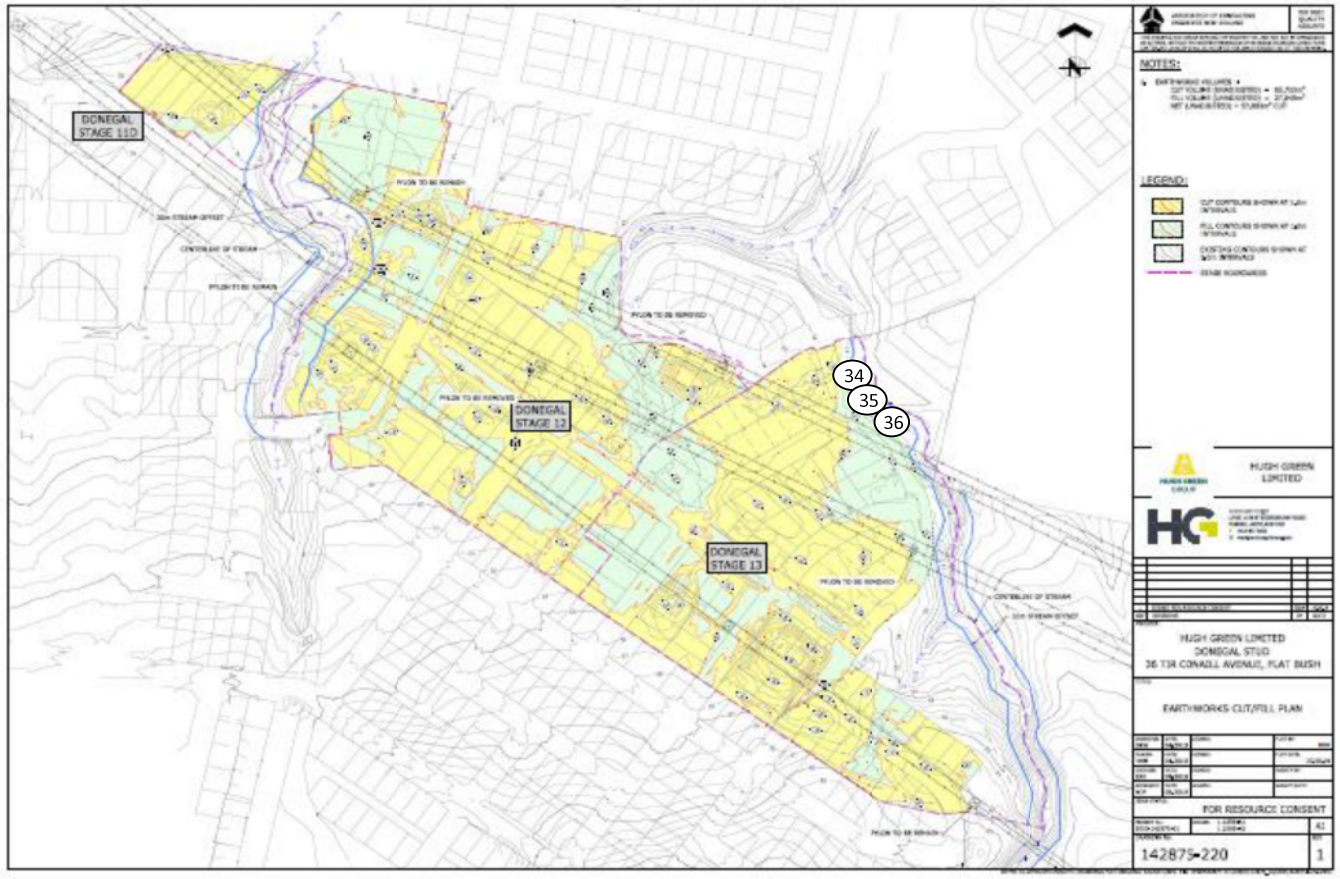
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00626
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: MP

Date tested: 21/03/2020



Issue date: 050517

East Tamaki Laboratory

Coffey Services (NZ) Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
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Earthworks Fill Report

Report No: EFIL:ETAM20W00642
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00642

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 4/05/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
29/04/2020	ETAM20W00642	LW	38	1.78	36.6	1.30	2.70	4	165	156	179	UTP	Retaining Wall	1770520	5905488	43.69	Clayey SILT	
29/04/2020	ETAM20W00642	LW	39	1.76	35.6	1.30	2.70	6	174	151	UTP	UTP	Retaining Wall	1770501	5905510	42.39	Clayey SILT	
29/04/2020	ETAM20W00642	LW	40	1.74	32.7	1.31	2.70	9	UTP	UTP	UTP	179	Retaining Wall	1770491	5905534	42.26	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

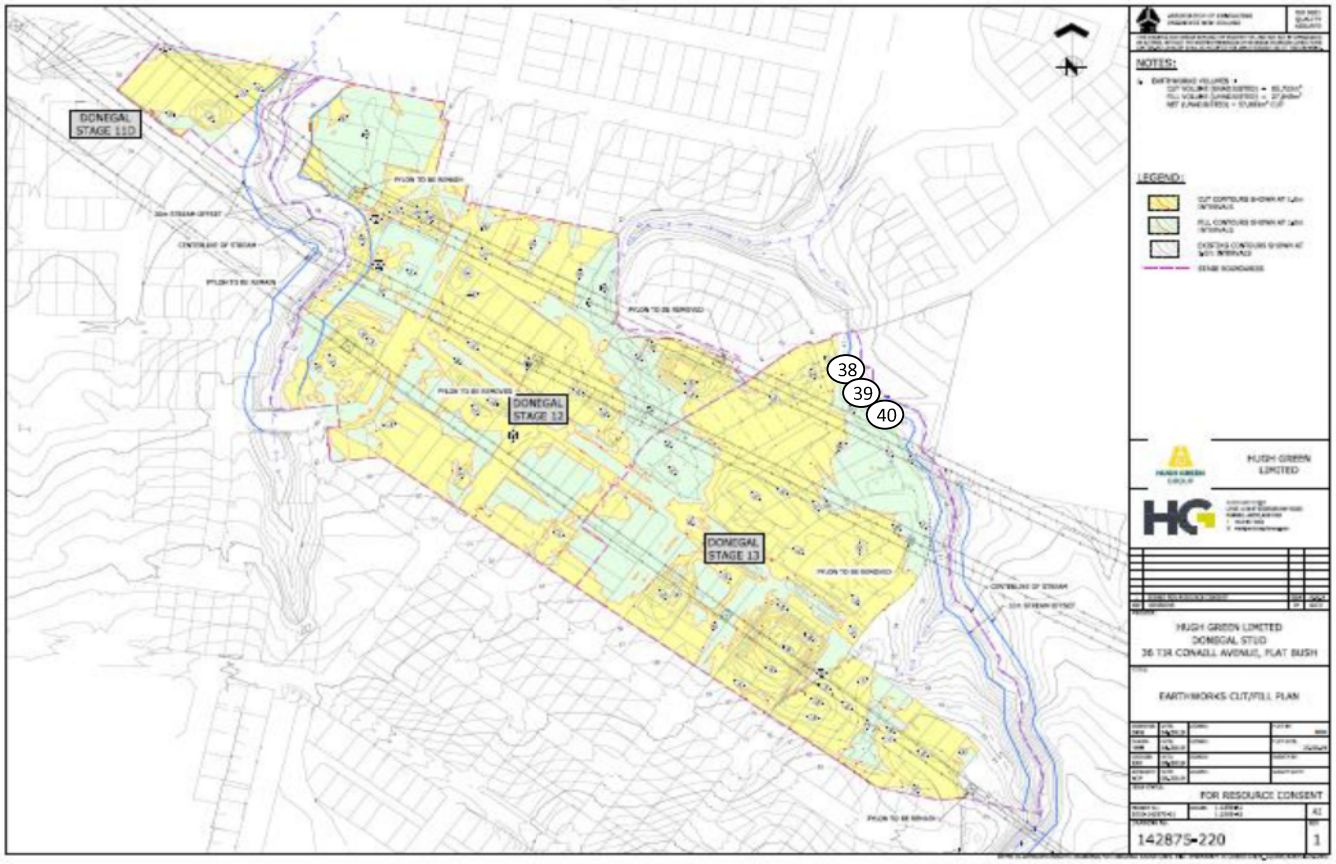
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00642
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: LW

Date tested: 29/04/2020



Issue date: 050517

East Tamaki Laboratory

Coffey Services (NZ) Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

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Fax: +64 9 272 3378

Earthworks Fill Report

Report No: EFIL:ETAM20W00647
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00647

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Joanna Jones
Laboratory Manager
IANZ Site Number: 105
Date of Issue: 6/05/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
1/05/2020	ETAM20W00647	MA	41	1.88	19.8	1.57	2.70	11.0	UTP	UTP	UTP	UTP	Stage 14 Fill Area	770742	5905262	55.62	CLAY	
1/05/2020	ETAM20W00647	MA	42	1.87	25.0	1.50	2.70	7.1	UTP	UTP	UTP	UTP	Stage 14 Fill Area	770748	5905247	56.3	CLAY	

Comments:

Form Number: R031N Issue Date: 20/09/2018

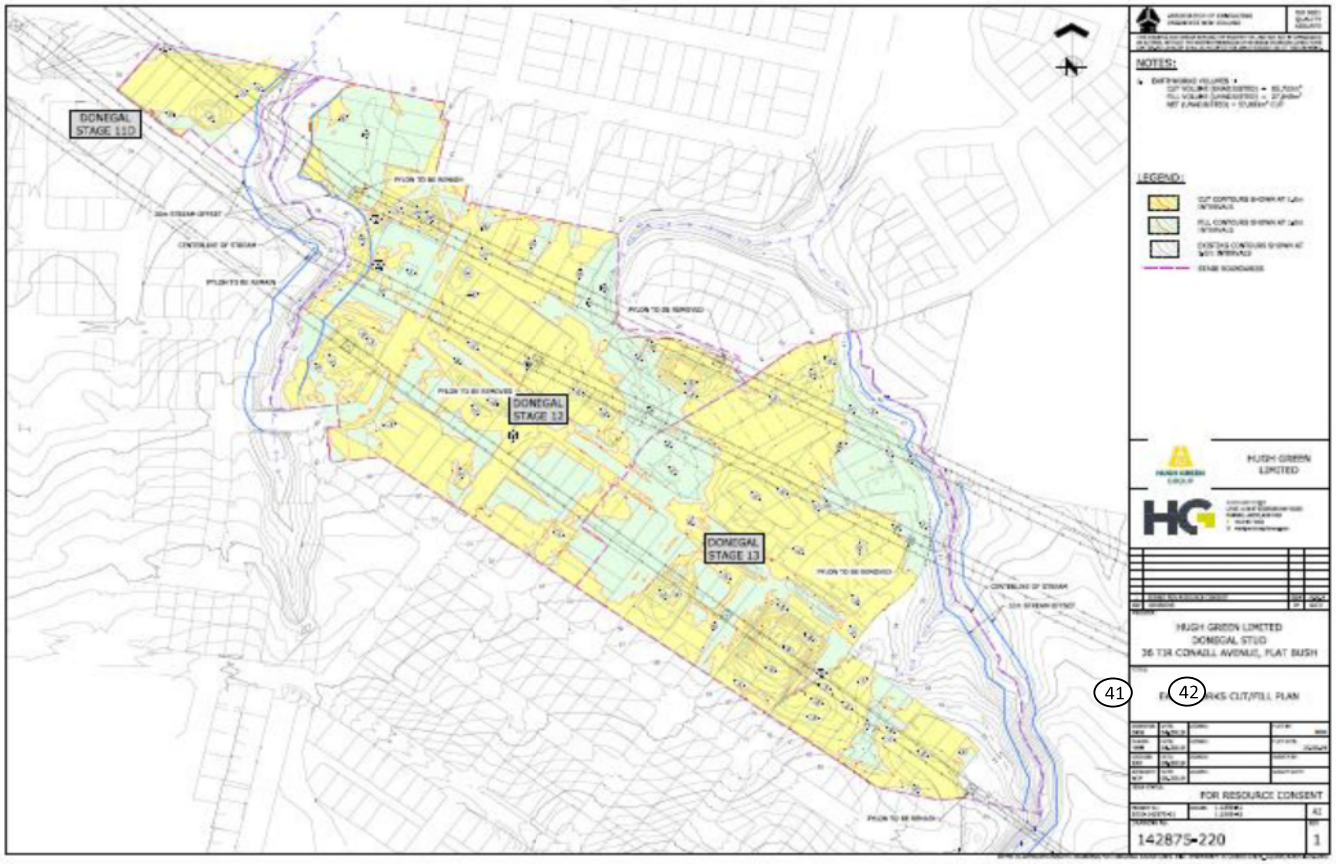
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00647
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: MA

Date tested: 1/05/2020



Issue date: 050517

East Tamaki Laboratory

Coffey Services (NZ) Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

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Fax: +64 9 272 3378

Earthworks Fill Report

Report No: EFIL:ETAM20W00655
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00655

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Joanna Jones
Laboratory Manager
IANZ Site Number: 105
Date of Issue: 6/05/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
2/05/2020	ETAM20W00655	MA	43	1.91	23.7	1.55	2.70	6.1	UTP	UTP	UTP	UTP	Wall Undercut	770552	5905460	40.72	CLAY	

Comments:

Form Number: R031N Issue Date: 20/09/2018

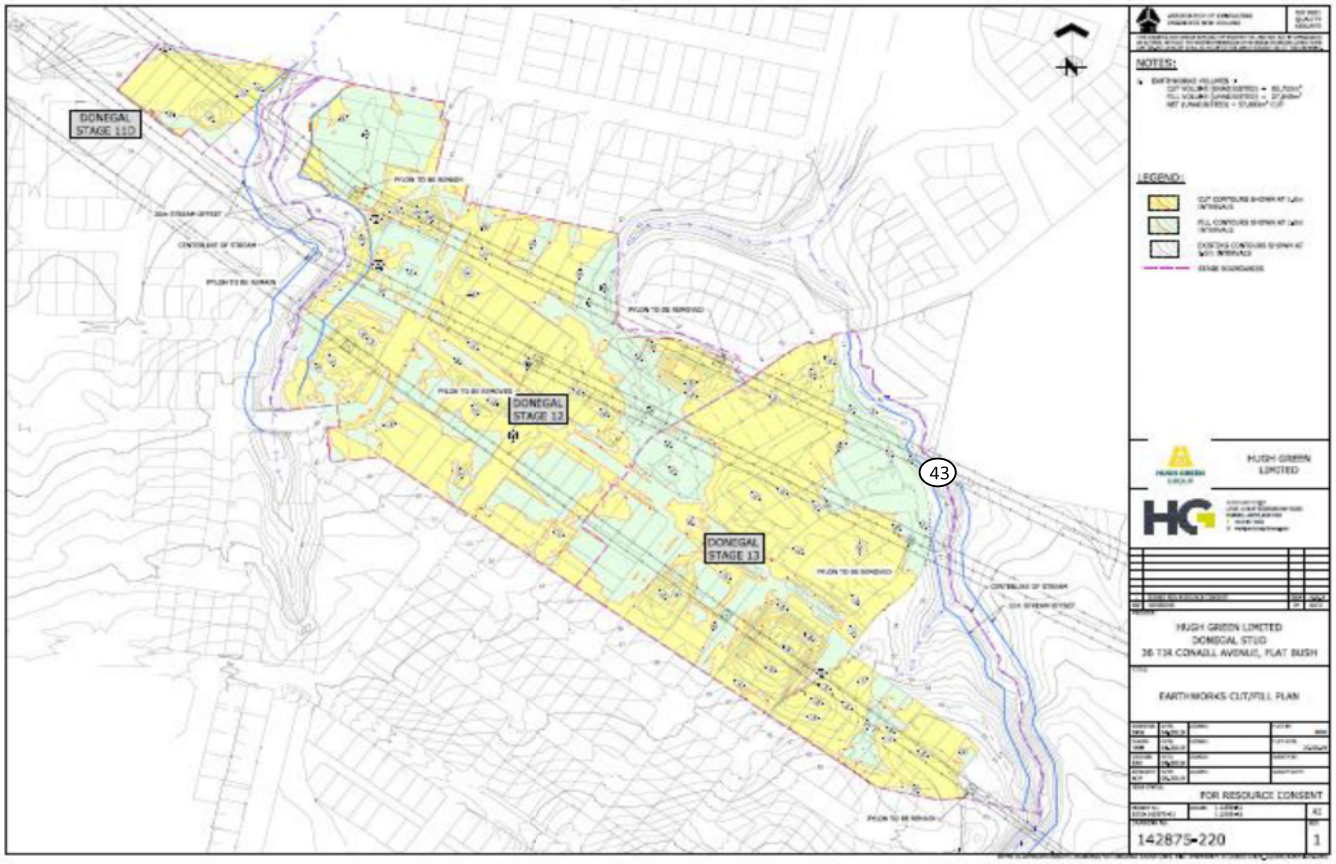
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00655
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: MA

Date tested: 2/05/2020



Issue date: 050517

East Tamaki Laboratory

Coffey Services (NZ) Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
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Earthworks Fill Report

Report No: EFIL:ETAM20W00685
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00685

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

Approved Signatory: Joanna Jones
Laboratory Manager
IANZ Site Number: 105
Date of Issue: 17/05/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
11/05/2020	ETAM20W00685	MA	44	1.88	26.4	1.49	2.70	5.5	155	152	155	160	Retaining Wall Undercut Backfill	413543	78868	41.3	CLAY	CH 100 (APCC)

Comments:

Form Number: R031N Issue Date: 20/09/2018

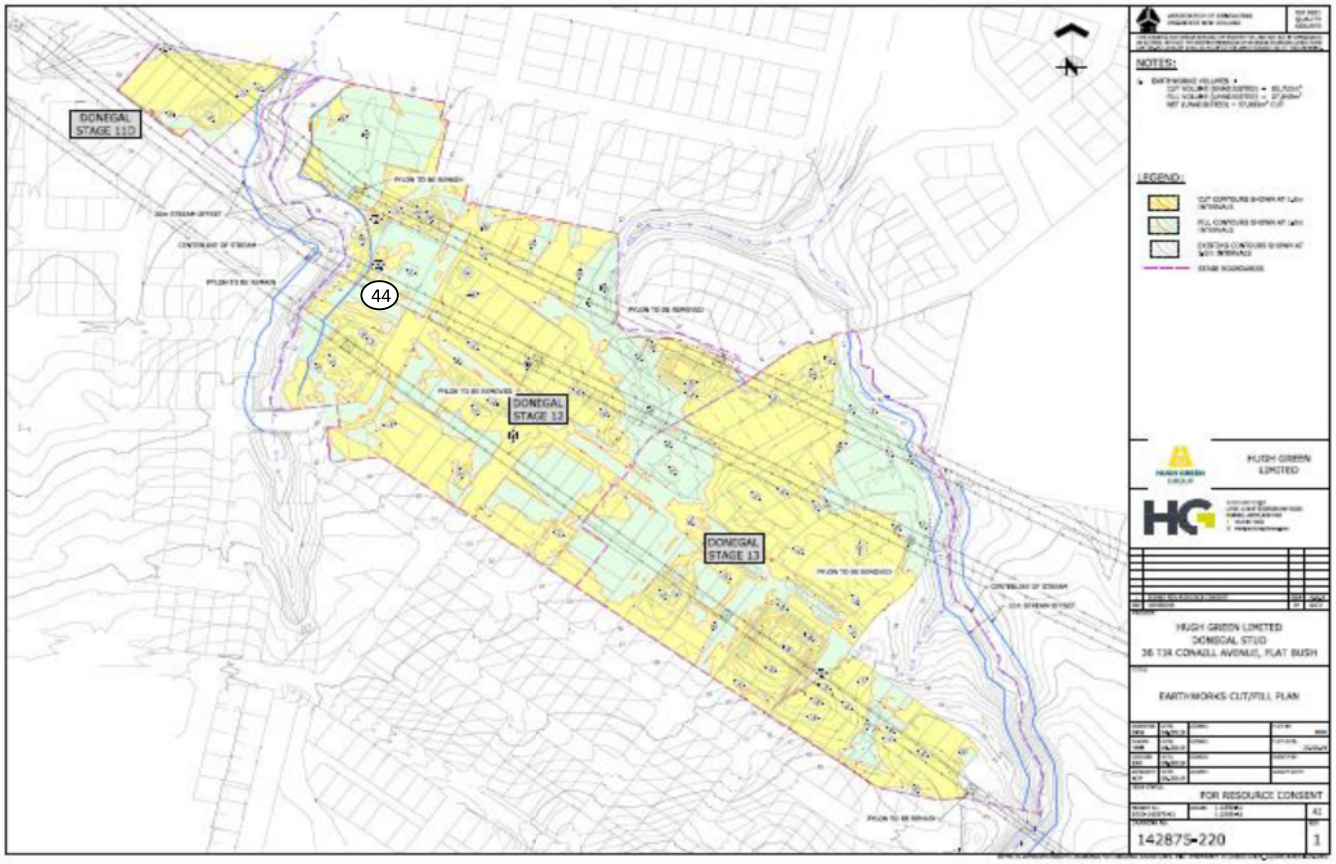
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00685
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: MA

Date tested: 11/05/2020



East Tamaki Laboratory

Coffey Services (NZ) Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Earthworks Fill Report

Report No: EFIL:ETAM20W00686
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W00686

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
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Approved Signatory: Joanna Jones
Laboratory Manager
IANZ Site Number: 105
Date of Issue: 17/05/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
11/05/2020	ETAM20W00686	MA	45	1.77	46.2	1.21	2.70	0.0	UTP	UTP	UTP	UTP	Retaining Wall Undercut Backfill	413536	788695	40.98	CLAY	CH 107.6 (APCC)

Form Number: R031N Issue Date: 20/09/2018

Comments:

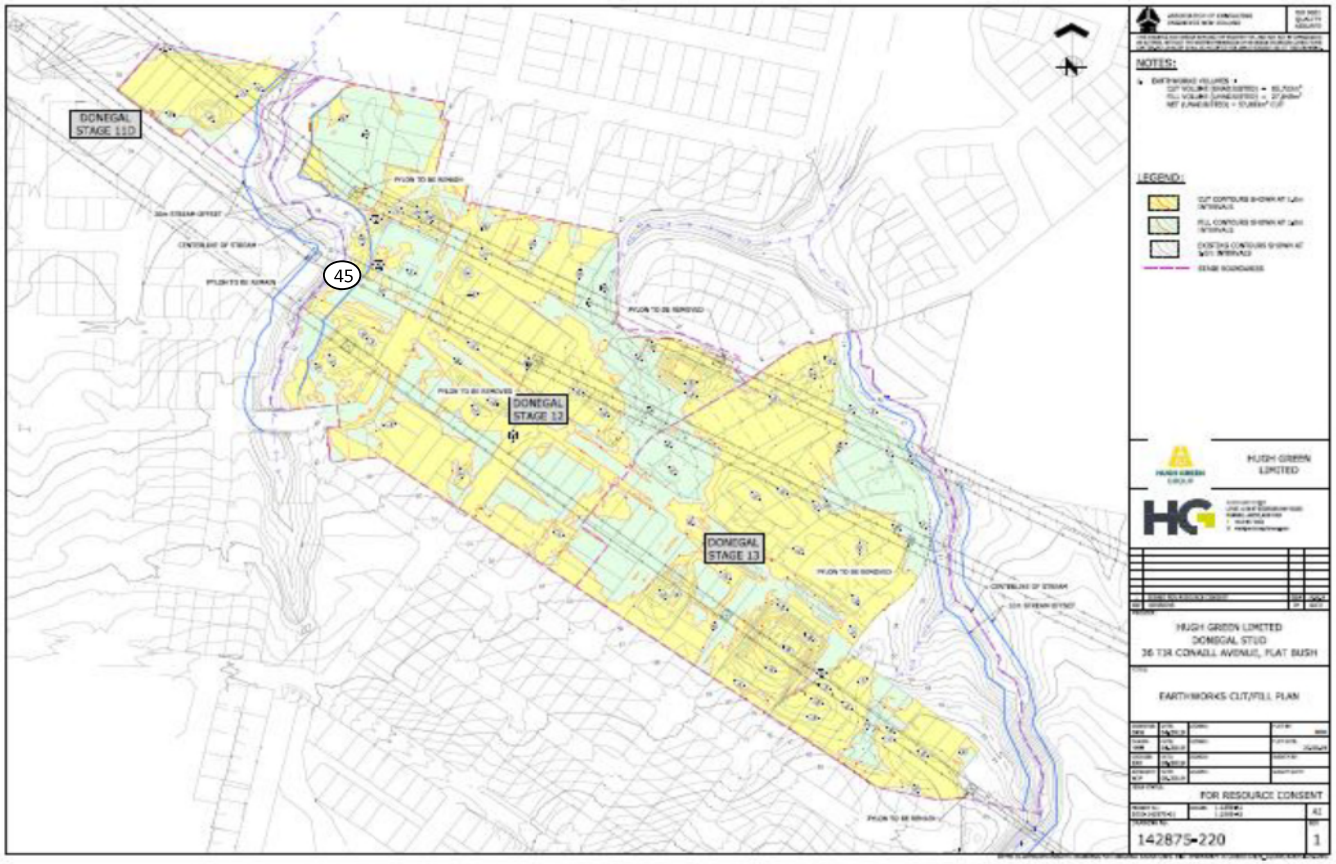
SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W00686
	Page No: 2 of 2

Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: As below

Tested by: MA

Date tested: 11/05/2020



Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited

Unit 10, 333 East Tamaki Road, Otara Auckland NZ 2013
, Manukau NZ 2163

Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM20W01400

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM20W01400

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Louis Smit
cc to:	-
Project No.:	773-ETAM01121AA
Project Name.:	773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13
Project Location:	Greenam Drive, Flat Bush

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 14/09/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
3/09/2020	ETAM20W01400	MA	56	1.91	26.5	1.51	2.70	4	163	163	143	156	Old Silt Pond Beside Rd 6	413459.7	788745.8	42.53	CLAY	

Comments:

Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

SITE PLAN	Project No: 773-ETAM01121AA
NOT TO SCALE	Work Order No: ETAM20W01400
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Project: 773-GENZAUCK16856AE - DONEGAL STUD - Stage 11-13

Location: Old Silt Pond beside Road 6

Tested by: MA

Date tested: 3/09/2020