Geotechnical Completion Report for Stages 1 & 2 Pembroke Heights Subdivision, Wanaka

Prepared for:	WFH Properties Ltd
Date:	23/06/2025
Our Reference Number:	22016_5 Rev2
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Authorised by:	Claude Midgley Director

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Contents

List of Figures

List of Tables

List of Appendices

1 Introduction and Scope of Report

JKCM Ltd, trading as Insight Engineering (IE), provided geotechnical and earthworks monitoring services for Stages 1 and 2 of the Pembroke Heights residential subdivision in Wanaka, (herein referred to as "the site").

Riley Consultants Ltd (Riley) and IE have previously undertaken geotechnical assessments for the proposed subdivision. The reports previously prepared for the site are:

- Geotechnical Assessment Report, Allenby Farms, Wanaka; reference number 160240-B, dated 7 October 2016 prepared by Riley; and
- Geotechnical Supplementary Assessment Report for proposed subdivision at Allenby Block, Wanaka; reference number 22016_1, dated 15 September 2022 prepared by IE.

This document should be read in conjunction with our prior report, as not all the information presented in our prior report will be reiterated herein.

Our scope of work for the Stages 1 and 2 earthworks phase of the development included:

- Site visits and coordination with the primary contractor, subcontractor, project engineer, subdivision engineers, surveyors and soil testing contractors as necessary to monitor and record the bulk earthworks within Stages 1 and 2 of the subdivision;
- Attend weekly site construction meetings;
- Review of laboratory and *in-situ* fill compaction test results and comparison with the earthworks specification;
- Plot *in-situ* fill compaction test locations and track test quantities relative to bulk fill volumes;
- Conduct supplementary soil testing in filled and excavated ground as needed; and
- Preparation of this completion report presenting our observations, summaries of test results and geotechnical conclusions in relation to the earthworks completed for Stages 1 and 2.

2 Overview of the Development

The site is located to the north-east of Wanaka (Figure 1). The Northlake and Northbrook residential subdivisions are located beyond the eastern and northern site boundaries respectively.

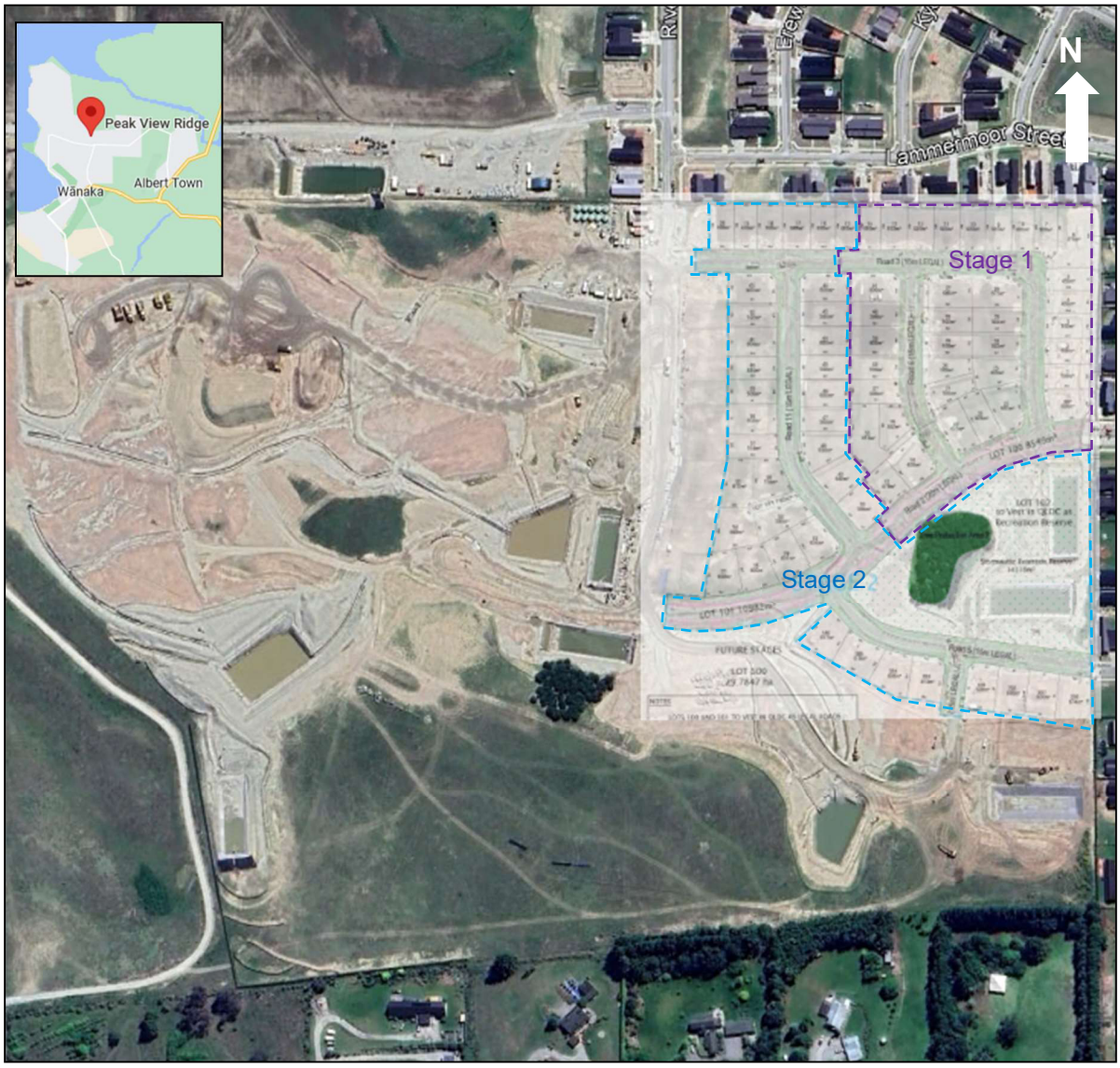
Prior to the bulk earthworks commencing, the site was undeveloped and contained no prior infrastructure or buildings.

The Stages 1 and 2 scheme plan (reference number 21091_101 dated 5 August 2022) and bulk earthworks plan (reference number 21091_102 dated 12 August 2022), prepared by LandPro Ltd, are presented as Appendix 1 of this report.

A total of 36 lots are included in Stage 1, and 38 lots are included in Stage 2. The stormwater detention basin is located within the boundaries of Stage 2, but bulk earthworks associated with the construction of the detention basin is excluded from the scope of this report.

Completed earthworks as-built plans have been prepared by LandPro Ltd and are presented as Appendix 2 of this report.

Figure 1: Pembroke Heights Stage 1 & 2 Location Plan



Base image sourced from Google Earth
Scheme plan overlay courtesy of LandPro Ltd

3 Summary of Earthworks

3.1 Contractors

Benchmark Construction Ltd (BM) is the main contractor to the development and their role is to complete civil construction works. Skevington Contracting Ltd (Skevingtons) is engaged as a subcontractor to complete the bulk earthworks.

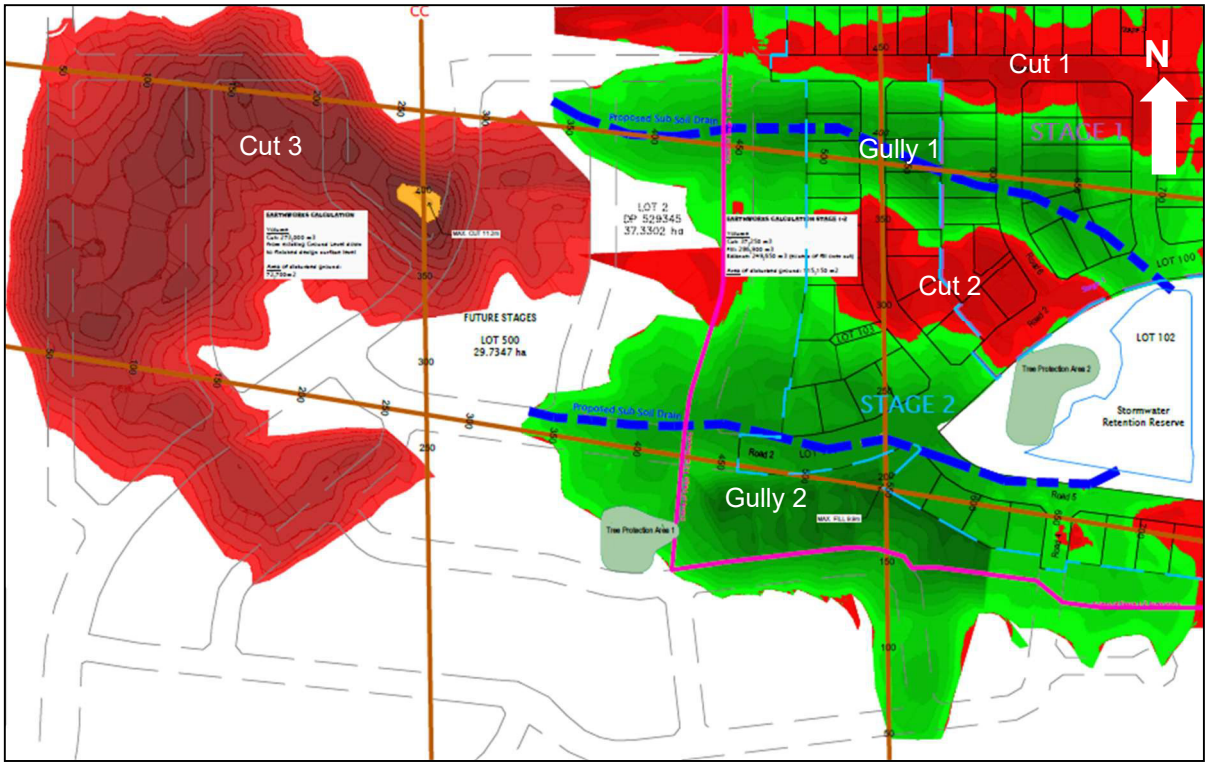
3.2 Earthworks Activities

In broad terms, the earthworks activities included excavation of elevated areas of the site and placement of the excavation spoil as bulk fill within the lower lying gullies to achieve the new design site contours.

The site was divided into fill areas labelled Gully 1 and Gully 2, and excavation areas named Cuts 1, 2 and 3 (Figure 2). Due to the volumes of fill required in Gullies 1 and 2, some of the earthworks areas are located outside of the extents of Stages 1 and 2. Therefore, the total earthworks completed to date extend beyond Stages 1 and 2.

Completed fill and excavation volumes calculated by BM was around 264,200 m^3 and 32,100 m^3 respectively.

Figure 2: Extents of Earthworks Excavation and Fill Areas



Base image courtesy of LandPro Ltd

Additionally, five (5) temporary stormwater and sediment retention ponds (SPR1-5) were constructed by Skevingtons. Two of these ponds (SPR4 and 5) were located within the permanent stormwater detention basin boundaries, and one pond (SPR3) was located adjacent to the eastern site boundary within Stage 1. Therefore, completion of the new Stage 1 lots included the decommissioning and infilling of SPR3.

3.3 Programme of works

Work commenced in late October 2023 with establishment of site offices, the construction of 5 temporary stormwater and sediment retention ponds (SPR1-5), and formation of haul roads.

Bulk earthworks commenced in early December 2023 in Gully 1. The work included topsoil stripping, installation of subfill drains and fill placement at the eastern end of Gully 1 using material from Cut 3. Fill placement in Gully 1 continued through the summer of 2024, using material from Cuts 1, 2 and 3. Formation of final surfaces were underway by the end of January 2024 along the northern site boundary, and this work progressed southwards through to March 2024. Final lot trimming, placement of topsoil and seeding on finished lots was underway by mid-February 2024.

Filling in Gully 2 commenced in late February 2024 with excavation spoil from Cut 3. Work commenced at the western end of the permitted earthworks extents and gradually progressed towards the eastern boundary in Gully 2. By May 2024, the majority of new lots were trimmed to final levels and stabilised with topsoil, hydroseed or hay mulch (or a combination of these methods).

Construction of two new temporary stormwater and sediment retention ponds (SPR6 and 7) at the western and southwestern sides of Stage 2 commenced by mid-May 2024. Upon completion of the new ponds, SPR3, which was located within Stage 1, could be decommissioned and filled. The footprint of SPR3 covered Lots 1-3 and Lot 397. Therefore, final trimming and stabilisation of the lots along the eastern boundary was completed by late June 2024.

During June to October 2024, there were no bulk earthworks being undertaken as Stages 1 and 2 were largely completed. Site works during this time were primarily related to the management of sediment and stormwater. Amendments to Lots numbered 1-6 and 397 were carried out from mid-October, involving excavation and re-shaping of the ground surfaces to reduce the elevations adjacent to the eastern site boundary. Bulk filling within the Northlake Drive Road reserve was also carried out during this time and these works were largely completed by mid-November 2024.

Additional amendments were made to Lots 9 and 10 during February and March 2025. This work involved trimming the surface of these lots to new design elevations. Lot 10 was trimmed by 0.5 m and Lot 9 was trimmed by 0.2 m.

Work commenced on the construction of the permanent stormwater detention basin by December 2024, which involved the decommissioning and demolition of SPR4 and 5, and placement of fill to form the new pond batters. This work is expected to be completed during April 2025.

Installation of civil infrastructure for Stages 1 and 2 by BM commenced in late winter and is ongoing at the time of writing.

3.4 Methods and Equipment

Skevingtons' proposed methodology to place and compact the fill was trialled on 1 November 2023 and involved the use of heavy dozers and sheepsfoot rollers to spread the fill materials and complete initial compaction. Further compaction was achieved with repeated passes of heavy loaded dump trucks. In rare instances, water was added to condition the fill prior to compaction.

Where required adjacent to slopes and batters, the fill was benched into slopes for additional stability.

Plant and machinery used by Skevingtons are too extensive to list here, however generally included multiple excavators ranging in size from 1.7T to 87.5T (including a long reach excavator), 825 compactor, 733 dump trucks, articulated dump trucks, watercarts and bulldozers.

4 Quality Control of Filled Areas

Quality control of the compacted fill areas included laboratory compaction testing, field compaction trials, visual monitoring and in-situ testing of filled and excavated areas.

Earthworks progress and records of fill and excavation volumes were managed by BM using aerial mapping technology. Copies of their records were sent to IE on a regular basis during the earthworks programme.

4.1.1 Laboratory Standard Compaction Testing

Laboratory testing was carried out by Central Testing Services (CTS), which is an accredited, independent laboratory.

Laboratory standard compaction testing was initially carried out on samples of site materials sampled by IE during 2022. Testing also included *in-situ* water content, plasticity and particle size distribution.

Additional laboratory testing was carried out periodically by CTS during the earthworks programme as necessary to verify material types and compaction targets.

Typical values from the test results are presented in Table 1 below.

Table 1: Summary of Laboratory Standard Compaction Test Results

CTS Report ref.	Sample description	Maximum Dry Density (t/m^3)	Optimum Water Content (%)
22/2078	Silty SAND with trace of gravel	1.89	11
22/2078	SAND with some gravel and silt	1.94	10
22/2078	SILT with some gravel and trace sand	1.95	11
22/2078	SILT with minor gravel and trace sand	1.93	10
23/4503	SILT and SAND with some gravel	1.92	11
23/4505	Gravelly SILT and SAND	1.96	10
23/4525	SILT and SAND with some gravel	1.96	10
24/007	SILT and SAND with some gravel	2.02	9
24/104	SILT and SAND with some gravel	1.98	10
24/117	Gravelly SILT and SAND	2.02	10
24/120	SILT and SAND with some gravel	1.95	10
24/1003	SILT and SAND with some gravel	1.93	10
CTS24W0717	SILT, SAND and GRAVEL	2.00	9.5
	Average	1.96	10.1

In-situ water contents typically ranged between 8.2 % and 10%, indicating minimal conditioning requirements for the fill materials. Addition of water, when required, was done with care as the fill materials are sensitive to water.

Copies of the test results are presented as Appendix 3 of this report.

4.1.2 Compaction Trial and Specification

A field compaction trial was carried out on 1 November 2023 in conjunction with CTS to assess whether the proposed fill placement and compaction strategy would achieve the target outcomes.

The trial involved compacting fill using different number of passes of variably weighted machinery and testing with a Nuclear Density Meter (NDM). The results of the compaction trial informed the contractors methodology and the earthworks specification, which are presented as Appendix 4 of this report.

4.1.3 Site Visits

Site visits, to monitor the progress of earthworks and observe the performance of the filled and excavated areas, were carried out during the earthworks programme between 1 November 2023 and January 2025.

Our observations, discussions with relevant parties, and photographs were recorded and, where necessary, geotechnical recommendations were communicated verbally and via daily or weekly site reports.

Site visits were typically carried out to observe stripped subgrade, fill placement and compaction activities, excavations, removal of boulders, proof rolling and to complete testing and in order to verify that the work was carried out in accordance with our recommendations and the provisions of NZS4431:2022 Engineered Fill for Lightweight Structures.

The activities which were not monitored by IE included some civil works, such as kerbing and road surface formation, and temporary sediment/stormwater controls.

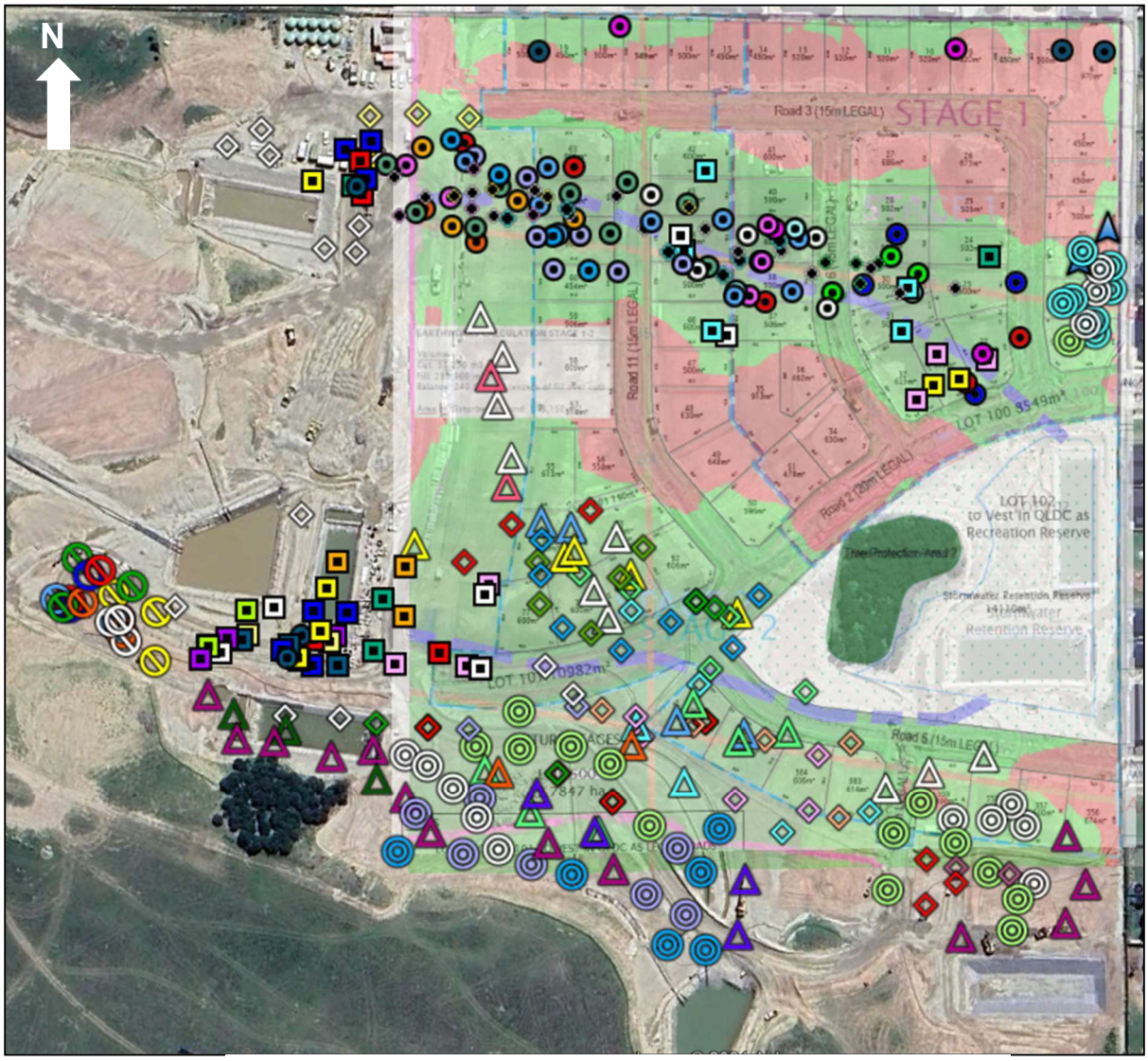
4.1.4 Field Compaction Testing

Field compaction tests were carried out by Central Testing Services during the earthworks programme on a periodic and regular basis. Tests were carried out using a Nuclear Density Meter (NDM), using the direct transmission method.

To date, a total of 161 tests were completed in the Gully 1 fill area, and 174 in the Gully 2 fill area. A summary of the test results is presented as Appendix 5 of this report. Individual test reports are presented under separate cover and not included in this report due to the large quantity of tests.

Test locations and elevations were captured by Skevingtons. IE plotted the locations to assess the distribution of tests and these are presented as Figure 3 below for information. A copy of Figure 3 with a symbol key is included in Appendix 5.

Figure 3: NDM Test Locations



Base image sourced from Google Earth
Scheme plan and Earthworks contour overlay courtesy of LandPro Ltd

Comparison of the *in-situ* test results with the laboratory results indicates that the majority of tests either met or exceeded the minimum acceptance criteria. In rare instances when the dry density did not meet the criteria, the fill was compacted further and retested, before worked progressed.

4.1.5 Scala Penetrometer Testing

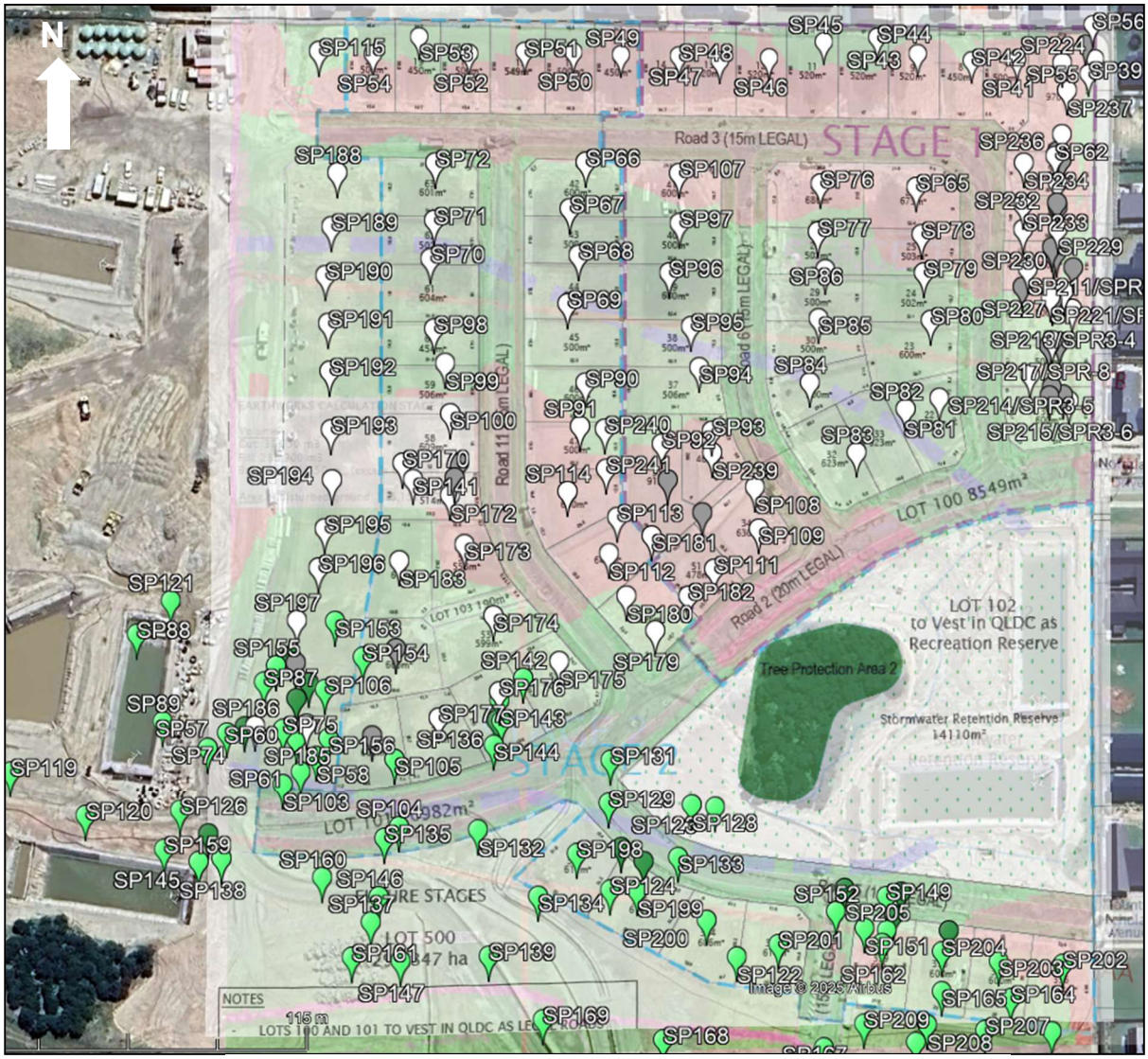
IE carried out limited Scala Penetrometer testing (Scala) on a regular basis during the earthworks programme to supplement the NDM test data. Additionally, we completed Scala testing on the finished surfaces of each new lot. Typically, one final Scala test was carried out per lot, however some of the lots located within the deeper cut areas received multiple tests to verify consistency of the new excavated surface. The Scala tests were typically terminated at relatively shallow depths[1] (i.e. less than 1 m) due to practical refusal in stiff/dense materials.

[1] Multiple tests were completed in progressive fill layers during earthworks (i.e. each fill lift was tested).

To date a total of 241 Scala tests were completed during the period December 2023 to January 2025. Therefore, not all test results are presented in this report. A summary of each new lot is presented as Appendix 7 of this report, and selected test results are included in this summary.

Approximate test locations are presented as Figure 4.

Figure 4: Scala Penetrometer Test Locations



Base image sourced from Google Earth
Scheme plan and Earthworks contour overlay courtesy of LandPro Ltd

5 Quality Control of Excavated Areas

Excavated areas were monitored periodically by IE for temporary stability, type and condition of excavation spoil for fill materials.

Where new lots were formed in excavated areas, Scala testing was performed to supplement previously existing investigation data and to assess the consistency of the new ground surfaces.

The performance of excavated areas under heavy machinery (fully loaded dump trucks weighing between approximately 70 and 100 tonnes) was periodically monitored by IE.

6 Conclusions and Recommendations

6.1 Filled Areas

IE has undertaken geotechnical subsurface investigations at the site in 2022 and has completed part time observation, monitoring and testing of the site during the earthworks period on a regular basis between November 2023 and January 2025.

The fill materials typically comprised mixtures of silty SAND/sandy SILT with some to trace of gravel, fine sandy SILT and gravelly SILT, which did not vary significantly during the earthworks period. Occasional boulders were encountered during excavations and removed from the fill prior to placement.

Fill placement and compaction methods during the earthworks programmed were consistent with the compaction trials carried out in November 2023.

In-situ compaction testing using a NDM was carried out by CTS on a regular basis when fill placement activities were underway. IE completed supplementary Scala testing progressively during the earthworks programme, as well as on the completed surfaces of the new lots.

Performance of filled ground under heavily loaded machinery (approximately 70-100 tonnes) was observed to be satisfactory (i.e. we did not observe significant deformations of the fill layers during or after the earthworks programme).

The NDM test results indicated that the target compaction has been met or exceeded in the fill areas. Certain test results indicated air voids greater than 10% when the fill was slightly dry of optimum. However taking into account our observations of the satisfactory fill performance, Scala test results and dry density results (generally meeting or exceeding 98% MDD) all indicating stiff to very stiff conditions, we consider that the fill compaction targets have been achieved.

Therefore, it is our opinion that the fill placement has been undertaken in accordance with our prior recommendations, the earthworks specification and NZS4431:2022 Engineered Fill for Lightweight Structures. A Schedule 2A certificate (statement of suitability) is presented as Appendix 6.

6.2 Excavated Areas

The materials exposed in the excavated areas at the site are generally in keeping with our expectations based on our prior geotechnical investigations.

Performance of excavated ground under heavily loaded machinery was observed to be satisfactory.

Supplementary Scala test results indicate typically stiff to very stiff soil conditions within the excavated areas.

6.3 Bearing Capacity for Future Foundations

Based on our observations and testing discussed herein, we consider that the filled and excavated ground within Stages 1 and 2 meets the criteria for “good ground” as per NZS3604:2011.

Summaries of each new lot, including the lot specific Scala test results[2], excavation/fill heights, set back requirements and specific foundation conditions are presented as Appendix 7 of this report.

[2] Note that we have presented only test results for the final ground surface on the summary sheets. Multiple tests were carried out during the earthworks programme. Figures 3 and 4 of this report show all the NDM and Scala test distributions.

We have assessed the geotechnical ultimate (unfactored) bearing capacity for the new lots within both filled and excavated ground based on lot specific Scala test results, as well as those tests completed during the earthworks programme. Clause 3.3.8 of NZS3604:2011 states that "*there shall be a minimum of four test sites for a building up to 200 m^2 plan area, with at least one additional test site for each 100m^2 additional plan area of the building*". However, this clause is intended for individual building sites in isolation and therefore does not apply in this case where bulk engineered earthworks have been undertaken and a statement of suitability issued.

Any proposed structure that falls outside of the scope of NZS3604:2011 (lightweight, timber framed structures) may require specific foundation design. We recommend that IE is contacted for further advice if this is required.

A strength reduction factor of 0.50 or 0.80 is recommended to be applied to all recommended geotechnical ultimate soil capacities in conjunction with their use in factored design load cases for static and earthquake overload conditions respectively.

6.4 Site Seismic Subsoil Class

The site seismic subsoil class is assessed as being Class D – deep or soft soil, in accordance with NZS1170.5.

6.5 Foundations and Setback Distances

Generally, we consider that foundation options complying with NZS3604:2011 should be suitable to support future dwellings at the site, providing that the dwellings are designed in accordance with NZS3604:2011. Foundation options generally include slab-on-grade foundations, waffle-style slab foundations, as well as shallow piles or pad and beam foundations. As discussed in the preceding section, structures falling outside of the scope of NZS3604:2011 may require specific foundation design.

All foundations should either bear within competent native soils or within engineered fill below topsoil.

Any lots with unsupported batter slopes or retaining walls on the boundaries may be subject to geotechnical set-back distances. Set back distances should be applied to the crest of unsupported slopes, top of retaining walls and from the base of retaining walls to allow access for any future maintenance that may be required.

QLDC have rules[3] relating to minimum setback distances from internal boundaries for low density residential development, which typically require two setbacks of 4.5 m and two setbacks of 2 m (subject to road boundaries). These minimum setback distances are not informed by specific geotechnical conditions, and therefore we recommend that future lot owners work with their architects and planners to ensure that both the QLDC setback and any specific geotechnical setback requirements are met.

Typically to avoid surcharging slopes or retaining walls, foundations should not bear within a 45 degree zone of influence, indicated by an imaginary line drawn rearwards from the toe of the slope or wall. Therefore, in most cases where a boundary slope height is 2 m or less, we anticipate that no specific geotechnical set back distances will be required in addition to the minimum set back distances required by QLDC.

However those lots that are located upslope of a boundary slope that is greater than 2 m are recommended to have a set back distance adjacent to that boundary that is at least equal to the height of the slope (e.g. if a dwelling is constructed upslope of a 2.5 m high slope, then the dwelling

[3] https://www.qldc.govt.nz/media/b0ybq40w/odp_-section-12-rules-for-northlake-may-2019.pdf

should be located a minimum distance of 2.5 m from the crest of the slope to avoid surcharging a retaining wall built between the adjacent lots).

Lots requiring specific setback distances are numbered 7 to 20, and 27 to 31 and further information is presented in Appendix 7.

If future building foundations are required to be located within the geotechnical setback distance of the crest of slopes or retaining walls, then specific foundation design is likely to required.

6.6 Retaining Walls

The recommendations presented in this section are intended to present broad information for the design of future retaining walls on individual lots. We recommend that specific engineering assessment is carried out for any future retaining walls, particularly those exceeding 1.5 m height or supporting neighbouring properties. Some retaining walls less than 1.5 m high are exempt from Building Consent, but each wall should be assessed on a case by case basis as the rule does not apply in all situations.

6.6.1 General Design Considerations

The designer should allow for any other relevant surcharges that are likely to be imposed on the wall, including any relevant building, vehicular, backslope, toeslope and seismic loads.

It should be noted that random boulders could remain within the native soils (i.e. on lots located within excavated areas) and this should be investigated for any retaining walls requiring embedded poles.

Depending on the style of wall, toe drainage may be required. Toe drainage should be connected into an approved stormwater disposal system.

The designer should satisfy themselves as to the appropriate soil properties to be relied upon for the design of retaining walls.

6.6.2 Seismic Design Considerations

Reference should be made to the Ministry of Business, Innovation and Employment (MBIE) / New Zealand Geotechnical Society (NZGS) Earthquake Resistant Retaining Wall Design (Module 6 version 1) guidance issued in November 2021.

Seismic design calculations should be carried out for any walls that meet the criteria outlined in Module 6.

The site may be taken as Class D (deep or soft soil site) and the topographic amplification factor may be taken as 1.0 in this case. The appropriate wall displacement factor (W_d) should be selected from Table 5.2 of Module 6.

The maximum peak ground acceleration (a_{max}) for various return periods for Wanaka is given in the MBIE and NZGS Earthquake Geotechnical Engineering Practice Module 1 issued in November 2021 (Table A1 in Appendix A of Module 1). The PGAs presented in Table A1 are applicable for all site classes.

6.7 Further Earthworks

If future lot owners require further earthworks to be undertaken on the new lots, then this work shall be completed under the guidance of a suitably qualified geotechnical professional.

6.8 Erosion, Sediment and Stormwater Management

The soils at the site are dispersive and susceptible to erosion when exposed to water and wind. Future lot owners will be responsible for the implementation and maintenance of relevant erosion and stormwater controls within the lot boundaries during and after development.

Permanent erosion control measures may include revegetating with suitable plants (with both fibrous and deep roots), hydro-seeding and/or the placement of proprietary erosion control mats to protect any unsupported batters or exposed soils at all times during and after earthworks, as well as during construction of future dwellings and retaining walls etc.

Ponding of water should not be permitted near or under the building areas, as well as foundation excavations. Building platforms should be formed to provide for rapid removal of surface water runoff from the foundation elements and to prevent ponding of water or seepage toward the foundation systems at any time during or after construction.

Stormwater from roof downspouts and other hardstand areas should be directed to the approved disposal system, and should not be permitted to discharge in a concentrated or uncontrolled manner into the ground.

Additionally, future builders/site contractors are responsible for implementing appropriate short term stormwater management (as well as sediment and dust controls) during construction of dwellings, such that water and sediment run-off from the site is appropriately treated prior to entering the receiving environment.

7 Closure

IE has undertaken regular site visits as described herein for observation, testing to provide ongoing geotechnical advice. However, our scope of work did not extend to full time monitoring and therefore our conclusions and the Schedule 2A certificate (Statement of Suitability) relies on the Contractors' work practices and assumptions that all information provided to IE is complete and accurate.

Similarly, we assume that all as-built information and other details provided by other members of the project team are accurate and correct in all respects.

If there are any queries in relation to this report and its contents, these should be directed to IE in the first instance.

8 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, WFH Properties Ltd, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments, observations, tests and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

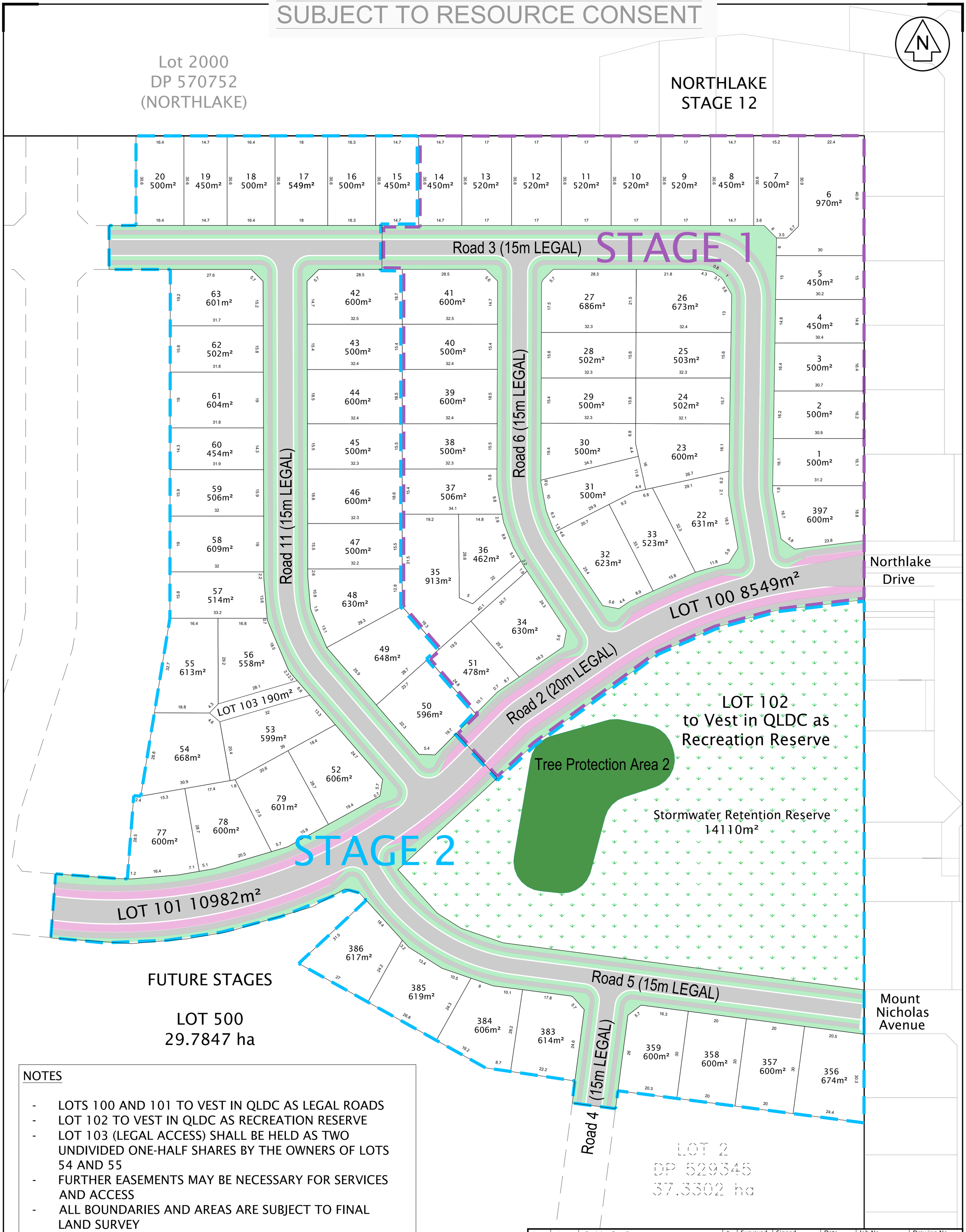
iv. This Limitation should be read in conjunction with the IPENZ/ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

Appendix 1

Proposed Scheme Plan and Bulk Earthworks Design Plan

SUBJECT TO RESOURCE CONSENT



NOTES

- LOTS 100 AND 101 TO VEST IN QLDC AS LEGAL ROADS
- LOT 102 TO VEST IN QLDC AS RECREATION RESERVE
- LOT 103 (LEGAL ACCESS) SHALL BE HELD AS TWO UNDIVIDED ONE-HALF SHARES BY THE OWNERS OF LOTS 54 AND 55
- FURTHER EASEMENTS MAY BE NECESSARY FOR SERVICES AND ACCESS
- ALL BOUNDARIES AND AREAS ARE SUBJECT TO FINAL LAND SURVEY

STAGE 1 - LOTS 1-14, 22-41, 51, 397 & 100
STAGE 2 - LOTS 42-50, 52-63, 77-79, 356-359, 383-386, 101-103

ISSUED FOR REVIEW 08.08.2022

Rev.	Date	Revision Details	By
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.	
			21091	101	
Drawn	Signed	Date	Scale		
KA		05.08.22	1:600 @ A1		
Designed	Signed	Date	Datum & Level	Rev.	
KA		05.08.22	Lindis Peak 2000	-	

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-If this plan is being used as part of sale and purchase agreement then it is done so on the basis that it is preliminary only, final dimensions and areas may vary on final survey

PROPOSED SUBDIVISION OF LOT 2 DP 529345
ALLENBY FARM, 44 PEAK VIEW RIDGE WANAKA
STAGE 1 & 2 SCHEME PLAN

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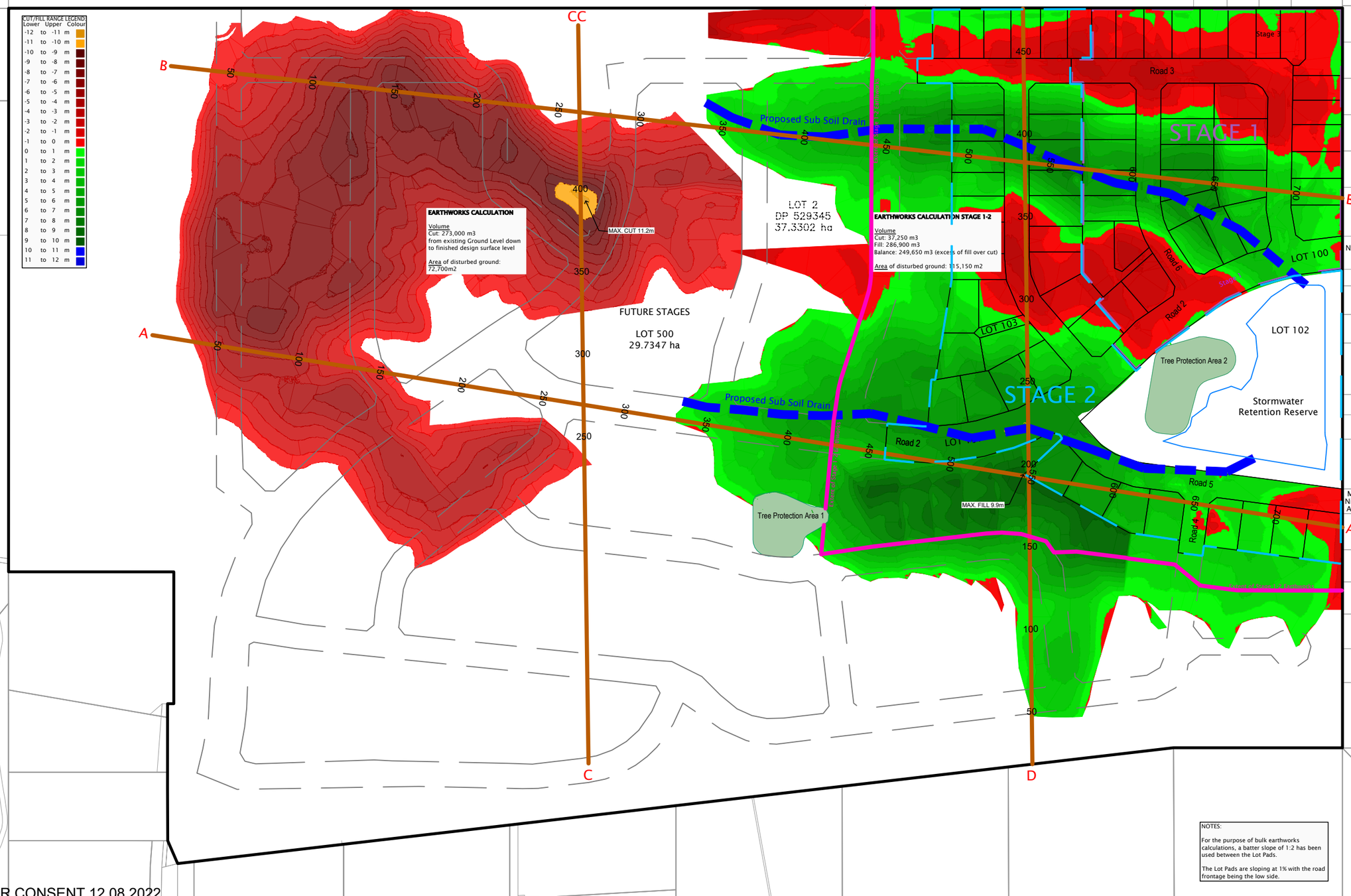

ISSUED FOR CONSENT 12.08.2022

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PROPOSED SUBDIVISION OF LOT 2 DP 529345
ALLENBY FARM, 44 PEAK VIEW RIDGE WANAKA
BULK EARTHWORKS PLAN STAGE 1 & 2

Rev.	Date	Revision Details	By
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.	
LP		2019	21091	102	
Drawn	Signed	Date	Scale	1:1250 @ A1 1:2500 @ A3	
KA		12.08.22			
Designed	Signed	Date	Datum & Level		Rev.
KA		JULY 22	LP2000 & NZVD16		-

Appendix 2

Earthworks As-Built Plans

Notes:

1. All works supervised and certified by Insight Engineering Ltd.
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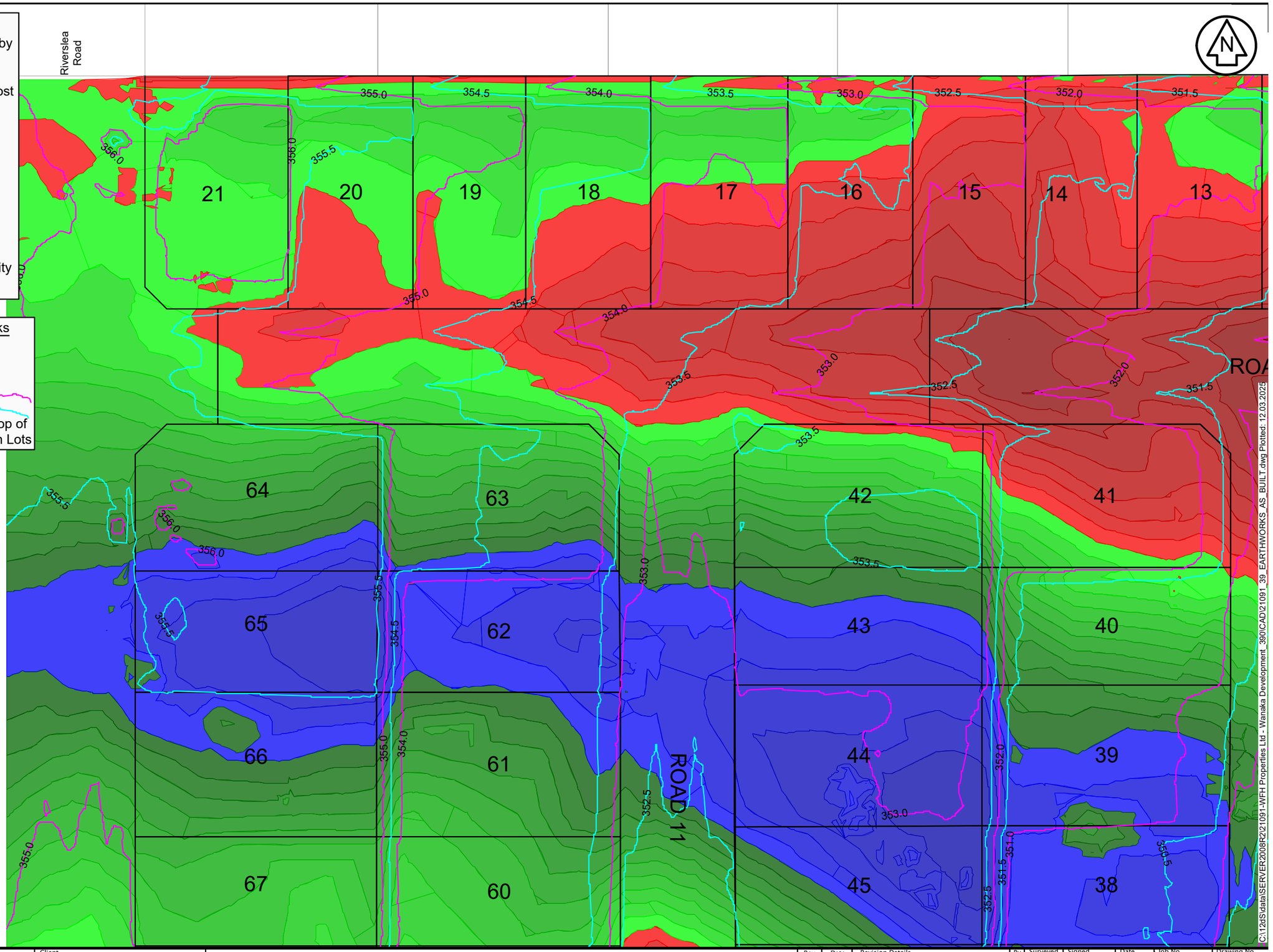
CUT/FILL DEPTHS LEGEND

Lower		Upper		Colour
-5.0	to	-4.5	m	
-4.5	to	-4.0	m	
-4.0	to	-3.5	m	
-3.5	to	-3.0	m	
-3.0	to	-2.5	m	
-2.5	to	-2.0	m	
-2.0	to	-1.5	m	
-1.5	to	-1.0	m	
-1.0	to	-0.5	m	
-0.5	to	0	m	
0	to	0.5	m	
0.5	to	1.0	m	
1.0	to	1.5	m	
1.5	to	2.0	m	
2.0	to	2.5	m	
2.5	to	3.0	m	
3.0	to	3.5	m	
3.5	to	4.0	m	
4.0	to	4.5	m	
4.5	to	5.0	m	
5.0	to	5.5	m	
5.5	to	6.0	m	
6.0	to	6.5	m	
6.5	to	7.0	m	
7.0	to	7.5	m	

Post Earthworks site contours
[NZVD16]
Intervals:
Major (1m)
Minor (0.5m)
Contours are top of topsoil layer on Lots



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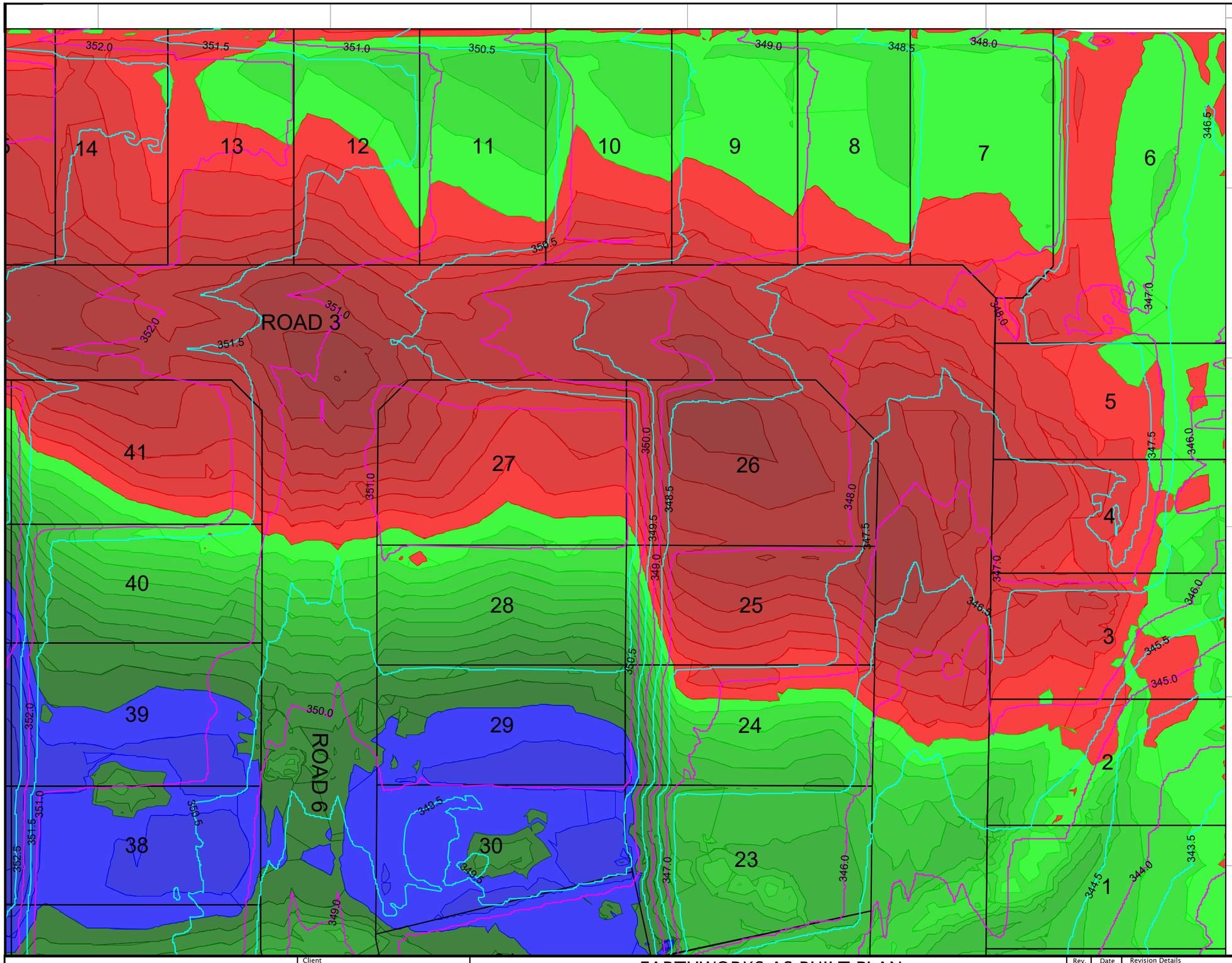
EARTHWORKS AS BUILT PLAN
FINAL SITE CONTOURS AND CUT/FILL DEPTHS
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.
BMC		12.06.24	21091	39_01
Drawn	Signed	Date	Scale	
KA		20.12.24	1:500 @ A3	
Designed	Signed	Date	Datum & Level	Rev.
-		-	LP2000 & NZVD16	1



CUT/FILL DEPTHS LEGEND

Lower		Upper		Colour
-5.0	to	-4.5	m	
-4.5	to	-4.0	m	
-4.0	to	-3.5	m	
-3.5	to	-3.0	m	
-3.0	to	-2.5	m	
-2.5	to	-2.0	m	
-2.0	to	-1.5	m	
-1.5	to	-1.0	m	
-1.0	to	-0.5	m	
-0.5	to	0	m	
0	to	0.5	m	
0.5	to	1.0	m	
1.0	to	1.5	m	
1.5	to	2.0	m	
2.0	to	2.5	m	
2.5	to	3.0	m	
3.0	to	3.5	m	
3.5	to	4.0	m	
4.0	to	4.5	m	
4.5	to	5.0	m	
5.0	to	5.5	m	
5.5	to	6.0	m	
6.0	to	6.5	m	
6.5	to	7.0	m	
7.0	to	7.5	m	

Post Earthworks site contours [NZVD16]
Intervals:
Major (1m)
Minor (0.5m)
Contours are top of topsoil layer on Lots

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Armidale Crescent

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EARTHWORKS AS BUILT PLAN
FINAL SITE CONTOURS AND CUT/FILL DEPTHS
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.	
BMC		12.06.24	21091	39_02	
Drawn	Signed	Date	Scale		
KA		20.12.24	1:500 @ A3		
Designed	Signed	Date	Datum & Level	Rev.	
-		-	LP2000 & NZVD16	1	

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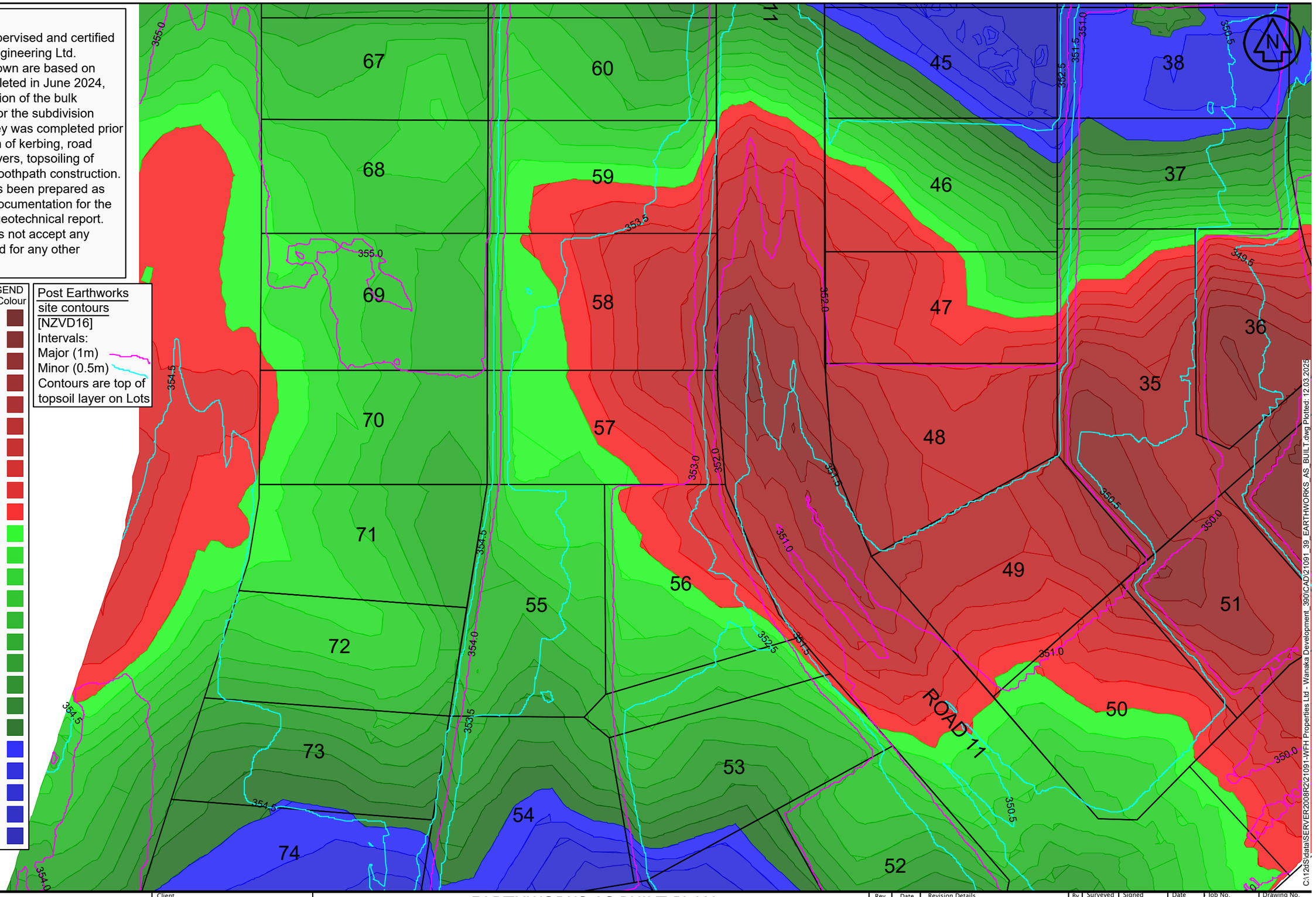
CUT/FILL DEPTHS LEGEND

Lower		Upper		Colour
-5.0	to	-4.5	m	
-4.5	to	-4.0	m	
-4.0	to	-3.5	m	
-3.5	to	-3.0	m	
-3.0	to	-2.5	m	
-2.5	to	-2.0	m	
-2.0	to	-1.5	m	
-1.5	to	-1.0	m	
-1.0	to	-0.5	m	
-0.5	to	0	m	
0	to	0.5	m	
0.5	to	1.0	m	
1.0	to	1.5	m	
1.5	to	2.0	m	
2.0	to	2.5	m	
2.5	to	3.0	m	
3.0	to	3.5	m	
3.5	to	4.0	m	
4.0	to	4.5	m	
4.5	to	5.0	m	
5.0	to	5.5	m	
5.5	to	6.0	m	
6.0	to	6.5	m	
6.5	to	7.0	m	
7.0	to	7.5	m	

Post Earthworks site contours
[NZVD16]
Intervals:
Major (1m)
Minor (0.5m)
Contours are top of topsoil layer on Lots



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EARTHWORKS AS BUILT PLAN
FINAL SITE CONTOURS AND CUT/FILL DEPTHS
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.	
BMC		12.06.24	21091	39_03	
Drawn	Signed	Date	Scale		
KA		20.12.24	1:500 @ A3		
Designed	Signed	Date	Datum & Level	Rev.	
-		-	LP2000 & NZVD16	1	

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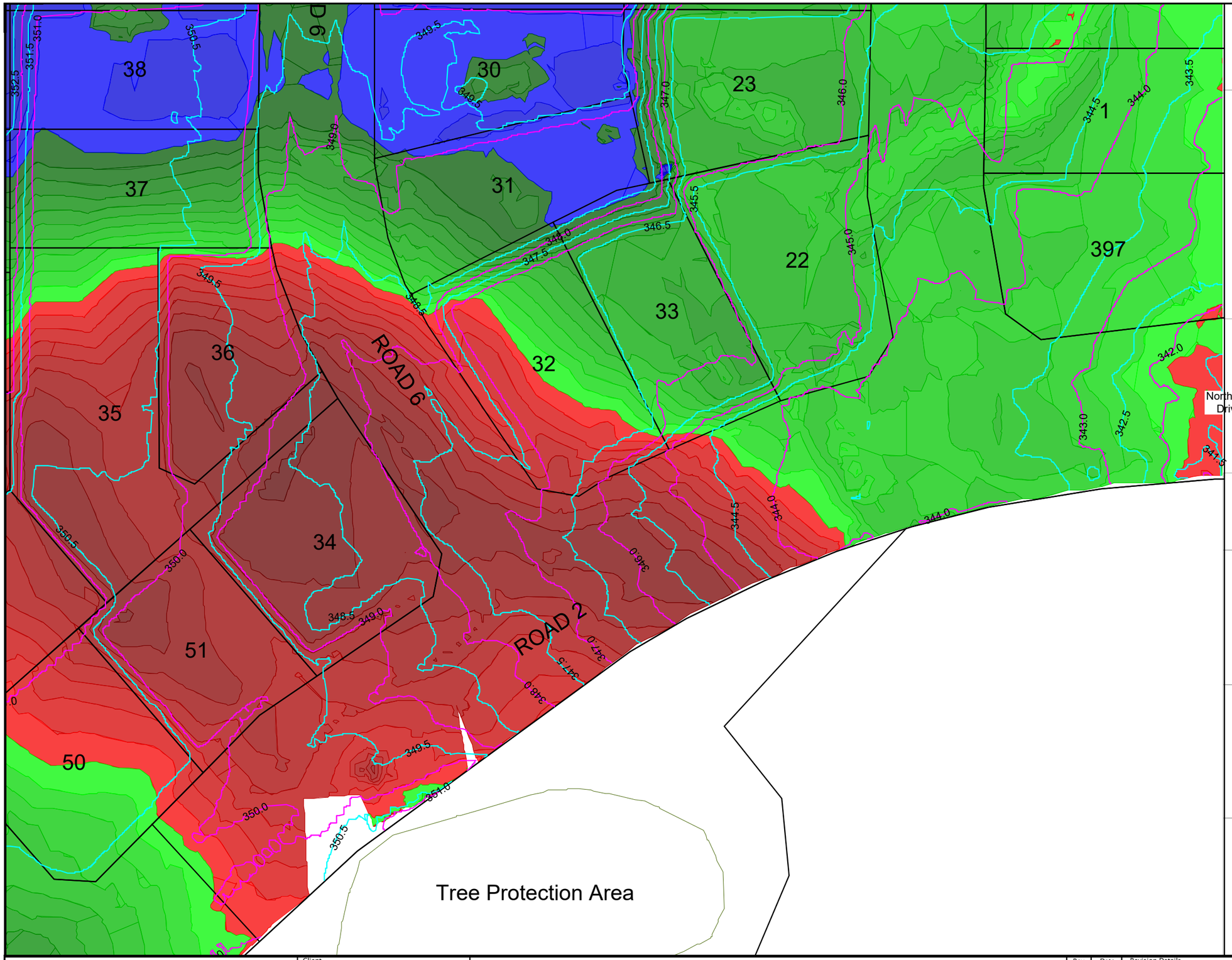

CUT/FILL DEPTHS LEGEND

Lower		Upper		Colour
-5.0	to	-4.5	m	
-4.5	to	-4.0	m	
-4.0	to	-3.5	m	
-3.5	to	-3.0	m	
-3.0	to	-2.5	m	
-2.5	to	-2.0	m	
-2.0	to	-1.5	m	
-1.5	to	-1.0	m	
-1.0	to	-0.5	m	
-0.5	to	0	m	
0	to	0.5	m	
0.5	to	1.0	m	
1.0	to	1.5	m	
1.5	to	2.0	m	
2.0	to	2.5	m	
2.5	to	3.0	m	
3.0	to	3.5	m	
3.5	to	4.0	m	
4.0	to	4.5	m	
4.5	to	5.0	m	
5.0	to	5.5	m	
5.5	to	6.0	m	
6.0	to	6.5	m	
6.5	to	7.0	m	
7.0	to	7.5	m	

Post Earthworks site contours
[NZVD16]
Intervals:
Major (1m)
Minor (0.5m)
Contours are top of topsoil layer on Lots

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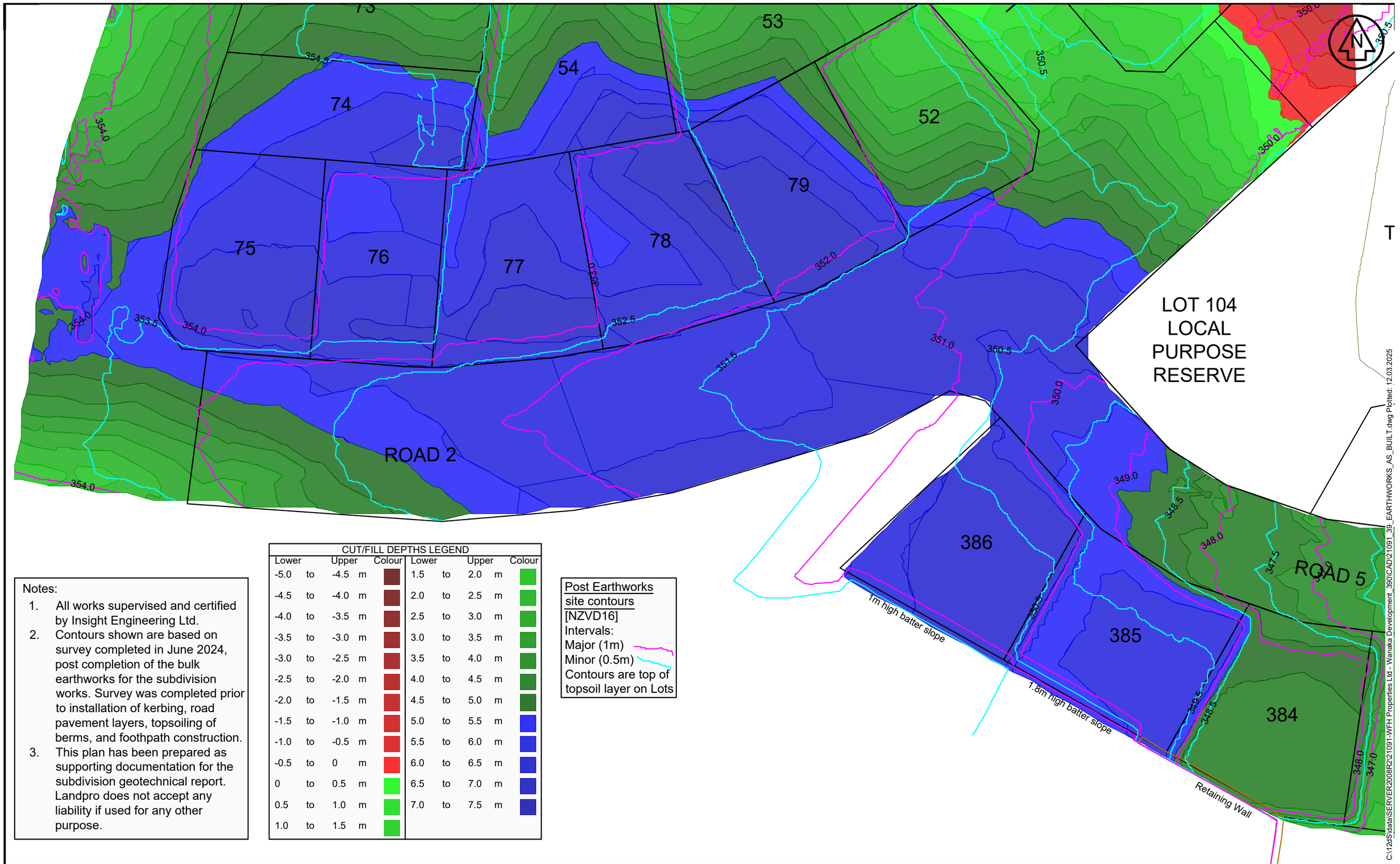
EARTHWORKS AS BUILT PLAN
FINAL SITE CONTOURS AND CUT/FILL DEPTHS
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.	
BMC		12.06.24	21091	39_04	
Drawn	Signed	Date	Scale		
KA		20.12.24	1:500 @ A3		
Designed	Signed	Date	Datum & Level	Rev.	
-		-	LP2000 & NZVD16	1	



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CUT/FILL DEPTHS LEGEND

Lower		Upper		Colour	Lower		Upper		Colour
-5.0	to	-4.5	m		1.5	to	2.0	m	
-4.5	to	-4.0	m		2.0	to	2.5	m	
-4.0	to	-3.5	m		2.5	to	3.0	m	
-3.5	to	-3.0	m		3.0	to	3.5	m	
-3.0	to	-2.5	m		3.5	to	4.0	m	
-2.5	to	-2.0	m		4.0	to	4.5	m	
-2.0	to	-1.5	m		4.5	to	5.0	m	
-1.5	to	-1.0	m		5.0	to	5.5	m	
-1.0	to	-0.5	m		5.5	to	6.0	m	
-0.5	to	0	m		6.0	to	6.5	m	
0	to	0.5	m		6.5	to	7.0	m	
0.5	to	1.0	m		7.0	to	7.5	m	
1.0	to	1.5	m						

Post Earthworks site contours
[NZVD16]
Intervals:
Major (1m)
Minor (0.5m)
Contours are top of topsoil layer on Lots

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EARTHWORKS AS BUILT PLAN
FINAL SITE CONTOURS AND CUT/FILL DEPTHS
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.
BMC		12.06.24	21091	39_05
Drawn	Signed	Date	Scale	
KA		20.12.24	1:500 @ A3	
Designed	Signed	Date	Datum & Level	Rev.
-		-	LP2000 & NZVD16	1

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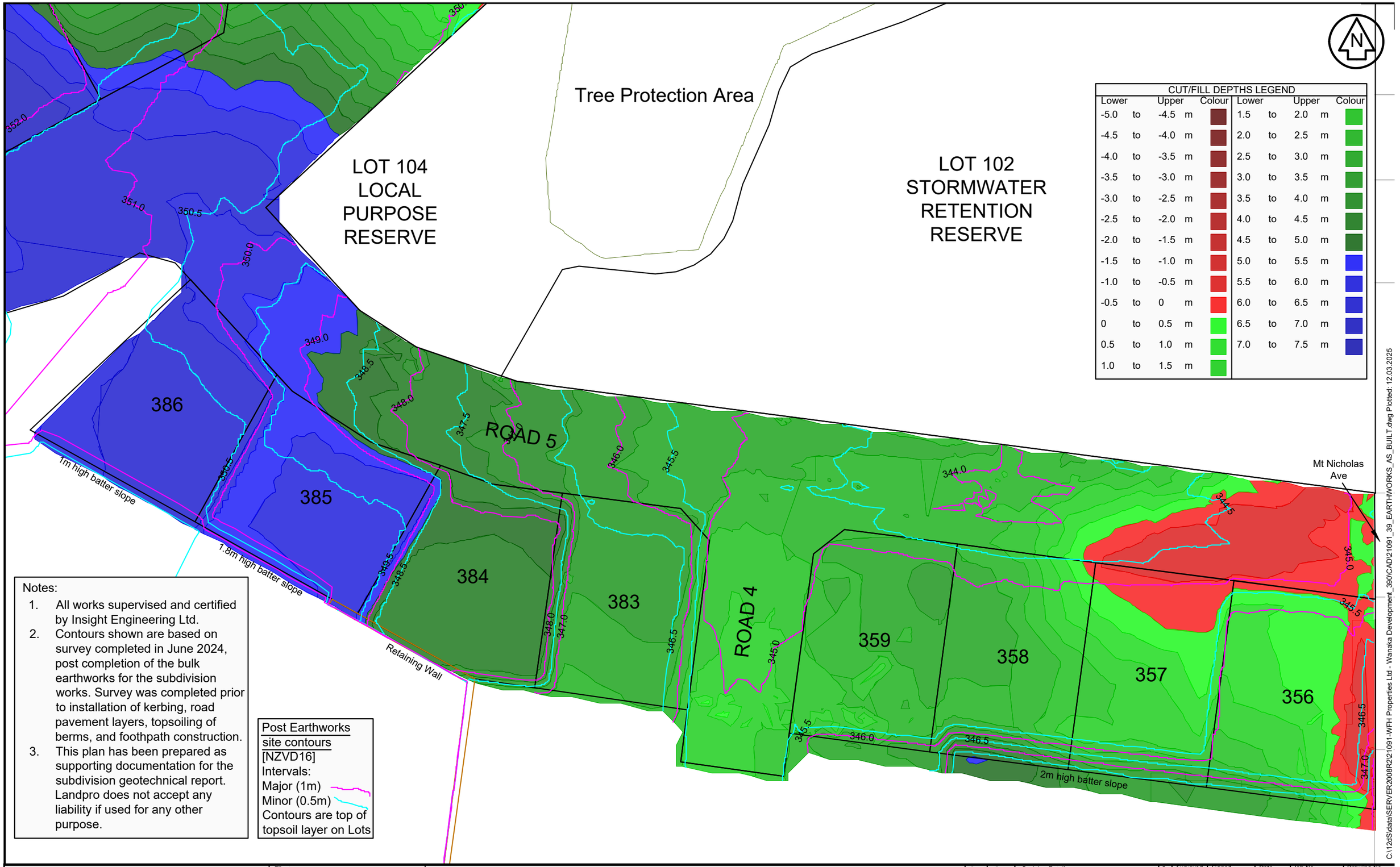

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Post Earthworks site contours
[NZVD16]
Intervals:
Major (1m)
Minor (0.5m)
Contours are top of topsoil layer on Lots

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EARTHWORKS AS BUILT PLAN
FINAL SITE CONTOURS AND CUT/FILL DEPTHS
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.
BMC		12.06.24	21091	39_06
Drawn	Signed	Date	Scale	
KA		20.12.24	1:500 @ A3	
Designed	Signed	Date	Datum & Level	Rev.
-		-	LP2000 & NZVD16	1

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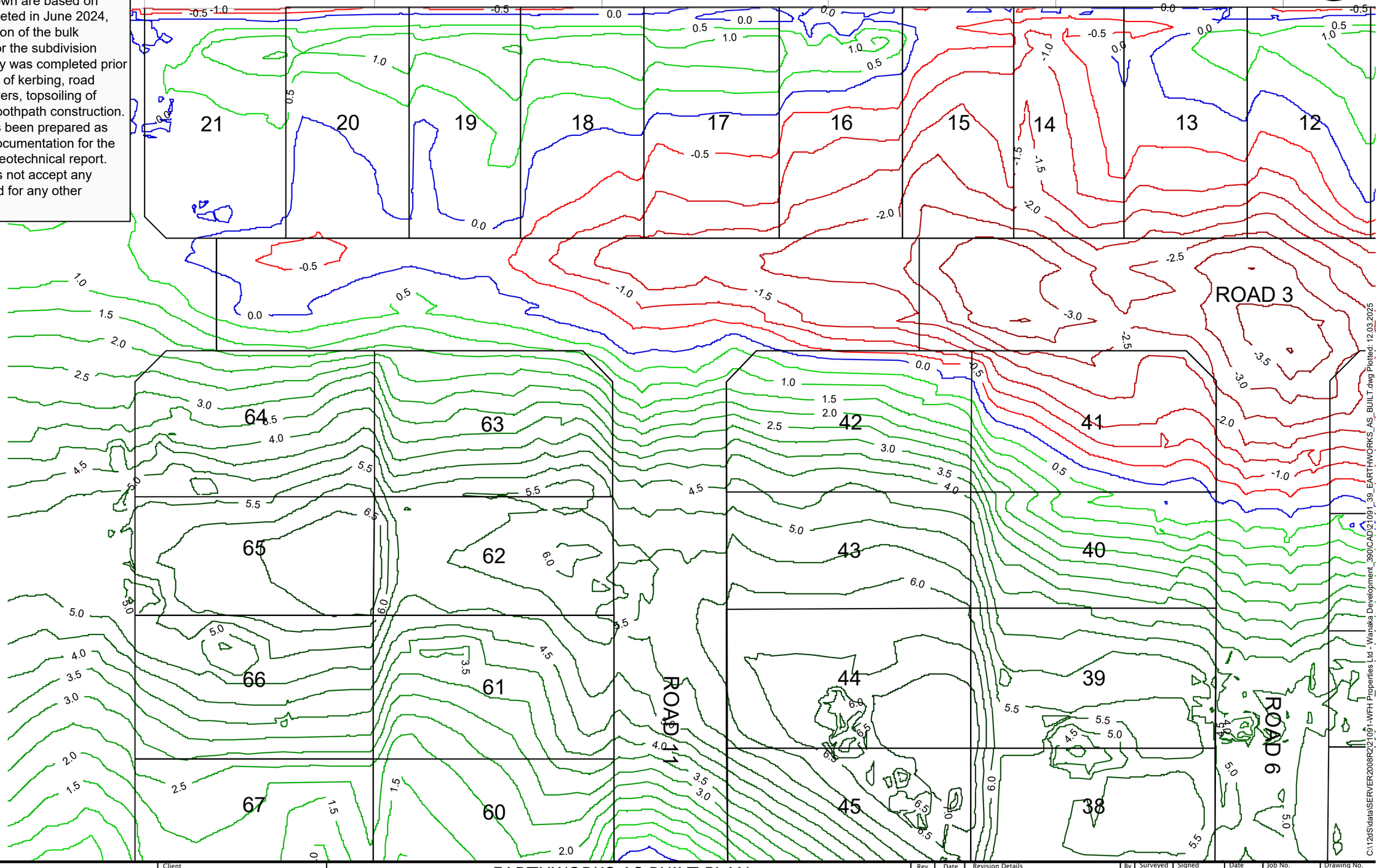
Fill Contour at 0.5m intervals: Green shaded
Zero Contour (end/start of cut/fill): Blue
Cut Contour at 0.5m intervals: Red shaded



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EARTHWORKS AS BUILT PLAN
CUT/FILL DEPTH CONTOURS
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.
BMC		12.06.24	21091	39_07
Drawn	Signed	Date	Scale	
KA		20.12.24	1:500 @ A3	
Designed	Signed	Date	Datum & Level	Rev.
-		-	LP2000 & NZVD16	1

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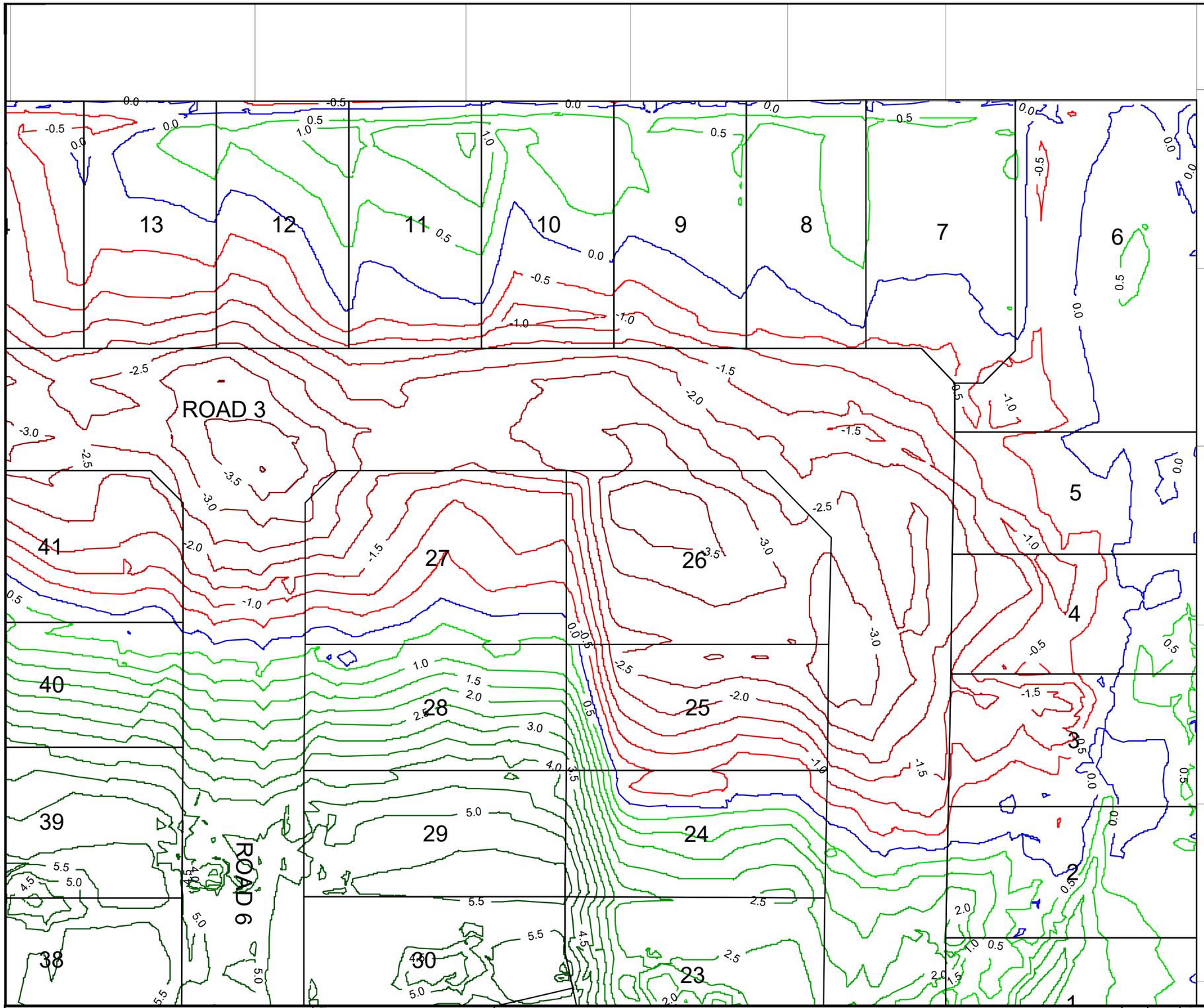

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EARTHWORKS AS BUILT PLAN
CUT/FILL DEPTH CONTOURS
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.	
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Drawn	Signed	Date	Scale		
KA		20.12.24	1:500 @ A3		
Designed	Signed	Date	Datum & Level	Rev.	
-		-	LP2000 & NZVD16	1	

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Fill Contour at 0.5m intervals: Green shaded
Zero Contour (end/start of cut/fill): Blue
Cut Contour at 0.5m intervals: Red shaded

ROAD 11

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EARTHWORKS AS BUILT PLAN
CUT/FILL DEPTH CONTOURS
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.	
BMC		12.06.24	21091	39_09	
Drawn	Signed	Date	Scale		
KA		20.12.24	1:500 @ A3		
Designed	Signed	Date	Datum & Level	Rev.	
-		-	LP2000 & NZVD16	1	

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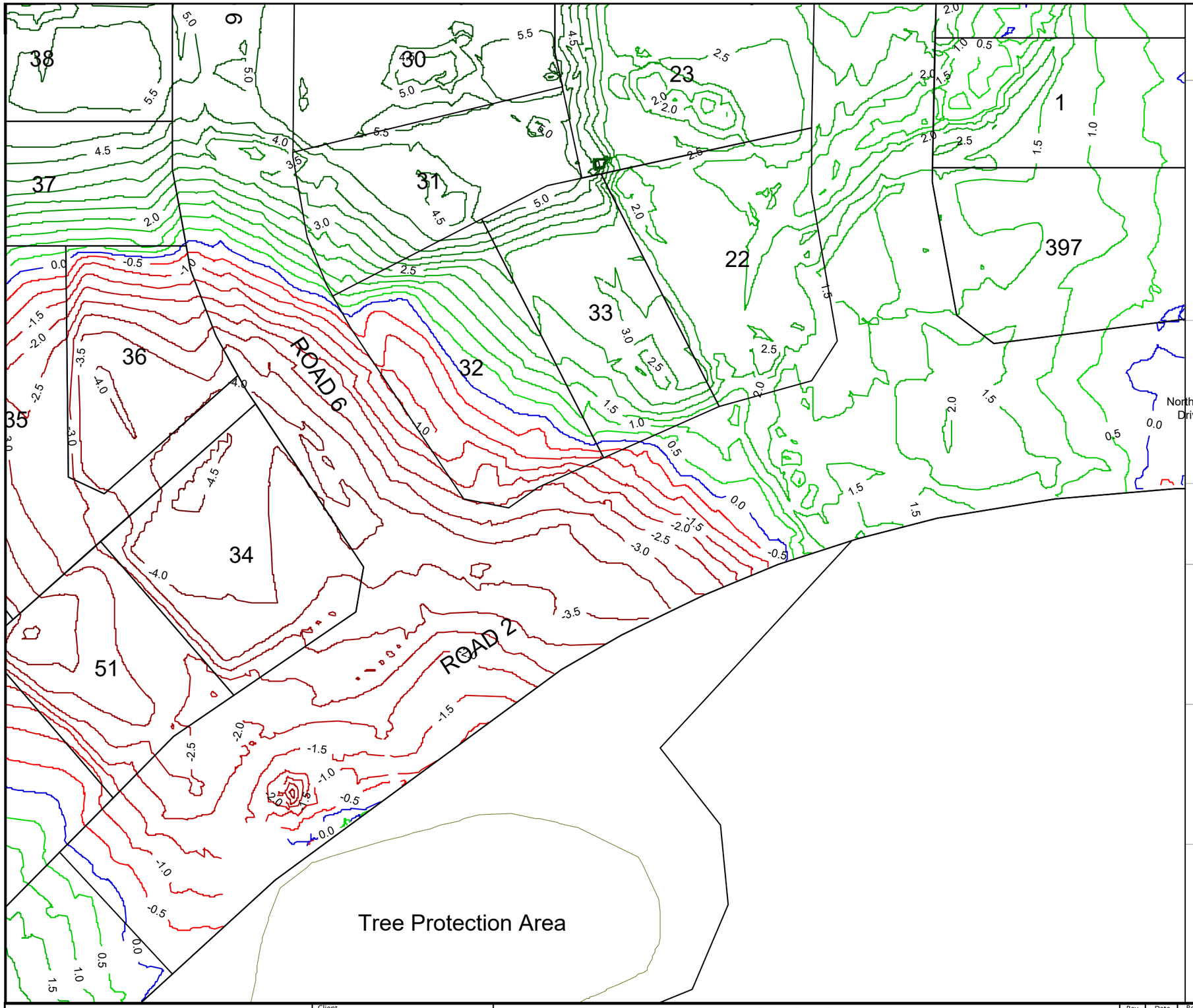

Fill Contour at 0.5m intervals: Green shaded
Zero Contour (end/start of cut/fill): Blue
Cut Contour at 0.5m intervals: Red shaded

Notes:

1. All works supervised and certified by Insight Engineering Ltd.
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3. This plan has been prepared as supporting documentation for the subdivision geotechnical report. Landpro does not accept any liability if used for any other purpose.

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WFH PROPERTIES

Client: WFH PROPERTIES LTD

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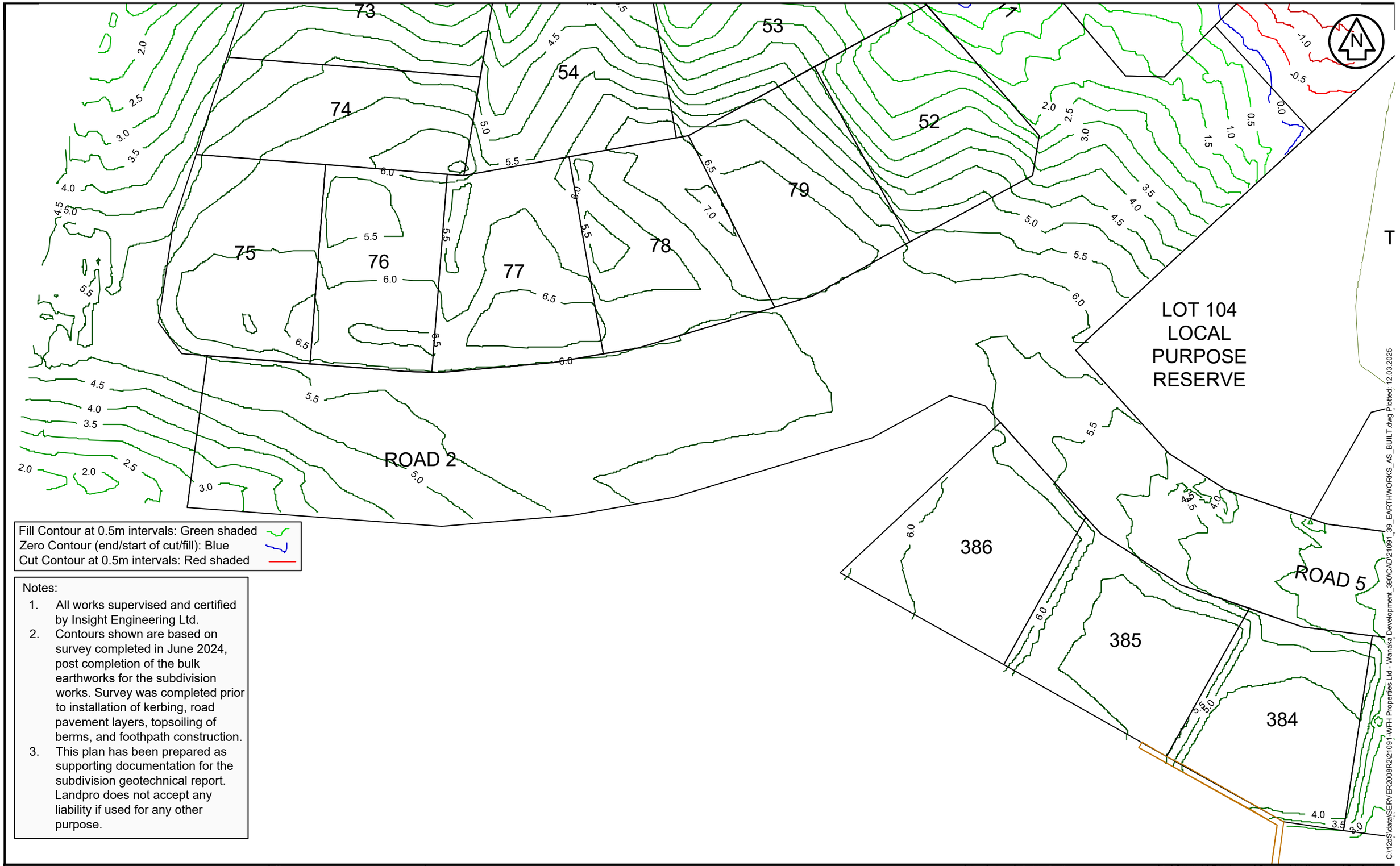
EARTHWORKS AS BUILT PLAN
CUT/FILL DEPTH CONTOURS
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.	
BMC		12.06.24	21091	39_10	
Drawn	Signed	Date	Scale		
KA		20.12.24	1:500 @ A3		
Designed	Signed	Date	Datum & Level	Rev.	
-		-	LP2000 & NZVD16	1	



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Cut Contour at 0.5m intervals: Red shaded

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Client
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EARTHWORKS AS BUILT PLAN
CUT/FILL DEPTH CONTOURS
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.
BMC		12.06.24	21091	39_11
Drawn	Signed	Date	Scale	
KA		20.12.24	1:500 @ A3	
Designed	Signed	Date	Datum & Level	Rev.
-		-	LP2000 & NZVD16	1

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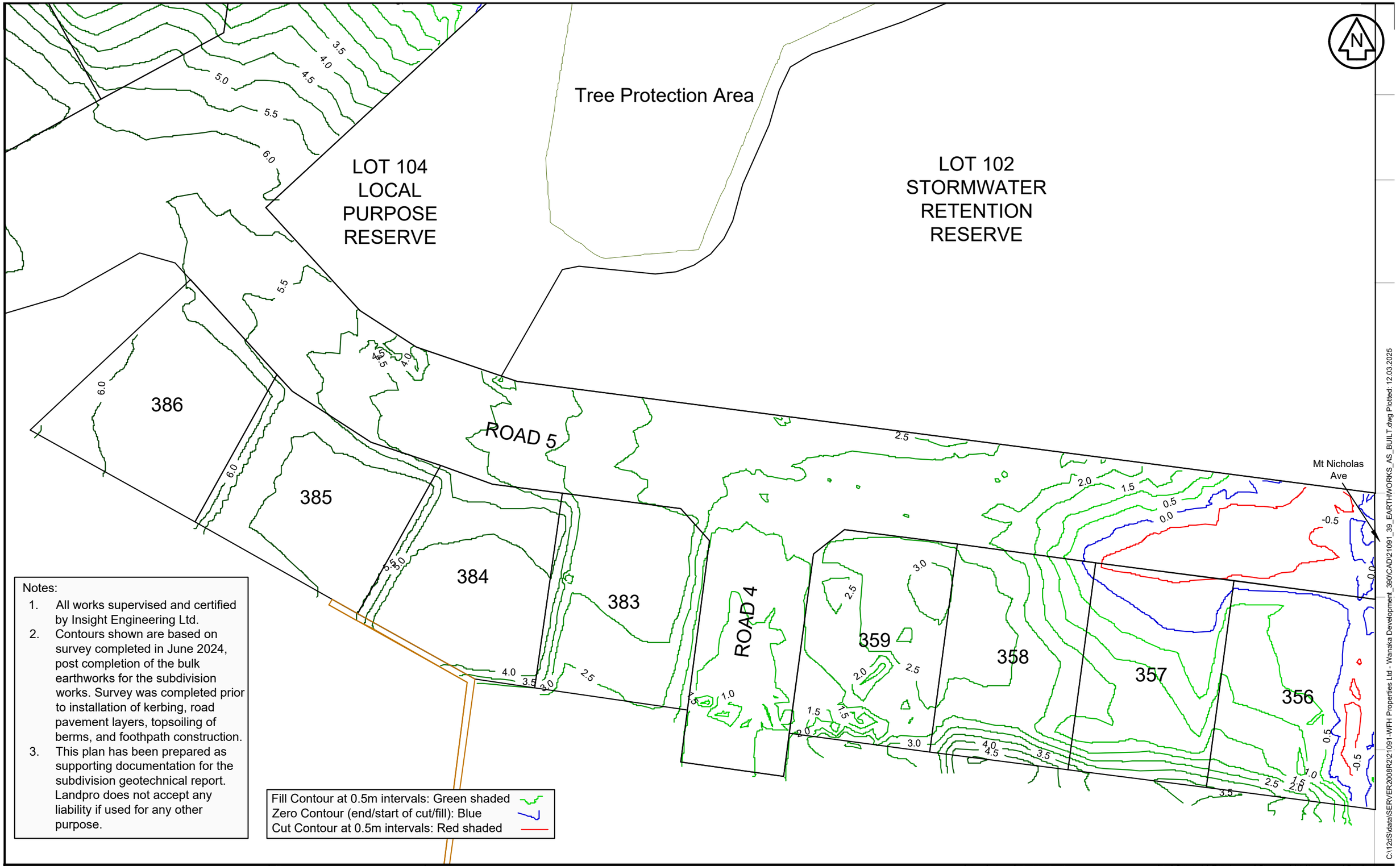

Notes:

1. All works supervised and certified by Insight Engineering Ltd.
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Zero Contour (end/start of cut/fill): Blue
Cut Contour at 0.5m intervals: Red shaded

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WFH PROPERTIES

Client
WFH PROPERTIES LTD

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EARTHWORKS AS BUILT PLAN
CUT/FILL DEPTH CONTOURS
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.
BMC		12.06.24	21091	39_12
Drawn	Signed	Date	Scale	
KA		20.12.24	1:500 @ A3	
Designed	Signed	Date	Datum & Level	Rev.
-		-	LP2000 & NZVD16	1

Notes:

1. All works supervised and certified by Insight Engineering Ltd.
2. Contours shown are based on survey completed in June 2024, post completion of the bulk earthworks for the subdivision works, and topsoiling of Lots. Survey was completed prior to installation of kerbing, road pavement layers, topsoiling of berms, and foothpath construction.
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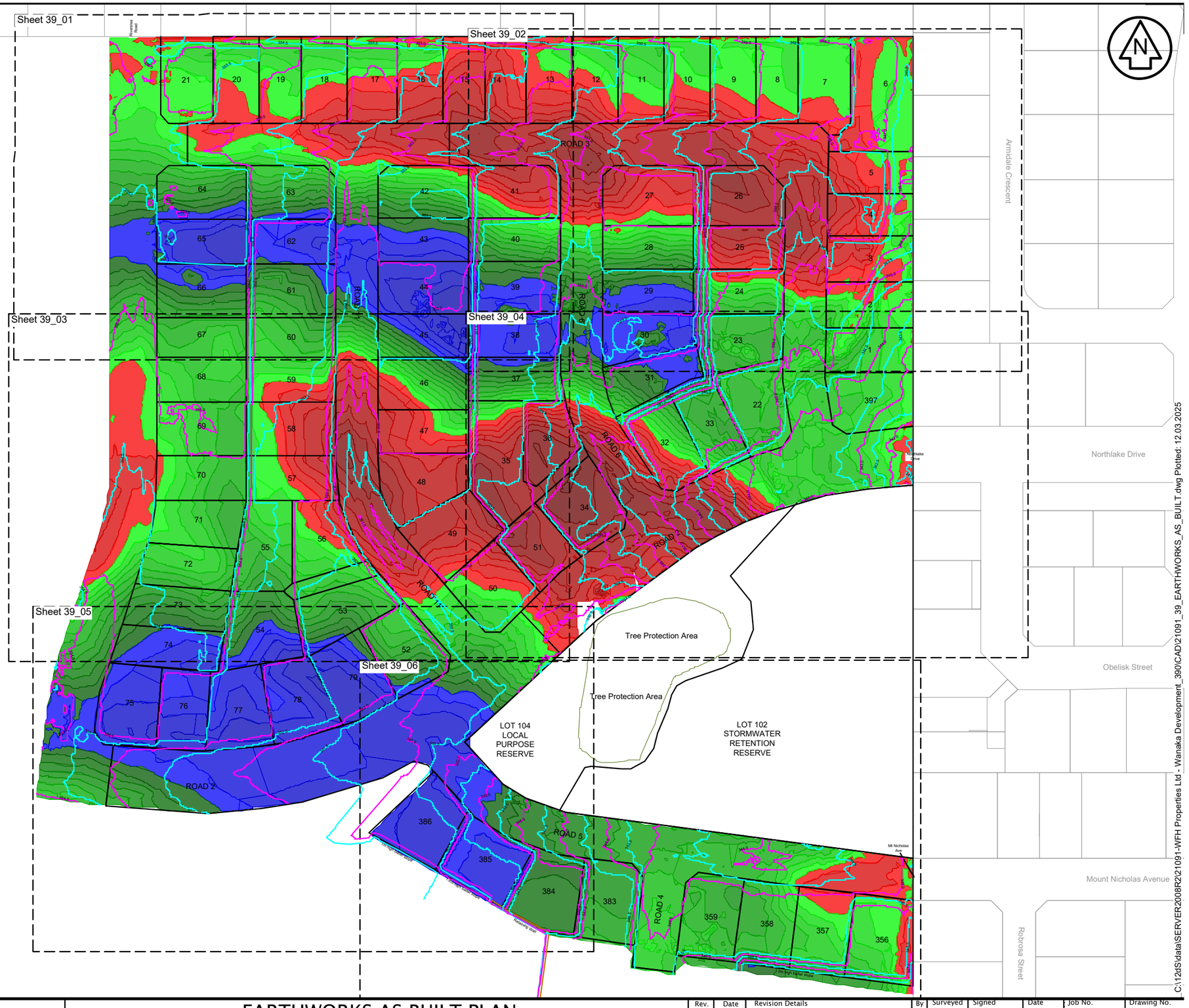
CUT/FILL DEPTHS LEGEND

Lower		Upper		Colour
-5.0	to	-4.5	m	
-4.5	to	-4.0	m	
-4.0	to	-3.5	m	
-3.5	to	-3.0	m	
-3.0	to	-2.5	m	
-2.5	to	-2.0	m	
-2.0	to	-1.5	m	
-1.5	to	-1.0	m	
-1.0	to	-0.5	m	
-0.5	to	0	m	
0	to	0.5	m	
0.5	to	1.0	m	
1.0	to	1.5	m	
1.5	to	2.0	m	
2.0	to	2.5	m	
2.5	to	3.0	m	
3.0	to	3.5	m	
3.5	to	4.0	m	
4.0	to	4.5	m	
4.5	to	5.0	m	
5.0	to	5.5	m	
5.5	to	6.0	m	
6.0	to	6.5	m	
6.5	to	7.0	m	
7.0	to	7.5	m	

Post Earthworks site contours [NZVD16]
Intervals:
Major (1m)
Minor (0.5m)
Contours are top of topsoil layer on Lots



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Client: WFH PROPERTIES LTD

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EARTHWORKS AS BUILT PLAN
FINAL SITE CONTOURS AND CUT/FILL DEPTHS - OVERVIEW
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.
BMC		12.06.24	21091	39_13
Drawn	Signed	Date	Scale	
KA		20.12.24	N.T.S	
Designed	Signed	Date	Datum & Level	Rev.
-		-	LP2000 & NZVD16	1

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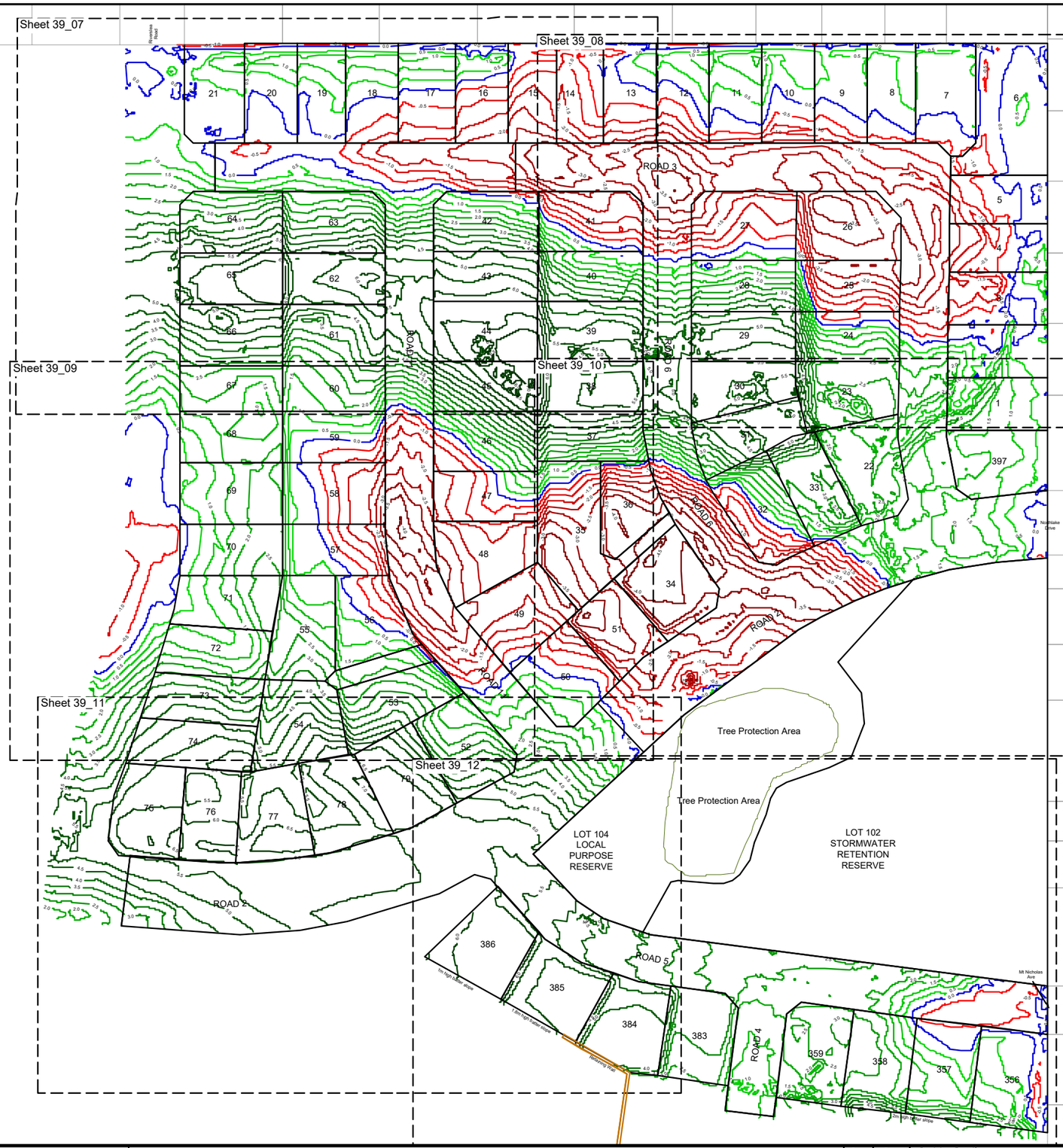

Fill Contour at 0.5m intervals: Green shaded
Zero Contour (end/start of cut/fill): Blue
Cut Contour at 0.5m intervals: Red shaded

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EARTHWORKS AS BUILT PLAN
CUT/FILL DEPTH CONTOURS - OVERVIEW
STAGE 1 AND 2 - QLDC RM220913
PEMBROKE HEIGHTS, 44 PEAK VIEW RIDGE WANAKA

Rev.	Date	Revision Details	By
0	10.01.25	Initial Issue	KA
1	10.03.25	Lots 9 & 10 remediation & raingarden update	KA
-	-	-	-

Surveyed	Signed	Date	Job No.	Drawing No.	
BMC		12.06.24	21091	39_14	
Drawn	Signed	Date	Scale		
KA		20.12.24	N.T.S		
Designed	Signed	Date	Datum & Level	Rev.	
-		-	LP2000 & NZVD16	1	

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Appendix 3

Laboratory Standard Compaction Test Results

Central Testing Services
18 Ngapara St, P.O. Box 397, Alexandra 9340, Central Otago, New Zealand
P: 03 4487644, W: www.centraltesting.co.nz, E: info@centraltesting.co.nz

Reference No: 24/007

Date: 30 January 2024

TEST REPORT - NZ STANDARD COMPACTION & SOLID DENSITY

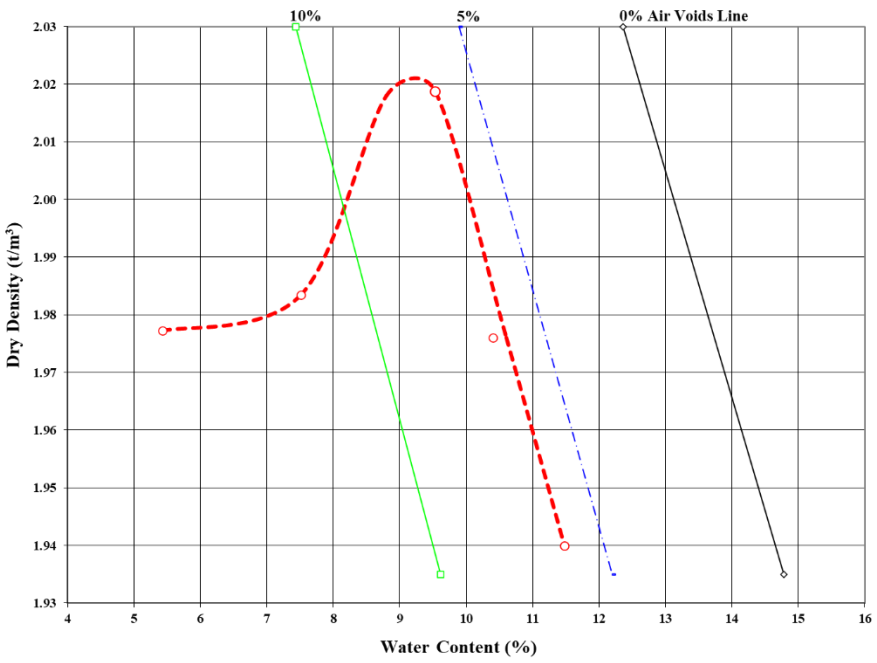
Client Details:	**Skevington Contracting Ltd, P.O. Box 5, Palmerston**	**Attention:**	**B. Skevington**
Job Description:	**Pembroke Heights, Wanaka - Quality Assurance Testing**		
Sample Description:	**SILT & SAND with some gravel**	**Client Order No:**	**N/A**
Sample Source:	**Cut to Fill**	**Sample Label No:**	**07653**
Date & Time Sampled:	**5-Jan-24**	**Sampled By:**	**M. Duncan**
Sample Method:	**NZS 4407:2015, Test 2.4.8.3**	**Date Received:**	**5-Jan-24**

SOLID DENSITY & NZ STANDARD COMPACTION - NZS 4402:1986, Test 2.7.1 & 4.1.1

% Retained (+19.0mm Fraction)	**3.0 %**
Solid Density: (-19.0mm Fraction)	**2.71 t/m^3**
Maximum Dry Density: (-19.0mm Fraction)	**2.02 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**9.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from the tested solid density above.*



General Notes:

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- *This report may not be reproduced except in full.*

Tested By: C. Henderson & L.T. Smith **Date:** 9 to 30-Jan-24

Checked By:

Approved Signatory

A.P. Julius
Technical Manager

ACCREDITED IANZ TESTING LABORATORY № 434

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

Central Testing Services
18 Ngapara St, P.O. Box 397, Alexandra 9340, Central Otago, New Zealand
P: 03 4487644, W: www.centraltesting.co.nz, E: info@centraltesting.co.nz

Reference No: 24/104

Date: 30 January 2024

TEST REPORT - NZ STANDARD COMPACTION & SOLID DENSITY

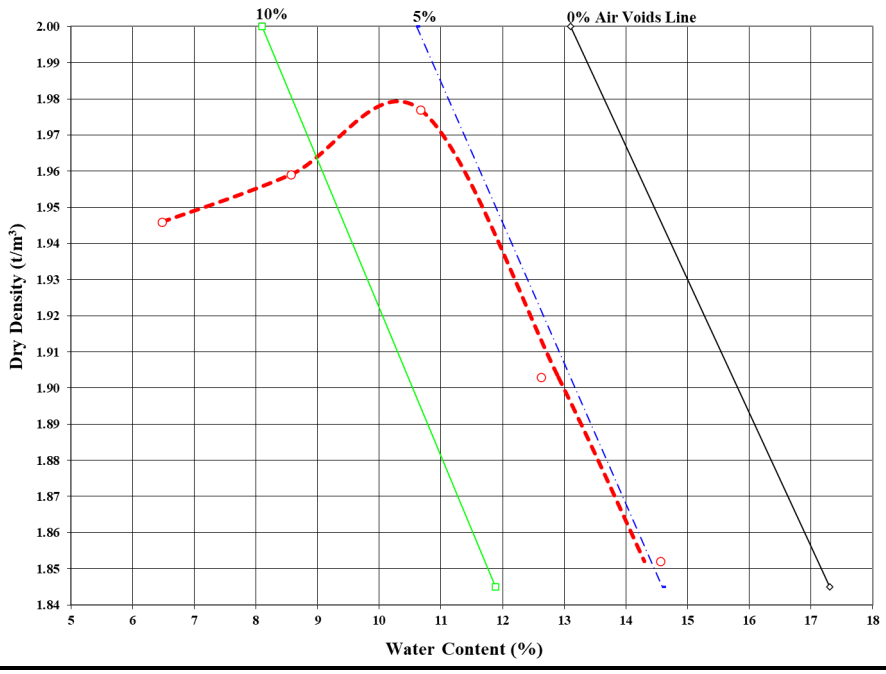
Client Details:	**Skevington Contracting Ltd, P.O. Box 5, Palmerston**	**Attention:**	**B. Skevington**
Job Description:	**Pembroke Heights, Wanaka - Quality Assurance Testing**		
Sample Description:	**SILT & SAND with some gravel**	**Client Order No:**	**N/A**
Sample Source:	**Cut to Fill**	**Sample Label No:**	**06697**
Date & Time Sampled:	**16-Jan-24**	**Sampled By:**	**A. Rowe**
Sample Method:	**NZS 4407:2015, Test 2.4.8.3**	**Date Received:**	**16-Jan-24**

SOLID DENSITY & NZ STANDARD COMPACTION - NZS 4402:1986, Test 2.7.1 & 4.1.1

% Retained (+19.0mm Fraction)	**4.0 %**
Solid Density: (-19.0mm Fraction)	**2.71 t/m^3**
Maximum Dry Density: (-19.0mm Fraction)	**1.98 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**10.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from the tested solid density above.*



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Tested By: C. Pearson & L.T. Smith **Date:** 21 to 30-Jan-24

Checked By:

Approved Signatory

A.P. Julius
Technical Manager

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Central Testing Services
18 Ngapara St, P.O. Box 397, Alexandra 9340, Central Otago, New Zealand
P: 03 4487644, W: www.centraltesting.co.nz, E: info@centraltesting.co.nz

Reference No: 24/117

Date: 30 January 2024

TEST REPORT - NZ STANDARD COMPACTION & SOLID DENSITY

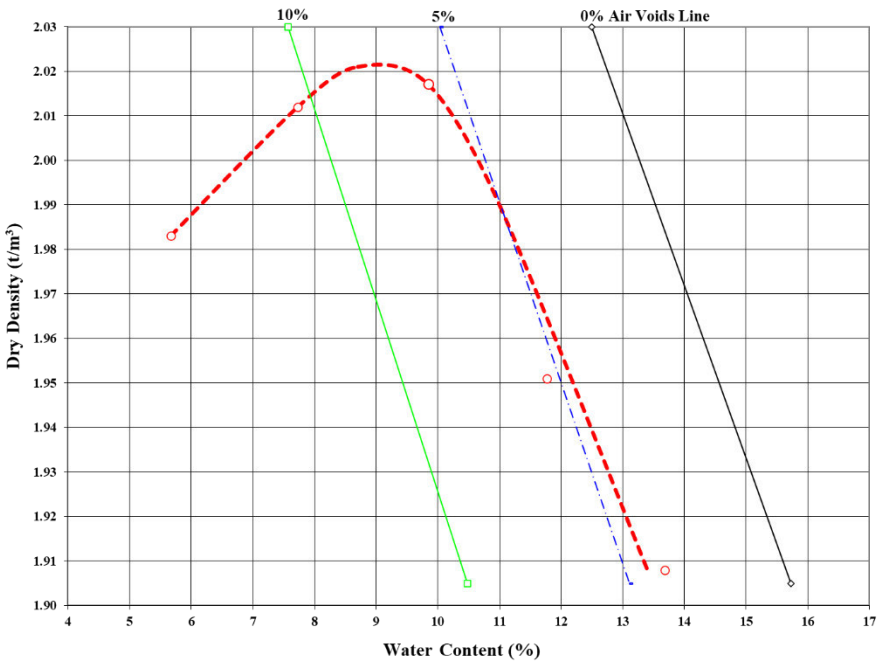
Client Details:	**Skevington Contracting Ltd, P.O. Box 5, Palmerston**	**Attention:**	**B. Skevington**
Job Description:	**Pembroke Heights, Wanaka - Quality Assurance Testing**		
Sample Description:	**Gravelly SILT & SAND**	**Client Order No:**	**N/A**
Sample Source:	**Cut to Fill**	**Sample Label No:**	**07774**
Date & Time Sampled:	**10-Jan-24**	**Sampled By:**	**M. Duncan**
Sample Method:	**NZS 4407:2015, Test 2.4.8.3**	**Date Received:**	**10-Jan-24**

SOLID DENSITY & NZ STANDARD COMPACTION - NZS 4402:1986, Test 2.7.1 & 4.1.1

% Retained (+19.0mm Fraction)	**5.0 %**
Solid Density: (-19.0mm Fraction)	**2.72 t/m^3**
Maximum Dry Density: (-19.0mm Fraction)	**2.02 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**10.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from the tested solid density above.*



General Notes:

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Tested By: M. Duncan & L.T. Smith **Date:** 24 to 30-Jan-24

Checked By:

Approved Signatory

A.P. Julius
Technical Manager

ACCREDITED IANZ TESTING LABORATORY №434

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

Central Testing Services
18 Ngapara St, P.O. Box 397, Alexandra 9340, Central Otago, New Zealand
P: 03 4487644, W: www.centraltesting.co.nz, E: info@centraltesting.co.nz

Reference No: 24/120

Date: 30 January 2024

TEST REPORT - NZ STANDARD COMPACTION & SOLID DENSITY

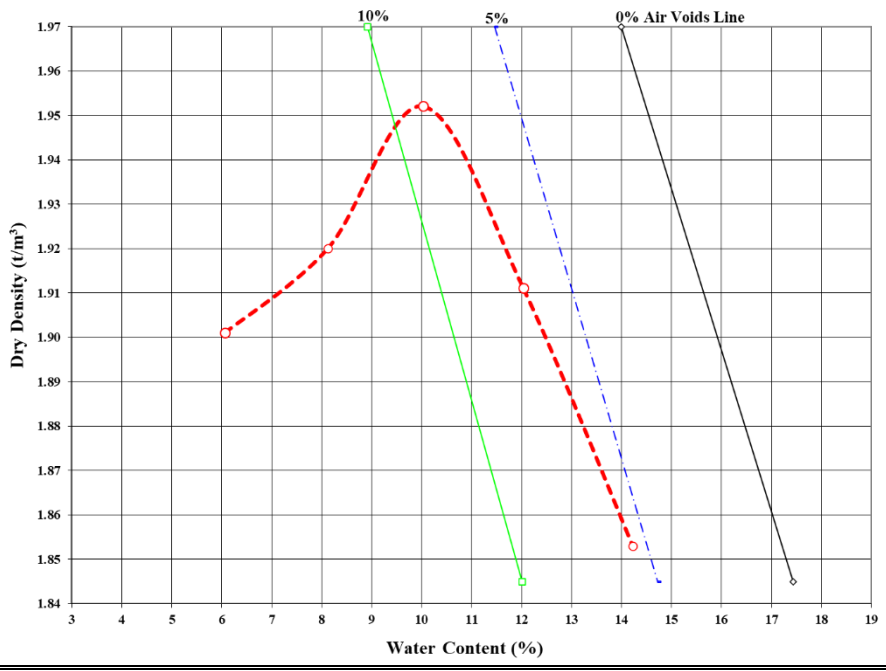
Client Details:	**Skevington Contracting Ltd, P.O. Box 5, Palmerston**	**Attention:**	**B. Skevington**
Job Description:	**Pembroke Heights, Wanaka - Quality Assurance Testing**		
Sample Description:	**SILT & SAND with some gravel**	**Client Order No:**	**N/A**
Sample Source:	**Cut to Fill**	**Sample Label No:**	**06695**
Date & Time Sampled:	**18-Jan-24**	**Sampled By:**	**A. Rowe**
Sample Method:	**NZS 4407:2015, Test 2.4.8.3**	**Date Received:**	**18-Jan-24**

SOLID DENSITY & NZ STANDARD COMPACTION - NZS 4402:1986, Test 2.7.1 & 4.1.1

% Retained (+19.0mm Fraction)	**2.0 %**
Solid Density: (-19.0mm Fraction)	**2.72 t/m^3**
Maximum Dry Density: (-19.0mm Fraction)	**1.95 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**10.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from the tested solid density above.*



General Notes:

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Tested By: M. Duncan & L.T. Smith **Date:** 24 to 30-Jan-24

Checked By:

Approved Signatory

A.P. Julius
Technical Manager

ACCREDITED IANZ TESTING LABORATORY №434

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

Central Testing Services
18 Ngapara St, P.O. Box 397, Alexandra 9340, Central Otago, New Zealand
P: 03 4487644, W: www.centraltesting.co.nz, E: info@centraltesting.co.nz

Reference No: 22/2078

Date: 5 July 2022

TEST REPORT – WHF PROPERTIES INVESTIGATIONS

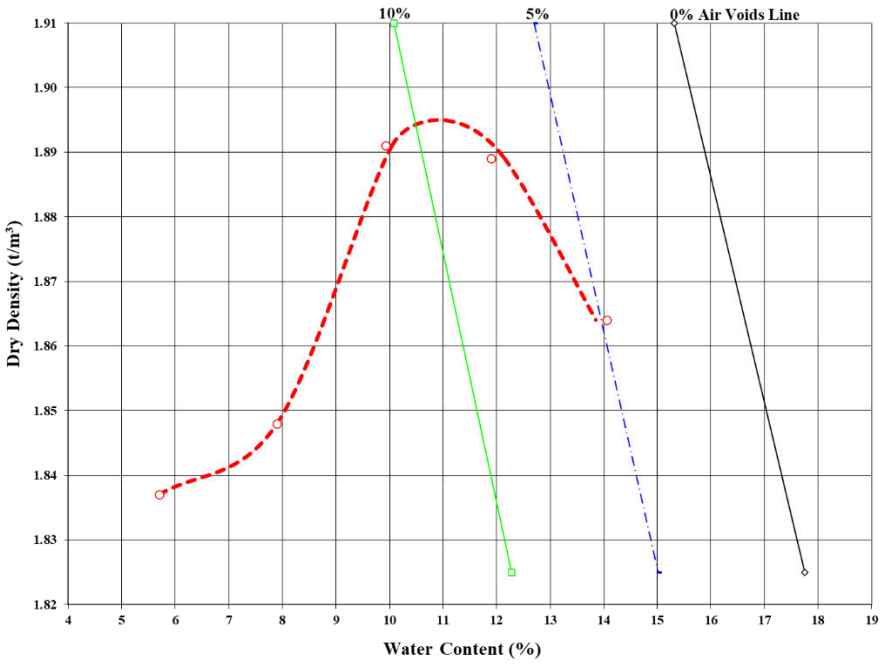
Client Details:	**WHF Properties Ltd, c/o Insight Engineering, P.O. Box 456, Cromwell**	**Attention:**	**J. Kruyshaar**
Job Description:	**WHF Properties Ltd Investigations**		
Sample Description:	**Silty SAND with trace of gravel**	**Client Order No:**	**N/A**
Sample Source: (cs)	**TP_A (Sample 1)**	**Sample Depth: (cs)**	**4.0m**
Date & Time Sampled:	**Unknown**	**Sampled By:**	**J. Kruyshaar**
Sample Method: (cs)	**Test Pit**	**Date Requested:**	**20-Jun-22**

WATER CONTENT & NZ STANDARD COMPACTION - NZS 4402:1986, Test 2.1 & 4.1.1

% Retained (+19.0mm Fraction)	**1.0 %**
Water Content: ("All In" As Received)	**9.4 %**
Maximum Dry Density: (-19.0mm Fraction)	**1.89 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**11.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from an assumed solid density of 2.70 t/m^3.*



Notes:

- *Information contained in this report which is Not IANZ Accredited relates to the sample descriptions based on NZ Geotechnical Society Guidelines 2005, the client supplied information (cs) and sampling.*
- *This report may not be reproduced except in full.*

Tested By: C. Fisher, T. Shaw & K. Hipkins **Date:** 21-Jun-22 to 4-Jul-22

Checked By:

ACCREDITED IANZ TESTING LABORATORY №434

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

Central Testing Services
18 Ngapara St, P.O. Box 397, Alexandra 9340, Central Otago, New Zealand
P: 03 4487644, W: www.centraltesting.co.nz, E: info@centraltesting.co.nz

Reference No: 22/2078

Date: 5 July 2022

TEST REPORT – WHF PROPERTIES INVESTIGATIONS

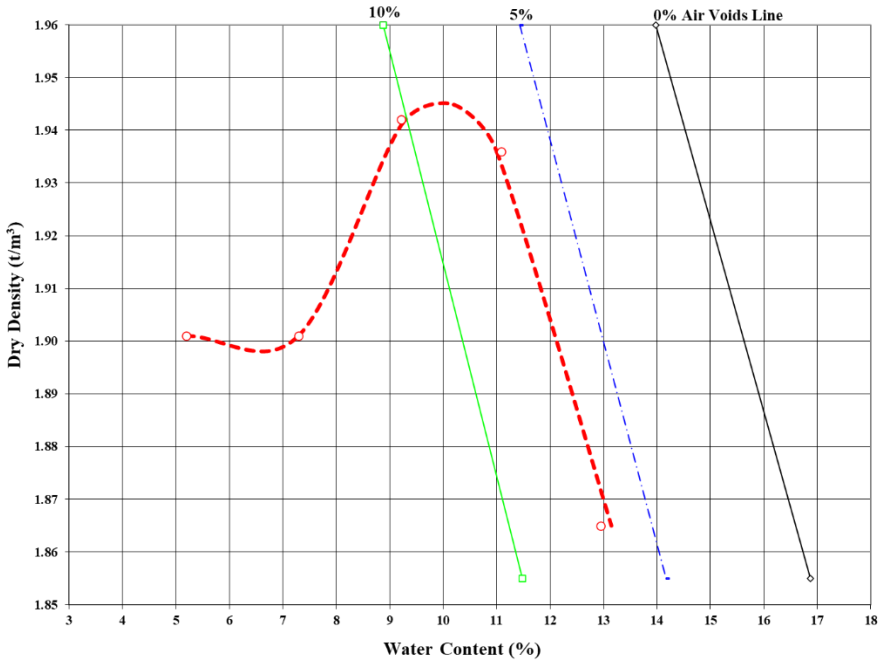
Client Details:	**WHF Properties Ltd, c/o Insight Engineering, P.O. Box 456, Cromwell**	**Attention:**	**J. Kruyshaar**
Job Description:	**WHF Properties Ltd Investigations**		
Sample Description:	**SAND with some gravel and some silt**	**Client Order No:**	**N/A**
Sample Source: (cs)	**TP_B (Sample 2)**	**Sample Depth: (cs)**	**2.0m**
Date & Time Sampled:	**Unknown**	**Sampled By:**	**J. Kruyshaar**
Sample Method: (cs)	**Test Pit**	**Date Requested:**	**20-Jun-22**

WATER CONTENT & NZ STANDARD COMPACTION - NZS 4402:1986, Test 2.1 & 4.1.1

% Retained (+19.0mm Fraction)	**3.0 %**
Water Content: ("All In" As Received)	**3.7 %**
Maximum Dry Density: (-19.0mm Fraction)	**1.94 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**10.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from an assumed solid density of 2.70 t/m^3.*



Notes:

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Tested By: C. Fisher, T. Shaw & K. Hipkins **Date:** 21-Jun-22 to 4-Jul-22

Checked By:

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Central Testing Services
18 Ngapara St, P.O. Box 397, Alexandra 9340, Central Otago, New Zealand
P: 03 4487644, W: www.centraltesting.co.nz, E: info@centraltesting.co.nz

Reference No: 22/2078

Date: 5 July 2022

TEST REPORT – WHF PROPERTIES INVESTIGATIONS

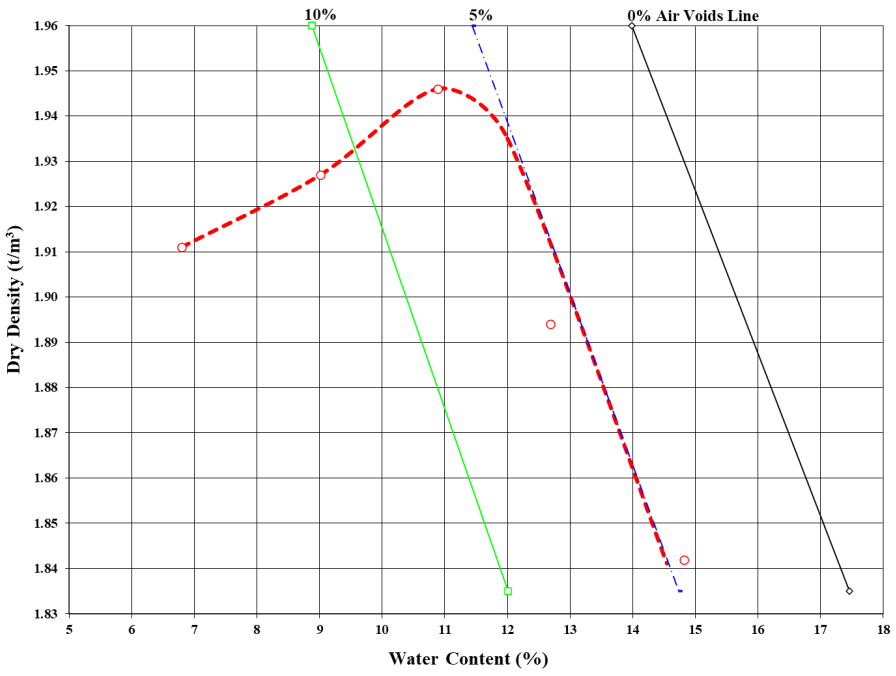
Client Details:	**WHF Properties Ltd, c/o Insight Engineering, P.O. Box 456, Cromwell**	**Attention:**	**J. Kruyshaar**
Job Description:	**WHF Properties Ltd Investigations**		
Sample Description:	**SILT with some gravel and trace of / minor sand**	**Client Order No:**	**N/A**
Sample Source: (cs)	**TP_E (Sample 4)**	**Sample Depth: (cs)**	**3.5m**
Date & Time Sampled:	**Unknown**	**Sampled By:**	**J. Kruyshaar**
Sample Method: (cs)	**Test Pit**	**Date Requested:**	**20-Jun-22**

WATER CONTENT & NZ STANDARD COMPACTION - NZS 4402:1986, Test 2.1 & 4.1.1

% Retained (+19.0mm Fraction)	**3.0 %**
Water Content: ("All In" As Received)	**7.1 %**
Maximum Dry Density: (-19.0mm Fraction)	**1.95 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**11.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from an assumed solid density of 2.70 t/m^3.*



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Tested By: C. Fisher, T. Shaw & K. Hipkins **Date:** 21-Jun-22 to 4-Jul-22

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Reference No: 22/2078

Date: 5 July 2022

TEST REPORT – WHF PROPERTIES INVESTIGATIONS

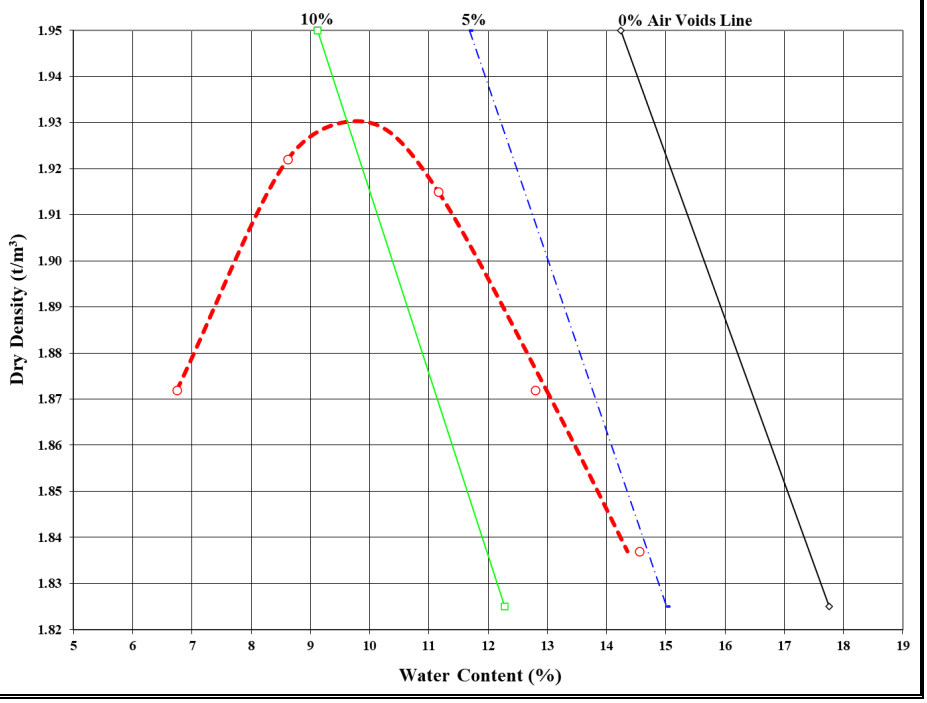
Client Details:	**WHF Properties Ltd, c/o Insight Engineering, P.O. Box 456, Cromwell**	**Attention:**	**J. Kruyshaar**
Job Description:	**WHF Properties Ltd Investigations**		
Sample Description:	**SILT with minor gravel and trace of sand**	**Client Order No:**	**N/A**
Sample Source: (cs)	**TP_J (Sample 6)**	**Sample Depth: (cs)**	**3.0m**
Date & Time Sampled:	**Unknown**	**Sampled By:**	**J. Kruyshaar**
Sample Method: (cs)	**Test Pit**	**Date Requested:**	**20-Jun-22**

WATER CONTENT & NZ STANDARD COMPACTION - NZS 4402:1986, Test 2.1 & 4.1.1

% Retained (+19.0mm Fraction)	**2.0 %**
Water Content: ("All In" As Received)	**7.8 %**
Maximum Dry Density: (-19.0mm Fraction)	**1.93 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**10.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from an assumed solid density of 2.70 t/m^3.*



Notes:

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Tested By: C. Fisher, T. Shaw & K. Hipkins **Date:** 21-Jun-22 to 4-Jul-22

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Reference No: 22/2078

Date: 5 July 2022

TEST REPORT – WHF PROPERTIES INVESTIGATIONS

Client Details:	**WHF Properties Ltd, c/o Insight Engineering, P.O. Box 456, Cromwell**	**Attention:**	**J. Kruyshaar**
Job Description:	**WHF Properties Ltd Investigations**		
Sample Description:	**See Below**	**Client Order No:**	**N/A**
Date & Time Sampled:	**Unknown**	**Sampled By:**	**J. Kruyshaar**
Sample Method: (cs)	**Test Pit**	**Date Requested:**	**20-Jun-22**

LABORATORY SOAKED CBR RESULTS – NZS 4402:1986, Test 6.1.1		
Sample Source: (cs)	**TP_E (Sample 4)**	**TP_J (Sample 6)**
Sample Depth: (cs)	**3.5m**	**3.0m**
Sample Description:	**SILT with some gravel and trace of / minor sand**	**SILT with minor gravel and trace of sand**
Condition of Sample:	**Soaked**	**Soaked**
Surcharge Mass: (kg)	**4.0**	**4.0**
Time Soaked:	**4 days**	**4 days**
Swell: (%)	**1.4**	**0.8**
Water Content as Compacted: (%)	**5.0**	**7.7**
Water Content From Under Plunger: (%)	**14.4**	**15.6**
Dry Density As Compacted: (t/m^3)	**1.89**	**1.89**
CBR Value @ 2.5 mm Penetration:	**10**	**1.5**
CBR Value @ 5.0 mm Penetration:	**18**	**4.5**
Reported CBR Value:	**18**	**4.5**

Notes:

- *The sample was received in a natural state.*
- *The sample tested was the fraction passing the 19.0mm test sieve.*
- *The sample was compacted to NZ Standard Compaction at the water content as received.*
- *The rate of penetration was 1.00 mm / min.*
- *Information contained in this report which is Not IANZ Accredited relates to the sample descriptions based on NZ Geotechnical Society Guidelines 2005, the client supplied information (cs) and sampling.*
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Tested By: C. Fisher, T. Shaw & K. Hipkins **Date:** 21-Jun-22 to 4-Jul-22

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Reference No: 22/2078

Date: 5 July 2022

TEST REPORT – WHF PROPERTIES INVESTIGATIONS

Client Details:	**WHF Properties Ltd, c/o Insight Engineering, P.O. Box 456, Cromwell**	**Attention:**	**J. Kruyshaar**
Job Description:	**WHF Properties Ltd Investigations**		
Sample Description:	**See Below**	**Client Order No:**	**N/A**
Date & Time Sampled:	**Unknown**	**Sampled By:**	**J. Kruyshaar**
Sample Method: (cs)	**Test Pit**	**Date Requested:**	**20-Jun-22**

LABORATORY SOAKED CBR RESULTS – NZS 4402:1986, Test 6.1.1		
Sample Source: (cs)	**TP_G (Sample 5)**	**TP_L (Sample 7)**
Sample Depth: (cs)	**2.5m**	**1.3m**
Sample Description:	**SAND with some silt, minor gravel and trace of cobbles**	**Silty SAND with minor gravel**
Condition of Sample:	**Soaked**	**Soaked**
Surcharge Mass: (kg)	**4.0**	**4.0**
Time Soaked:	**6 days**	**6 days**
Swell: (%)	**0.8**	**0.6**
Water Content as Compacted: (%)	**5.3**	**11.3**
Water Content From Under Plunger: (%)	**15.0**	**14.1**
Dry Density As Compacted: (t/m^3)	**1.89**	**1.91**
CBR Value @ 2.5 mm Penetration:	**12**	**20**
CBR Value @ 5.0 mm Penetration:	**17**	**35**
Reported CBR Value:	**17**	**35**

Notes:

- *The sample was received in a natural state.*
- *The sample tested was the fraction passing the 19.0mm test sieve.*
- *The sample was compacted to NZ Standard Compaction at the water content as received.*
- *The rate of penetration was 1.00 mm / min.*
- *Information contained in this report which is Not IANZ Accredited relates to the sample descriptions based on NZ Geotechnical Society Guidelines 2005, the client supplied information (cs) and sampling.*
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Tested By: C. Fisher, T. Shaw & K. Hipkins **Date:** 21-Jun-22 to 4-Jul-22

Checked By:

Approved Signatory

A.P. Julius
Laboratory Manager

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P: 03 4487644, W: www.centraltesting.co.nz, E: info@centraltesting.co.nz

Reference No: 23/4503

Date: 7 January 2024

TEST REPORT - NZ STANDARD COMPACTION & DRY DENSITY

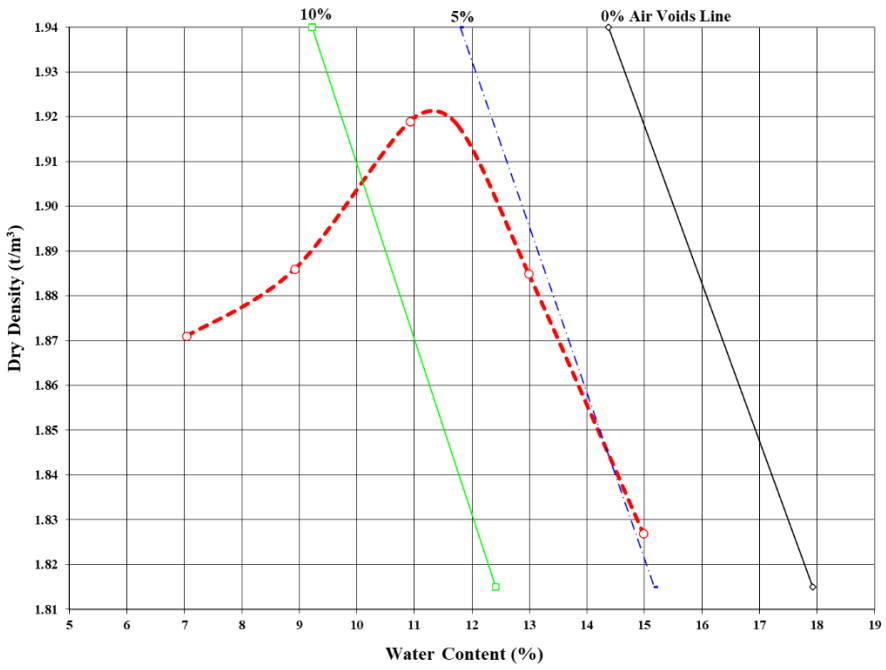
Client Details:	**Skevington Contracting Ltd, P.O. Box 5, Palmerston**	**Attention:**	**B. Skevington**
Job Description:	**Allenby Farms Subdivision – Quality Assurance Testing**		
Sample Description:	**SILT & SAND with some gravel**	**Order No:**	**N/A**
Sample Source:	**Cut to Fill**	**Sample Label No:**	**06691**
Date & Time Sampled:	**19-Dec-23**	**Sampled By:**	**A. Rowe**
Sample Method:	**NZS 4407:2015, Test 2.4.8.3**	**Date Received:**	**19-Dec-23**

SOLID DENSITY & NZ STANDARD COMPACTION - NZS 4402:1986, Test 2.7.1 & 4.1.1
DRY DENSITY & ABSORPTION - NZS 3111:1986, Test 12

% Retained (+19.0mm Fraction)	**4.0 %**
Dry Density: (+19.0mm Fraction)	**2.58 t/m^3**
Absorption (+19.0mm Fraction)	**1.5 %**
Solid Density: (-19.0mm Fraction)	**2.68 t/m^3**
Maximum Dry Density: (-19.0mm Fraction)	**1.92 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**11.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from a tested solid density of 2.68 t/m^3.*



General Notes:

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Tested By: C. Julius **Date:** 22-Dec-23 to 7-Jan-24

Checked By:

Approved Signatory

A.P. Julius
Technical Manager

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Reference No: 23/4505

Date: 7 January 2024

TEST REPORT - NZ STANDARD COMPACTION & DRY DENSITY

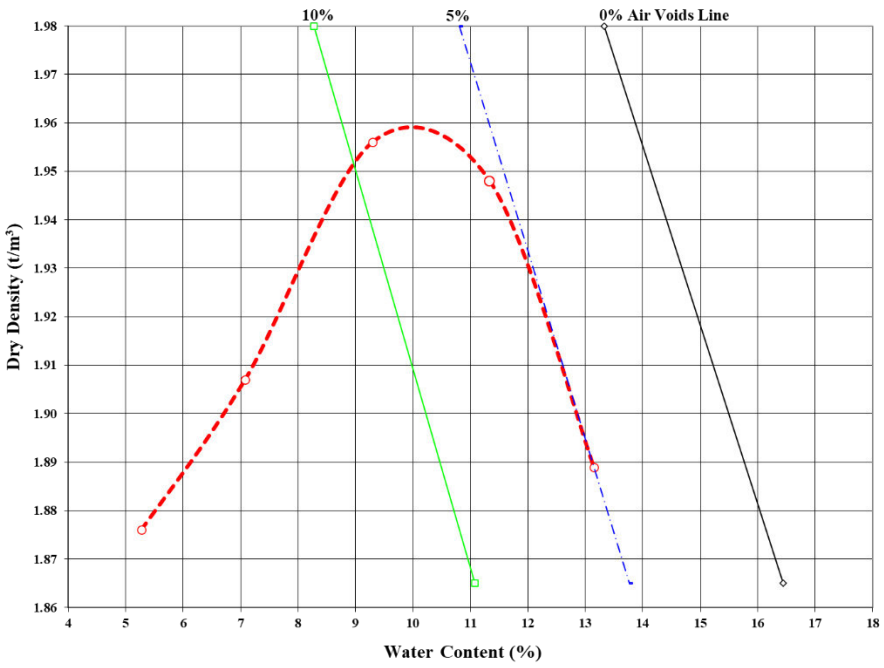
Client Details:	**Skevington Contracting Ltd, P.O. Box 5, Palmerston**	**Attention:**	**B. Skevington**
Job Description:	**Allenby Farms Subdivision – Quality Assurance Testing**		
Sample Description:	**Gravelly SILT & SAND**	**Order No:**	**N/A**
Sample Source:	**Cut to Fill**	**Sample Label No:**	**06693**
Date & Time Sampled:	**19-Dec-23**	**Sampled By:**	**A. Rowe**
Sample Method:	**NZS 4407:2015, Test 2.4.8.3**	**Date Received:**	**19-Dec-23**

SOLID DENSITY & NZ STANDARD COMPACTION - NZS 4402:1986, Test 2.7.1 & 4.1.1
DRY DENSITY & ABSORPTION - NZS 3111:1986, Test 12

% Retained (+19.0mm Fraction)	**5.0 %**
Dry Density: (+19.0mm Fraction)	**2.55 t/m^3**
Absorption (+19.0mm Fraction)	**1.7 %**
Solid Density: (-19.0mm Fraction)	**2.71 t/m^3**
Maximum Dry Density: (-19.0mm Fraction)	**1.96 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**10.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from a tested solid density of 2.71 t/m^3.*



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Tested By: C. Julius **Date:** 22-Dec-23 to 7-Jan-24

Checked By:

Approved Signatory

A.P. Julius
Technical Manager

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Reference No: 23/4525

Date: 7 January 2024

TEST REPORT - NZ STANDARD COMPACTION & DRY DENSITY

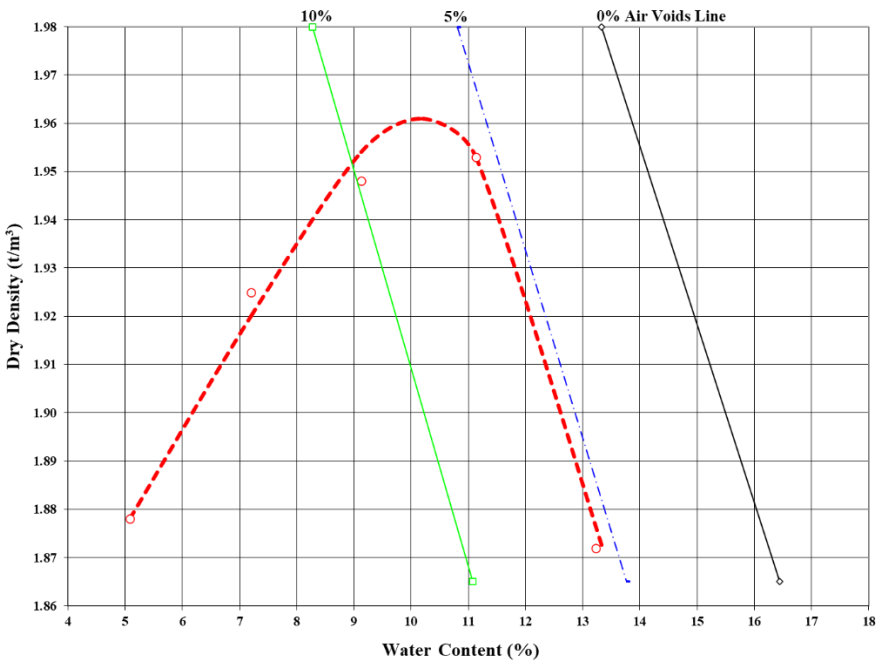
Client Details:	**Skevington Contracting Ltd, P.O. Box 5, Palmerston**	**Attention:**	**B. Skevington**
Job Description:	**Allenby Farms Subdivision – Quality Assurance Testing**		
Sample Description:	**SILT & SAND with some gravel**	**Order No:**	**N/A**
Sample Source:	**Cut to Fill**	**Sample Label No:**	**06705**
Date & Time Sampled:	**20-Dec-23**	**Sampled By:**	**A. Rowe**
Sample Method:	**NZS 4407:2015, Test 2.4.8.3**	**Date Received:**	**20-Dec-23**

SOLID DENSITY & NZ STANDARD COMPACTION - NZS 4402:1986, Test 2.7.1 & 4.1.1

% Retained (+19.0mm Fraction)	**1.0 %**
Solid Density: (-19.0mm Fraction)	**2.71 t/m^3**
Maximum Dry Density: (-19.0mm Fraction)	**1.96 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**10.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from a tested solid density of 2.71 t/m^3.*



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Tested By: C. Julius **Date:** 22-Dec-23 to 7-Jan-24

Checked By:

Approved Signatory

A.P. Julius
Technical Manager

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Reference No: 23/4531

Date: 6 January 2024

TEST REPORT – WATER CONTENT % OVERSIZE FRACTION

Client Details:	**Skevington Contracting Ltd, P.O. Box 5, Palmerston**	**Attention:**	**B. Skevington**
Job Description:	**Allenby Farms Subdivision - Quality Assurance Testing**		
Sample Description: (cs)	**Bulkfill**	**Order No:**	**N/A**
Sample Source: (cs)	**Allenby Farms**	**Sample Label No:**	**N/A**
Date & Time Sampled:	**Unknown**	**Sampled By: (cs)**	**Skevington Staff**
Sample Method:	**Unknown**	**Date Received:**	**27-Dec-23**

WATER CONTENT & % OVERSIZE FRACTION - NZS 4402:1986, Test 2.1 & 2.8.2		
Sample ID	**Water Content (%)**	**% +19.0mm Fraction**
22	9.6	1
23	8.2	1
24	8.3	6
25	9.9	5
26	8.9	4
27	8.9	2
28	9.7	2
29	9.2	3
30	9.7	2
31	10.0	2

General Notes:

- *Information contained in this report which is Not IANZ Accredited relates to; the % +19.0mm fraction, the client supplied information (cs) and sampling.*
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Tested By: M. Duncan **Date:** 28-Dec-23

Checked By:

Approved Signatory

A.P. Julius
Technical Manager

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Reference No: 24/1003

Date: 27 March 2024

TEST REPORT - NZ STANDARD COMPACTION & DRY DENSITY

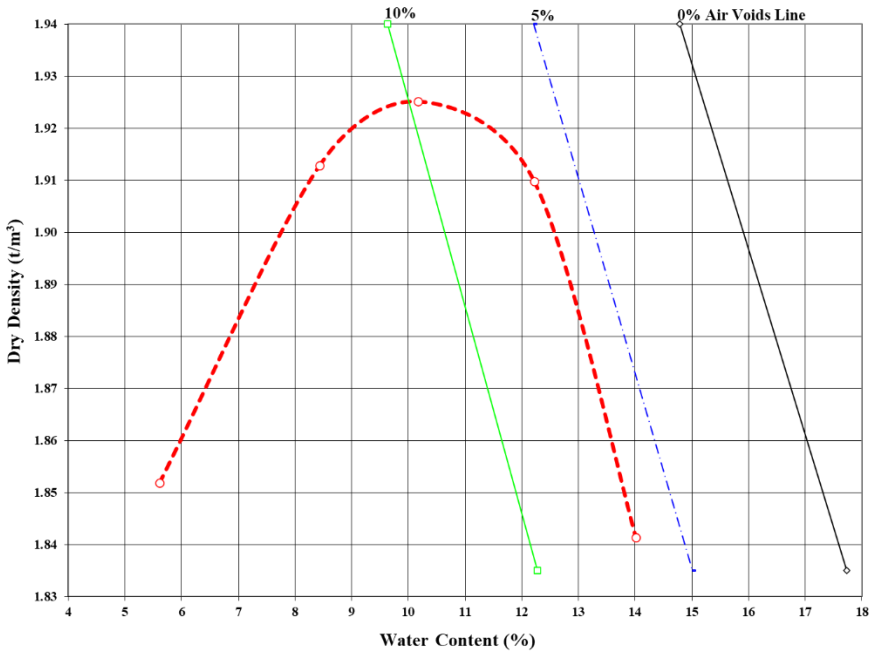
Client Details:	**Skevington Contracting Ltd, P.O. Box 5, Palmerston**	**Attention:**	**B. Skevington**
Job Description:	**Pembroke Heights, Wanaka**		
Sample Description:	**SILT & SAND with some gravel**	**Client Order No:**	**N/A**
Sample Source:	**Cut to Fill**	**Sample Label No:**	**06700**
Date & Time Sampled:	**15-Mar-24 @ 11.00am**	**Sampled By:**	**C. Pearson**
Sample Method:	**NZS 4407:2015, Test 2.4.8.3**	**Date Received:**	**15-Mar-24**

NZ STANDARD COMPACTION - NZS 4402:1986, Test 4.1.1
DRY DENSITY & ABSORPTION - NZS 3111:1986, Test 12

% Retained (+19.0mm Fraction)	**3.0 %**
Dry Density: (+19.0mm Fraction)	**2.62 t/m^3**
Absorption (+19.0mm Fraction)	**1.7 %**
Maximum Dry Density: (-19.0mm Fraction)	**1.93 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**10.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from an assumed solid density of 2.72 t/m^3.*



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Tested By: N.P. Danischewski & L.T. Smith **Date:** 24 & 25-Mar-24

Checked By:

Approved Signatory

L.T. Smith
Key Technical Personnel

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Reference No: CTS24W0717

Date: 27 May 2024

TEST REPORT - NZ STANDARD COMPACTION & DRY DENSITY

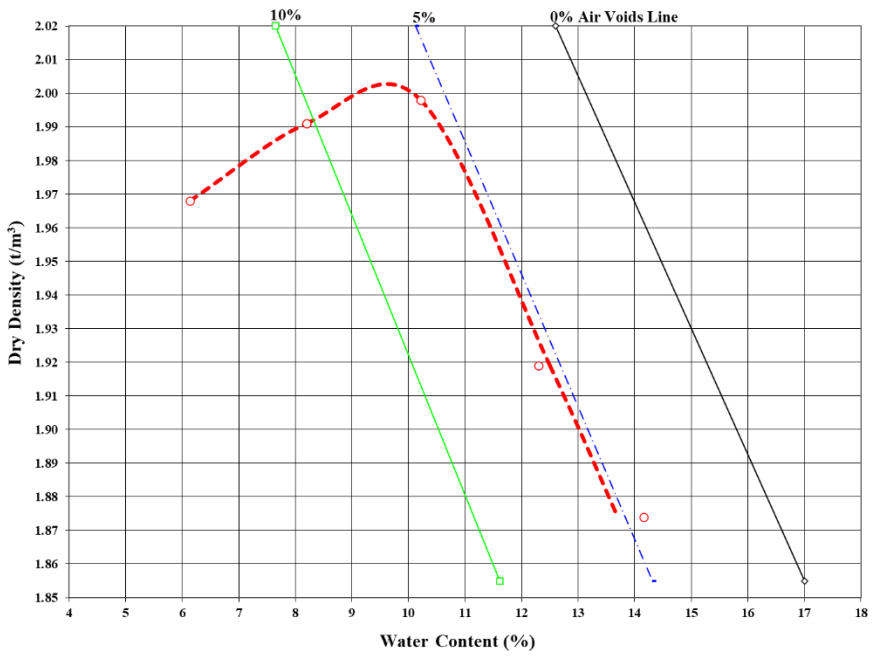
Client Details:	**Skevington Contracting Ltd, P.O. Box 5, Palmerston**	**Attention:**	**B. Skevington**
Job Description:	**Pembroke Heights, Wanaka**		
Sample Description:	**SILT, SAND & GRAVEL**	**Client Order No:**	**N/A**
Sample Source:	**Cut to Fill (NDM Sites 166 – 168)**	**Sample Label No:**	**07880**
Date & Time Sampled:	**10-May-24**	**Sampled By:**	**C. Maxwell**
Sample Method:	**NZS 4407:2015, Test 2.4.8.3**	**Date Received:**	**10-May-24**

SOLID DENSITY & NZ STANDARD COMPACTION - NZS 4402:1986, Test 2.7.1 & 4.1.1
DRY DENSITY & ABSORPTION - NZS 3111:1986, Test 12

% Retained (+19.0mm Fraction)	**6.0 %**
Dry Density: (+19.0mm Fraction)	**2.58 t/m³**
Absorption (+19.0mm Fraction)	**1.5 %**
Solid Density: (-19.0mm Fraction)	**2.71 t/m³**
Maximum Dry Density: (-19.0mm Fraction)	**2.00 t/m³**
Optimum Water Content: (-19.0mm Fraction)	**9.5 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from the tested solid density above.*



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Tested By: J. Smith & L.T. Smith **Date:** 23 to 28-May-24

Checked By:

Approved Signatory

L.T. Smith
Key Technical Personnel

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Appendix 4

Bulk Earthworks Specification and Compaction Trial Results

Bulk Earthworks Specification for Stages 1 to 2, Allenby Block, Wanaka

The bulk earthworks shall be undertaken in accordance with NZS4431:2022 unless noted otherwise in this report and specification.

Material definition	**Fill use type**	Bulk 4431 fill		
	Source material type	F-D (fine-grained – dry)		
	Typical use description	General fill for residential earthworks using site-won materials		
Source material acceptance testing[1]	**Test and method**	**Minimum test frequency**	**Normal acceptance criteria**	**Notes**
	Particle size distribution (NZS4402 2.8.1)	1 for each source and 1 for each change in material	Refer to Table A2 NZS4431:2022	Completed before works begin and during the works if material changes
	Dry density/water content relationship (NZS 4402 2.1 & 4.1.1)	1 for each source and 1 for each change in material	OMC and MDD determined for compaction acceptance testing	Completed before works begin and during the works if material changes
	Water Content (NZS4402 2.1)	1 for each source and 1 for each change in material	Between OMC -2% and OMC +4%	Ongoing during the works confirm conditioning requirements
	Liquid and plastic limit (NZS4402 2.2, 2.3 & 2.4)	1 for each source and 1 for each change in material	Plasticity index < 25% Liquid limit <50%	Completed before works begin and during the works if material changes
Placement requirements[1]	Loose layer thickness < 360 mm Wetting as necessary			
Compaction acceptance testing	**Test and method**	**Minimum test frequency**	**Normal acceptance criteria**	**Notes**
	Field water content and density (NZS4402 2.1 NZS4407 4.1,4.2 & 4.3)	2 per 1,000 m3 (minimum 5 per lift[2])	≥95% MDD where fill height is <3 m ≥98% MDD where fill height is >3m <10% air voids	Nuclear Density Meter on direct transmission or backscatter mode.
	Dynamic Cone Penetrometer	As specified by the certifier (maximum depth of test is 2 m)	≥ 5 blows per 100 mm	The DCP is indicative only and should not be used alone for compaction compliance.

[1] Refer to Compaction Trial Plateau test results (attached)
[2] For this project the maximum height of a lift is taken as no greater than 750 mm or three compacted layers

Central Testing Services
18 Ngapara St, P.O. Box 397, Alexandra 9340, Central Otago, New Zealand
P: 03 4487644, W: www.centraltesting.co.nz, E: info@centraltesting.co.nz

Reference No: 23/3819

Date: 10 November 2023

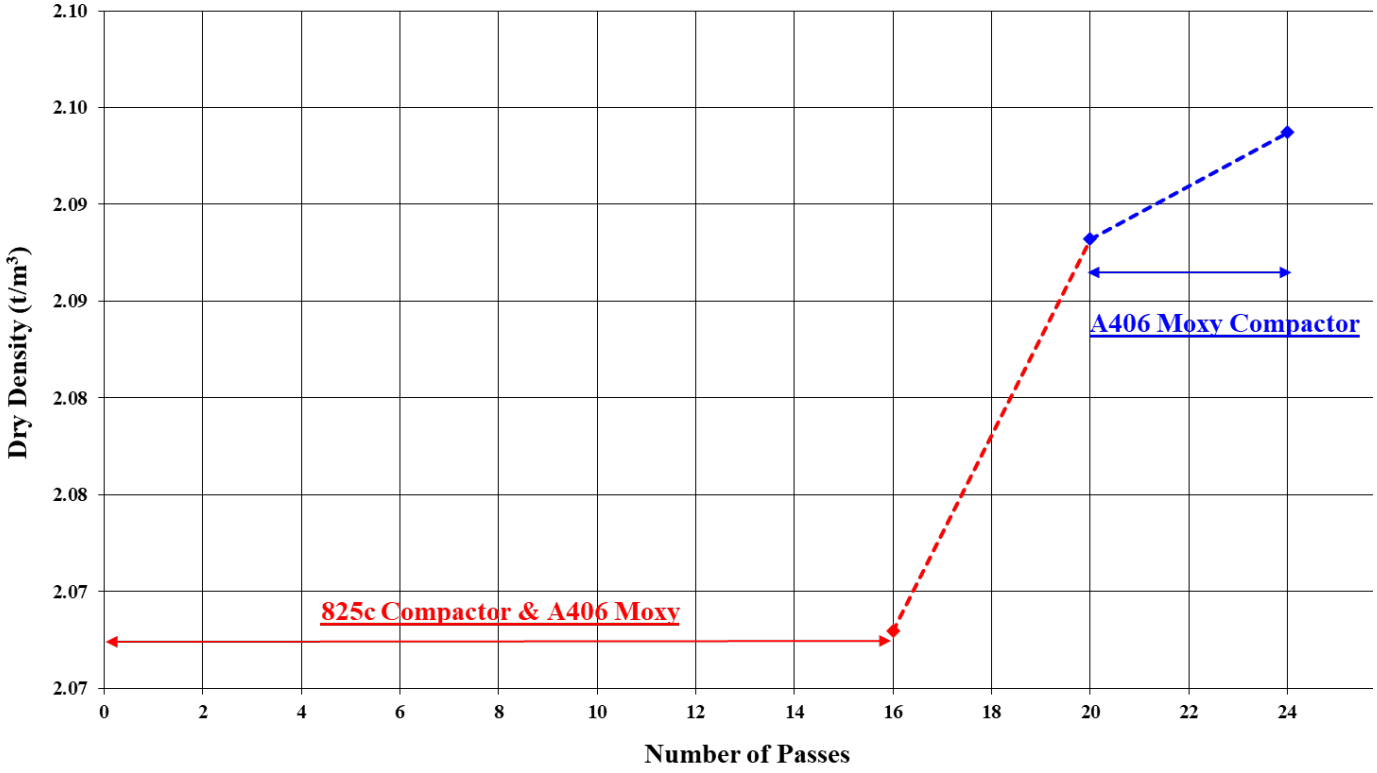
TEST REPORT – PLATEAU DENSITY & WATER CONTENT

Client Details:	Skevington Contracting Ltd, P.O. Box 5, Palmerston	**Attention:**	B. Skevington
Job Description:	Allenby Farms Subdivision – Quality Assurance Testing		
Sample Description:	Sandy GRAVEL with minor silt and trace of cobbles	**Sample Source:**	Cut to Fill
Sample Method:	NZS 4407:2015, Test 2.4.8.3	**Sampled By:**	C. Maxwell
Test Methods:	Field Density - NZS 4407:2015, Test 4.2 (250mm probe depth); Water Content - NZS 4402:1986, Test 2.1 Corrected Maximum Dry Density – ASTM D4718/D4718M-15 & NZS 4402:1986, Test 2.8.2		

Compaction Used	Total Passes	Wet Density (t/m³)	Dry Density (t/m³)	Corrected Water Content (%)	Relative Compaction (%)	Air Voids (%)	Total Voids (%)
10 Passes 825c + 6 Passes Moxy	16	2.22	2.07	7.5	98	8	23
10 Passes 825c + 10 Passes Moxy	20	2.24	2.09	7.5	99	7	23
10 Passes 825c + 14 Passes Moxy	24	2.26	2.09	7.8	100	6	22

Note: The density results reported above are the mean of 4 individual NDM probes.

PLATEAU DENSITY #1



General Notes:

- *Information contained in this report which is Not IANZ Accredited relates to the calculation of the corrected maximum dry density, the calculation of % relative compaction and the sample description based on NZ Geotechnical Society Guidelines 2005.*
- *Relative Compaction values have been calculated using a maximum dry density (corrected for 10% +19mm fraction in accordance with ASTM D4718/D4718M-15) of 2.10 t/m³. Voids have been calculated using an assumed solid density of 2.70 t/m³ (See Reference No. 23/3820 for NZ standard compaction details).*
- *A water content correction based on comparative laboratory water contents has been applied to this data.*
- *This report may not be reproduced except in full.*

Tested By: C. Maxwell & M. Duncan **Date:** 1 & 2-Nov-23 **Checked By:**

Approved Signatory

A.P. Julius
Technical Manager

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

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Reference No: 23/3820

Date: 9 November 2023

TEST REPORT - NZ STANDARD COMPACTION & DRY DENSITY

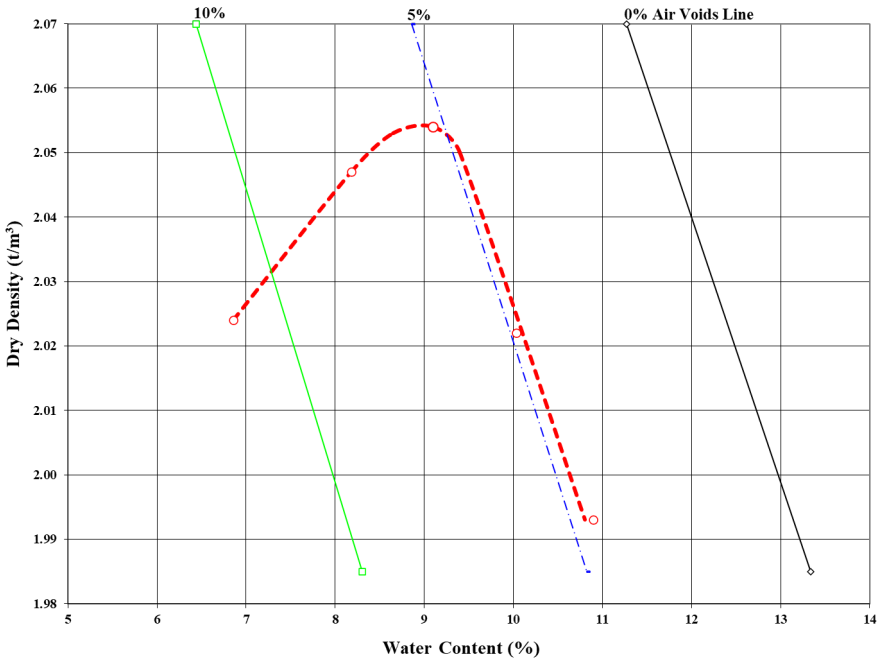
Client Details:	**Skevington Contracting Ltd, P.O. Box 5, Palmerston**	**Attention:**	**B. Skevington**
Job Description:	**Allenby Farms Subdivision – Quality Assurance Testing**		
Sample Description:	**Sandy GRAVEL with minor silt & trace of cobbles**	**Order No:**	**N/A**
Sample Source:	**Cut to Fill (Plateau #1)**	**Sample Label No:**	**07780**
Date & Time Sampled:	**1-Nov-23**	**Sampled By:**	**C. Maxwell**
Sample Method:	**NZS 4407:2015, Test 2.4.8.3**	**Date Received:**	**1-Nov-23**

NZ STANDARD COMPACTION - NZS 4402:1986, Test 4.1.1
DRY DENSITY & ABSORPTION - NZS 3111:1986, Test 12

% Retained (+19.0mm Fraction)	**16.0 %**
Dry Density: (+19.0mm Fraction)	**2.60 t/m^3**
Absorption (+19.0mm Fraction)	**1.4 %**
Maximum Dry Density: (-19.0mm Fraction)	**2.05 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**9.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from an assumed solid density of 2.70 t/m^3.*



General Notes:

- *Information contained in this report which is Not IANZ Accredited relates to the sample description based on NZ Geotechnical Society Guidelines 2005.*
- *This report may not be reproduced except in full.*

Tested By: M. Duncan & L.T. Smith **Date:** 4 to 9-Nov-23

Checked By:

Approved Signatory

A.P. Julius
Technical Manager

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Reference No: 23/3821

Date: 10 November 2023

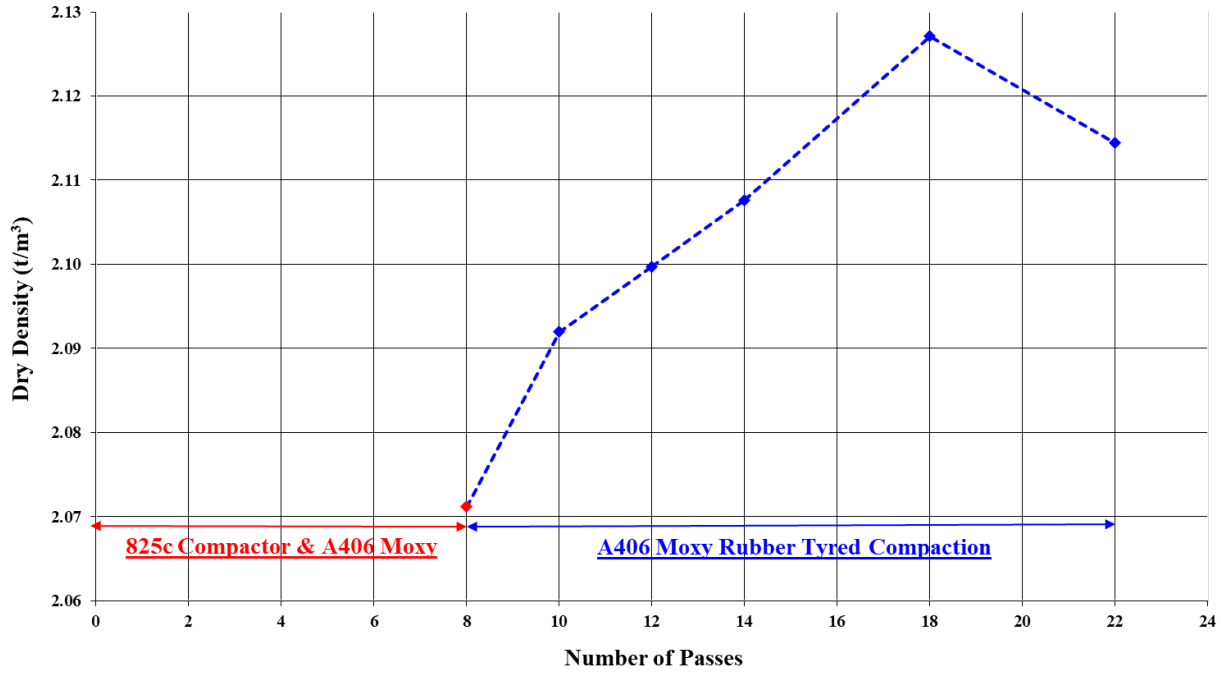
TEST REPORT – PLATEAU DENSITY & WATER CONTENT

Client Details:	**Skevington Contracting Ltd, P.O. Box 5, Palmerston**	**Attention:**	**B. Skevington**
Job Description:	**Allenby Farms Subdivision – Quality Assurance Testing**		
Sample Description:	**Sandy GRAVEL with minor silt and trace of cobbles**	**Sample Source:**	**Cut to Fill**
Sample Method:	**NZS 4407:2015, Test 2.4.8.3**	**Sampled By:**	**C. Maxwell**
Test Methods:	**Field Density - NZS 4407:2015, Test 4.2 (250mm probe depth); Water Content - NZS 4402:1986, Test 2.1 Corrected Maximum Dry Density – ASTM D4718/D4718M-15 & NZS 4402:1986, Test 2.8.2**		

Compaction Used	Total Passes	Wet Density (t/m³)	Dry Density (t/m³)	Corrected Water Content (%)	Relative Compaction (%)	Air Voids (%)	Total Voids (%)
6 Passes 825c + 2 Passes Moxy	8	2.19	2.07	5.9	96	11	23
6 Passes 825c + 4 Passes Moxy	10	2.22	2.09	5.9	97	10	23
6 Passes 825c + 6 Passes Moxy	12	2.22	2.10	5.9	98	10	22
6 Passes 825c + 8 Passes Moxy	14	2.23	2.11	5.9	98	10	22
6 Passes 825c + 12 Passes Moxy	18	2.25	2.13	5.8	99	9	21
6 Passes 825c + 16 Passes Moxy	22	2.24	2.11	5.9	98	9	22

Note: The density results reported above are the mean of 4 individual NDM probes.

PLATEAU DENSITY #2



General Notes:

- *Information contained in this report which is Not IANZ Accredited relates to the calculation of the corrected maximum dry density, the calculation of % relative compaction and the sample description based on NZ Geotechnical Society Guidelines 2005.*
- *Relative Compaction values have been calculated using a maximum dry density (corrected for 12% +19mm fraction in accordance with ASTM D4718/D4718M-15) of 2.15 t/m³. Voids have been calculated using an assumed solid density of 2.70 t/m³ (See Reference No. 23/3827 for NZ standard compaction details).*
- *A water content correction based on comparative laboratory water contents has been applied to this data.*
- *This report may not be reproduced except in full.*

Tested By: C. Maxwell & M. Duncan **Date:** 1 & 2-Nov-23 **Checked By:**

Approved Signatory

A.P. Julius
Technical Manager

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Reference No: 23/3827

Date: 9 November 2023

TEST REPORT - NZ STANDARD COMPACTION & DRY DENSITY

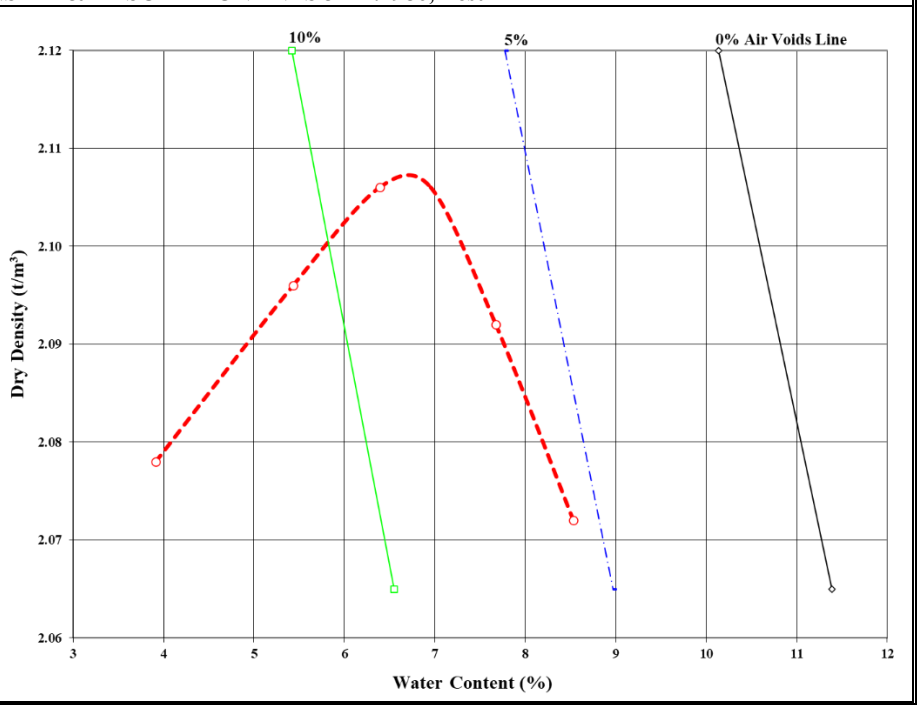
Client Details:	**Skevington Contracting Ltd, P.O. Box 5, Palmerston**	**Attention:**	**B. Skevington**
Job Description:	**Allenby Farms Subdivision - Quality Assurance Testing**		
Sample Description:	**Sandy GRAVEL with trace of / minor silt**	**Order No:**	**N/A**
Sample Source:	**Cut to Fill (Plateau 2)**	**Sample Label No:**	**07779**
Date & Time Sampled:	**1-Nov-23**	**Sampled By:**	**C. Maxwell**
Sample Method:	**NZS 4407:2015, Test 2.4.8.3**	**Date Received:**	**1-Nov-23**

NZ STANDARD COMPACTION - NZS 4402:1986, Test 4.1.1
DRY DENSITY & ABSORPTION - NZS 3111:1986, Test 12

% Retained (+19.0mm Fraction)	**9.0 %**
Dry Density: (+19.0mm Fraction)	**2.55 t/m^3**
Absorption (+19.0mm Fraction)	**1.8 %**
Maximum Dry Density: (-19.0mm Fraction)	**2.11 t/m^3**
Optimum Water Content: (-19.0mm Fraction)	**7.0 %**

Notes:

- *The sample was received in a natural state.*
- *The material tested in the NZ Standard Compaction test was the fraction passing a 19.0mm test sieve.*
- *The air voids lines were calculated from an assumed solid density of 2.70 t/m^3.*



General Notes:

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- *This report may not be reproduced except in full.*

Tested By: M. Duncan & L.T. Smith **Date:** 4 to 9-Nov-23

Checked By:

Approved Signatory

A.P. Julius
Technical Manager

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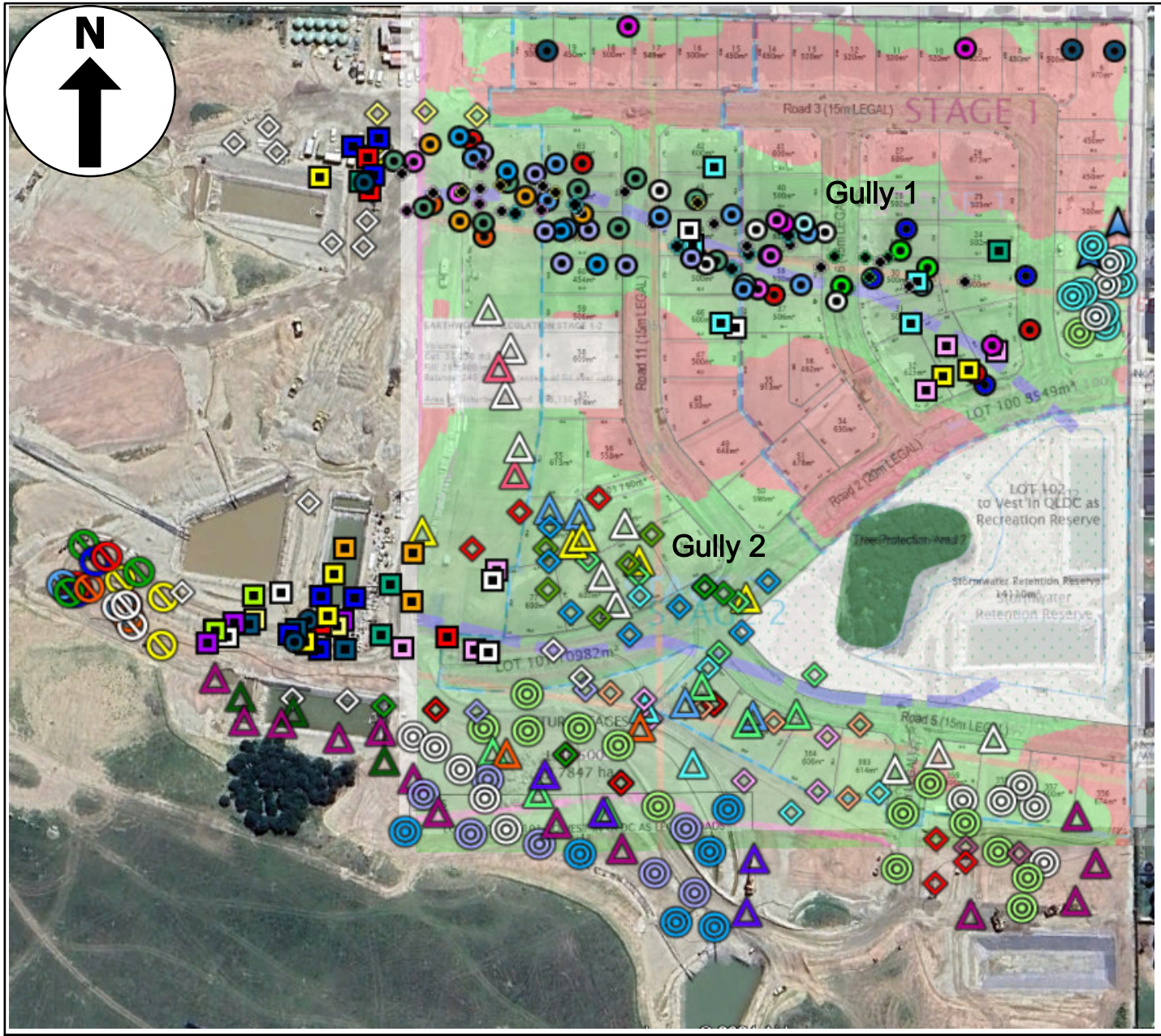
Appendix 5

NDM Test Summaries and Location Plan



Key:

Dec 23 (test numbers G1 1-27)

Jan 24 (test numbers G1 28-99; G2 1-2))

Feb 24 (test numbers G1 100-120; G2 3-35)

Mar 24 (test numbers G1 121-130; G2 36-94)

Apr 24 (test numbers G1 131-138; G2 95-138)

May 24 (test numbers G1 139-156; G2 139-174)

Jun 24 (test numbers G1 157-158)

Jul 24 (test numbers G1 159)

Notes:

Different symbol colours indicate specific test dates within each month.

Refer to the tabulated summaries in Appendix 5 for test details for Gully 1 (G1) and Gully 2 (G2) respectively.

Individual test reports are presented under separate cover.

Description	Nuclear Density Test Locations (Not to scale, for information only)		
Project	Stages 1 and 2, Pembroke Heights	Date drawn	06/01/2024
Client	WFH Properties Ltd	Drawn by	JK
Reference Number	22061_5	Approved by	CM

Pembroke Heights Subdivision, Wanaka

Summary of Nuclear Density Meter Testing completed for Stages 1 and 2

Gully 1

Test Number	Coordinate Northing	Coordinate Easting	Coordinate Elevation	CTS report ref.	Date	Relative Compaction (%)	Air Voids (%)	Comments
1	806749.85	374926.04	351.088	23/4501	19/12/2023	95	10	
2	806742.23	374938.23	350.385	23/4501	19/12/2023	96	10	
3	806744.08	374956.57	350.003	23/4501	19/12/2023	98	7	
4	806735.12	374965.06	349.688	23/4501	19/12/2023	98	8	
5	806745.29	374981.09	349.164	23/4501	19/12/2023	100	5	
6	806735.98	374994.79	348.778	23/4501	19/12/2023	98	11	
7	806743.38	375013.25	348.25	23/4501	19/12/2023	98	10	
8	806730.81	375024.29	347.569	23/4501	19/12/2023	99	5	
9	806731.01	375048.35	346.759	23/4501	19/12/2023	98	5	
10	806722.21	375061.39	346.021	23/4501	19/12/2023	96	12	
11	806722.8	375078.44	345.66	23/4501	19/12/2023	100	11	
12	806714.05	375090.69	345.117	23/4501	19/12/2023	99	10	
13	806716.36	375114.23	344.752	23/4501	19/12/2023	97	9	
14	806706.79	375125.83	344.623	23/4501	19/12/2023	96	11	
15	806708.87	375148.21	344.271	23/4501	19/12/2023	97	8	
16	806734.25	374970.38	350.254	23/4523	20/12/2023	11	7	
17	806738.06	374993.7	349.504	23/4523	20/12/2023	99	9	
18	806721.78	375033.8	347.701	23/4523	20/12/2023	100	6	
19	806712.96	375055.38	346.695	23/4523	20/12/2023	97	12	
20	806718.89	375062	346.739	23/4523	20/12/2023	99	11	
21	806726.64	375077.7	346.385	23/4523	20/12/2023	97	9	
22	806752.56	374926.81	352.43	23/4536	27/12/2023	102	9	
23	806753.38	374957.15	351.55	23/4536	27/12/2023	100	16	
24	806751.34	374979.98	351.054	23/4536	27/12/2023	97	9	
25	806735.74	374980.52	351.026	23/4536	27/12/2023	100	9	
26	806737.91	374956.32	351.788	23/4536	27/12/2023	98	10	
27	806734.92	374928.06	352.274	23/4536	27/12/2023	99	8	
28	806744.64	375027.44	349.449	24/001	3/01/2024	99	11	
29	806729.38	375065.56	347.858	24/001	3/01/2024	101	11	
30	806728.69	375092.87	347.144	24/001	3/01/2024	97	16	
31	806701.02	375097.54	346.789	24/001	3/01/2024	101	17	
32	806703.29	375072.74	347.183	24/001	3/01/2024	100	18	
33	806715.33	375045.85	348.194	24/001	3/01/2024	99	10	
34	806754.89	374986.73	351.182	24/004	4/01/2024	98	9	
35	806740.15	374983.58	351.466	24/004	4/01/2024	96	7	
36	806728.97	374990.99	350.994	24/004	4/01/2024	97	9	
37	806734.16	375027.57	349.724	24/004	4/01/2024	102	11	
38	806735.32	375055.88	348.5	24/004	4/01/2024	98	10	
39	806705.44	375060.54	347.848	24/004	4/01/2024	99	8	
40	806707.4	375083.38	347.577	24/004	4/01/2024	96	11	
41	806728.21	375086.05	347.705	24/004	4/01/2024	99	14	
42	806756.91	374954.5	352.626	24/004	4/01/2024	99	7	
43	806755.36	374923.55	353.026	24/006	5/01/2024	98	10	
44	806736.83	374935.17	353.193	24/006	5/01/2024	99	7	
45	806730.91	374958.5	352.473	24/006	5/01/2024	98	5	
46	806729.33	375011.4	350.761	24/006	5/01/2024	99	2	
47	806747.17	374967.97	352.196	24/006	5/01/2024	99	8	
48	806744.63	374995.51	351.268	24/006	5/01/2024	99	6	
49	806749.47	375017.95	350.668	24/006	5/01/2024	98	10	
50	806741.28	375041.76	349.556	24/006	5/01/2024	100	10	
51	806716.77	375050.02	348.839	24/006	5/01/2024	98	9	
52	806705.51	375066.42	348.049	24/013	8/01/2024	97	16	
53	806718.97	375071.42	348.325	24/013	8/01/2024	98	14	
54	806733.34	375073.68	348.36	24/013	8/01/2024	99	16	
55				24/013	8/01/2024	97	17	location not recorded
56	806755.17	374931.21	353.424	24/013	8/01/2024	101	11	
57	806742.63	374948.54	353.264	24/013	8/01/2024	101	12	
58	806762.24	374937.52	353.757	24/018	9/01/2024	99	16	
59	806731.59	374949.26	353.668	24/018	9/01/2024	98	6	
60	806741.74	374974.89	352.818	24/018	9/01/2024	98	11	
61	806734.89	374997.25	351.949	24/018	9/01/2024	100	12	
62	806738.28	374938.47	354.06	24/025	10/01/2024	98	13	
63	806725.44	374958.83	353.638	24/025	10/01/2024	98	10	
64	806727.74	374982.6	353.147	24/035	11/01/2024	98	13	
65	806715.03	374989.2	352.564	24/035	11/01/2024	96	12	
66	806728.56	374999.59	352.44	24/035	11/01/2024	99	12	

Gully 1

Test Number	Coordinate Northing	Coordinate Easting	Coordinate Elevation	CTS report ref.	Date	Relative Compaction (%)	Air Voids (%)	Comments
67	806714.46	375014.5	351.546	24/035	11/01/2024	100	10	
68	806717.7	375040.06	350.85	24/035	11/01/2024	99	10	
69	806750.83	374978.59	353.725	24/035	11/01/2024	100	8	
70	806759.06	374958.04	354.323	24/035	16/01/2024	100	10	
71				24/035	16/01/2024	97	11	location not recorded
72	806765.35	374948.9	355.278	24/077	16/01/2024	101	14	
73	806751.72	374967.7	354.863	24/077	16/01/2024	100	9	
74	806728.01	374988.91	353.736	24/077	16/01/2024	101	12	
75	806714.78	375002.98	352.654	24/077	16/01/2024	99	9	
76	806718.14	375041.89	351.468	24/077	16/01/2024	99	7	
77	806718.98	375070.66	349.43	24/077	16/01/2024	101	8	
78	806764.02	374954.01	355.592	24/097	18/01/2024	101	10	
79	806755.28	374997.03	354.311	24/097	18/01/2024	98	12	
80	806672.22	375153.46	344.274	24/097	18/01/2024	100	9	
81	806690.28	375174.99	343.976	24/097	18/01/2024	101	9	
82	806667.71	375157.04	344.774	24/142	22/01/2024	97	18	
83	806712.1	375173.25	345.085	24/142	22/01/2024	99	13	
84	806730.43	375125.16	347.153	24/142	22/01/2024	98	14	
85	806710.39	375111.76	347.606	24/142	22/01/2024	98	15	
86	806707.4	375061.25	350.328	24/179	25/01/2024	96	14	
87	806732.06	375084.5	349.542	24/179	25/01/2024	97	17	
88	806707.69	375131.54	347.429	24/179	25/01/2024	100	13	
89	806707.15	375099.47	349.309	24/193	26/01/2024	98	12	
90	806721.72	375122.86	349.168	24/193	26/01/2024	102	11	
91	806714.96	375133.7	348.876	24/193	26/01/2024	99	15	
92	806810.21	375014.86	354.008	24/258	30/01/2024	99	10	
93	806803.54	375148.26	349.499	24/258	30/01/2024	98	13	
94	806731.85	375076.42	350.645	24/258	30/01/2024	99	7	
95	806683.77	375159.9	344.66	24/258	30/01/2024	100	12	
96	806746.71	374911.96	351.758	24/282	31/01/2024	99	16	
97	806800.13	374983.03	355.316	24/282	31/01/2024	100	14	
98	806803.6	375190.91	348.229	24/282	31/01/2024	98	14	
99	806803.28	375207.94	347.724	24/282	31/01/2024	100	12	
100	806728.81	375039.09	352.403	24/329	5/02/2024	99	15	
101	806728.82	375039.11	352.402	24/329	5/02/2024	101	11	
102	806689.84	375057.46	350.523	24/380	9/02/2024	98	14	
103	806722.95	375040.52	352.74	24/380	9/02/2024	98	14	
104	806691.66	375051.75	352.202	24/380	9/02/2024	98	12	
105	806754.33	375048.89	353.311	24/380	9/02/2024	98	15	
106	806692.34	375127.23	348.545	24/380	9/02/2024	99	9	
107	806709.35	375129.63	349.324	24/433	12/02/2024	97	18	
108	806665.36	375133.43	346.435	24/434	12/02/2024	99	10	
109	806683.41	375141.47	346.223	24/435	12/02/2024	102	13	
110	806681.37	375161.79	344.907	24/480	13/02/2024	98	12	
111	806671.12	375140.18	346.377	24/480	13/02/2024	97	12	
112	806673.68	375150.49	345.812	24/480	13/02/2024	100	13	
113	806757.34	374915.68	352.639	24/480	13/02/2024	98	7	
114	806748.62	374894.71	352.352	24/497	14/02/2024	97	6	
115	806747.13	374910.34	352.905	24/497	14/02/2024	100	15	
116	806722.1	375162.3	346.648	24/526	16/02/2024	100	17	
117	806756.68	374913.19	353.227	24/526	16/02/2024	99	16	
118	806743.5	374914.08	353.139	24/642	26/02/2024	97	10	
119	806764.42	374917.47	353.952	24/642	26/02/2024	100	14	
120	806761.08	374907.38	354.057	24/642	26/02/2024	98	10	
121	806749.68	374915.57	353.909	24/735	4/03/2024	100	9	
122	806760.1	374917.57	354.912	24/735	4/03/2024	99	10	
123	806730.7	374912.54	354.509	24/735	4/03/2024	101	2	
124	806720.43	374911.3	354.263	24/735	4/03/2024	97	9	
125	806721.71	374899.17	354.131	24/735	4/03/2024	99	8	
126	806757.99	374877.45	354.96	24/735	4/03/2024	99	9	
127	806761.35	374860.97	355.04	24/735	4/03/2024	98	5	
128	806767.9	374874.17	355.021	24/755	5/03/2024	96	13	
129	806773.62	374916.54	355.282	24/755	5/03/2024	98	10	
130	806774.76	374935.05	356.009	24/755	5/03/2024	99	10	
131	806773.18	374955.41	355.687	24/1272	17/04/2024	98	11	
132	806584.92	375045.39	347.592	24/1272	17/04/2024	97	9	
133	806695.45	374960.13	354.618	24/1272	17/04/2024	98	11	
134	806680.12	374968.8	354.317	24/1272	17/04/2024	98	12	
135	806661.82	374966.87	353.971	24/1293	18/04/2024	100	14	
136	806640.55	374972.46	353.89	24/1293	18/04/2024	98	9	
137	806672.68	374964.26	354.776		18/04/2024			Outside of St 1&2
138	806630	374970.67	354.424		18/04/2024			Outside of St 1&2

Gully 1

Test Number	Coordinate Northing	Coordinate Easting	Coordinate Elevation	CTS report ref.	Date	Relative Compaction (%)	Air Voids (%)	Comments
139	806695.07	375201.12	341.088	CTS24W0880	27/05/2024	97	16	SPR3 Fill (1)
140	806707.95	375205.21	341.135	CTS24W0880	27/05/2024	98	18	SPR3 Fill (2)
141	806716.83	375206.55	340.616	CTS24W0880	27/05/2024	98	17	SPR3 Fill (3)
142	806703.23	375198.52	343.507	CTS24W0893	28/05/2024	98	14	SPR3 Fill (4)
143	806703.12	375198.58	341.908	CTS24W0893	28/05/2024	99	14	SPR3 Fill (5)
144	806713.92	375204.5	342.29	CTS24W0893	28/05/2024	98	18	SPR3 Fill (6)
145	806697.82	375208.39	342.384	CTS24W0920	29/05/2024	98	8	SPR3 Fill (7)
146	806711.23	375199.83	342.229	CTS24W0920	29/05/2024	100	10	SPR3 Fill (8)
147	806726.91	375207.74	342.757	CTS24W0941	30/05/2024	99	10	SPR3 Fill (9)
148	806725.29	375198.64	342.778	CTS24W0941	30/05/2024	99	9	SPR3 Fill (10)
149	806718.09	375210.96	343.004	CTS24W0941	30/05/2024	99	9	SPR3 Fill (11)
155	806703.27	375191.72	343.451	CTS24W0957	31/05/2024	98	7	SPR3 Fill (12)
156	806688.38	375194.63	343.796	CTS24W0957	31/05/2024	100	8	SPR3 Fill (13)
157	806711.18	375198.04	345.442	CTS24W0982	5/06/2024	100	15	SPR3 Fill (14)
158	806724.03	375209.49	345.516	CTS24W1028	12/06/2024	98	10	SPR3 Fill (15)
159	806577.22	374819.31	353.034	CTS24W1028	12/07/2024	98	13	SPR3 Fill (16)
1	-	-	-	CTS24W2287	22/10/2024	98	9	Northlake Dr extension
2	-	-	-	CTS24W2287	22/10/2024	98	8	Northlake Dr extension

Pembroke Heights Subdivision, Wanaka

Summary of Nuclear Density Meter Testing completed for Stages 1 and 2

Gully 2

Test Number	Coordinate Northing	Coordinate Easting	Coordinate Elevation	CTS report ref.	Date	Relative Compaction (%)	Air Voids (%)	Comments
1	806563.37	374885.71	350.481	24/282	31/01/2024	99	14	
2	806571.98	374891.02	350.115	24/282	31/01/2024	98	14	
3	806569.66	374902.15	350.111	24/297	1/02/2024	97	17	
4	806572.28	374870.18	351.402	24/297	1/02/2024	102	11	
5	806559.33	374961.18	347.46	24/330	5/02/2024	100	13	
6	806559.33	374961.18	347.46	24/330	5/02/2024	98	16	
7	806588.07	374962.65	348.351	24/330	5/02/2024	103	13	
8	806565.33	374859.64	352.221	24/330	5/02/2024	100	11	
9	806582.89	374880.22	351.404	24/352	7/02/2024	100	16	
10	806568.01	374854.57	353.051	24/352	7/02/2024	100	11	
11	806567.71	374854.82	352.962	24/434	12/02/2024	98	11	
12	806581.69	374869.5	352.367	24/434	12/02/2024	98	14	
13	806561.04	374927.78	349.926	24/434	12/02/2024	97	11	
14	806560.32	374955.81	349.108	24/481	13/02/2024	100	14	
15	806592.13	374964.23	349.426	24/481	13/02/2024	96	14	
16	806563.35	374889.74	351.342	24/481	13/02/2024	99	12	
17	806573.71	374898.46	351.194	24/498	14/02/2024	99	9	
18	806590.38	374900.85	350.811	24/498	14/02/2024	98	13	
19	806586.27	374922.73	350.754	24/527	16/02/2024	101	9	
20	806566.16	374919.34	350.622	24/527	16/02/2024	99	15	
21	806565.41	374945.06	350.477	24/527	16/02/2024	99	14	
22	806570.45	374895.7	351.889	24/560	20/02/2024	98	13	
23	806562.81	374851.73	353.453	24/560	20/02/2024	99	15	
24	806570.88	374862.17	353.322	24/560	20/02/2024	100	7	
25	806562.48	374890.3	352.18	24/560	20/02/2024	101	7	
26	806571.96	374904.43	352.179	24/609	22/02/2024	99	11	
27	806600.69	374904.86	352.253	24/609	22/02/2024	98	15	
28	806598.89	374931.54	351.859	24/609	22/02/2024	97	17	
29	806579.51	374931.15	352.03	24/643	26/02/2024	100	14	
30	806560.36	374895.45	353.205	24/643	27/02/2024	100	13	
31	806566.43	374883.72	353.533	24/643	28/02/2024	100	9	
32	806581.52	374895.74	353.394	24/643	26/02/2024	100	11	
33	806580.91	374908.87	353.14	24/688	29/02/2024	100	17	
34	806570.31	374867.84	354.263	24/688	29/02/2024	97	12	
35	806568.34	374886.43	353.818	24/688	29/02/2024	98	17	
36	806560.45	374905.33	353.315	24/736	4/03/2024	98	9	
37	806618.34	374890.36	353.709	24/736	4/03/2024	101	7	
38	806582.35	374841.4	354.115	24/736	4/03/2024	97	8	
39	806540.25	374884.6	353.697	24/736	4/03/2024	98	8	
40	806539.4	374906.1	353.473	24/736	4/03/2024	98	4	
41	806559.68	374986.24	348.997	24/736	4/03/2024	97	7	
42	806548.68	374997.23	347.217	24/756	5/03/2024	97	11	
43	806581.25	375019.84	346.273	24/756	5/03/2024	99	12	
44	806552.47	375046.82	345.67	24/756	5/03/2024	99	13	
45	806501.87	375114.67	344.207	24/756	5/03/2024	98	11	
46	806589.48	375019.31	347.072	24/733	6/03/2024	97	13	
47	806595.69	374999.57	347.633	24/733	6/03/2024	97	9	
48	806578.9	375058.63	345.935	24/733	6/03/2024	99	13	
49	806549.47	375088.93	344.424	24/733	6/03/2024	99	10	
50	806558.47	375051.07	346.268	24/733	6/03/2024	98	12	
51	806540.03	375021.8	345.379	24/802	7/03/2024	99	14	
52	806532.16	375024.28	345.478	24/802	7/03/2024	102	10	
53	806507.06	375061.18	345.957	24/802	7/03/2024	99	12	
54	806502.51	375090.42	345.924	24/802	7/03/2024	98	10	
55	806524.42	375094.1	345.309	24/802	7/03/2024	100	11	
56	806542.56	375008.55	346.336	24/834	11/03/2024	99	16	
57	806536.63	375044.55	345.047	24/834	11/03/2024	99	16	
58	806530.53	375072.84	345.936	24/834	11/03/2024	98	15	
59	806529.23	375107.06	345.454	24/834	11/03/2024	101	14	
60	806499.65	375102.39	346.475	24/834	11/03/2024	101	13	
61	806535.15	374956.44	349.246	24/884	12/03/2024	100	13	
62	806543.96	374998.82	348.136	24/884	12/03/2024	100	16	
63	806537.9	375049.17	347.167	24/909	14/03/2024	100	15	
64	806506.74	375012.94	348.306	24/909	14/03/2024	97	19	
65	806518.12	374991.79	348.983	24/909	14/03/2024	97	18	

Gully 2

Test Number	Coordinate Northing	Coordinate Easting	Coordinate Elevation	CTS report ref.	Date	Relative Compaction (%)	Air Voids (%)	Comments
66	806535.76	374940.47	350.695	24/909	14/03/2024	97	19	
67	806537.36	374920.23	352.137	24/909	14/03/2024	97	10	
68	806535.92	374940.42	350.69	24/935	15/03/2024	99	7	
69	806518.14	374991.23	348.988	24/935	15/03/2024	96	12	
70	806506.83	375012.82	348.315	24/935	15/03/2024	97	12	
71	806537.89	375049.36	347.191	24/935	15/03/2024	97	10	
72	806584.92	375045.39	347.592	24/935	15/03/2024	101	9	
73	806582.3	375052.8	347.33	24/935	15/03/2024	101	10	
74	806608.74	374984.56	350.404	24/953	19/03/2024	98	10	
75	806595.14	374984.19	350.422	24/953	19/03/2024	96	12	
76	806574.66	374992.87	350.265	24/953	19/03/2024	96	12	
77	806565.79	375015.93	349.724	24/953	19/03/2024	98	16	
78	806576.89	375035.4	349.25	24/953	19/03/2024	99	11	
79	806566.67	375059.93	348.303	24/953	19/03/2024	98	13	
80	806587.25	375070.35	347.764	24/953	19/03/2024	99	15	
81	806600.22	374982.94	351.407	24/1012	21/03/2024	99	10	
82	806583.74	374983.9	351.441	24/1012	21/03/2024	101	12	
83	806572.53	375004.15	350.88	24/1012	21/03/2024	99	11	
84	806594.22	375015.34	350.453	24/1012	21/03/2024	98	11	
85	806605.93	375024.4	349.993	24/1012	21/03/2024	97	11	
86	806465.28	375137.08	344.142	24/1042	26/03/2024	96	8	
87	806473.82	375149.29	343.543	24/1042	26/03/2024	98	4	
88	806483.03	375137.48	343.825	24/1042	26/03/2024	98	8	
89	806600.03	374954.18	352.836	24/1042	26/03/2024	99	6	
90	806614.8	374972.66	352.092	24/1042	26/03/2024	99	7	
91	806620.35	375003.51	351.375	24/1042	26/03/2024	98	9	
92	806479.75	375149.34	344.052	24/1060	27/03/2024	98	5	
93	806477.18	375170.63	343.859	24/1060	27/03/2024	98	4	
94	806578.39	375010.71	351.944	24/1060	27/03/2024	99	4	
95	806589.1	375005.14	352.124	24/1092	2/04/2024	98	13	
96	806609.98	375013.9	351.705	24/1092	2/04/2024	98	9	
97	806511.11	375121.12	344.449	24/1092	2/04/2024	99	10	
98	806517.34	375138.47	344.043	24/1092	2/04/2024	98	9	
99	806523.63	375160.48	343.338	24/1092	2/04/2024	99	7	
100	806613.63	374995.94	352.763	24/1092	2/04/2024	98	9	
101	806615.94	374984.27	352.982	24/1135	4/04/2024	99	12	
102	806538.46	375037.95	348.256	24/1135	4/04/2024	98	13	
103	806533.18	375064.56	347.996	24/1135	4/04/2024	100	8	
104	806528.98	375020.22	349.336	24/1135	4/04/2024	98	13	
105	806518.53	374968.26	351.728	24/1153	5/04/2024	98	16	
106	806475.88	375065.23	345.989	24/1153	5/04/2024	98	15	
107	806454.58	375062.36	346.305	24/1172	9/04/2024	99	12	
108	806510.29	374983.32	351.415	24/1172	9/04/2024	99	9	
109	806495.09	375006.02	350.496	24/1172	9/04/2024	98	13	
110	806536.53	375022.13	349.791	24/1172	9/04/2024	97	16	
111	806514.27	375040.96	349.716	24/1294	18/04/2024	99	13	
112	806604.88	374997.38	353.077	24/1394	18/04/2024	97	17	
113	806602.14	374993.5	353.071	24/1312	19/04/2024	99	11	
114	806595.44	375019.59	352.114	24/1312	19/04/2024	99	16	
115	806580.48	375061.71	350.528	24/1312	19/04/2024	97	13	
116	806606.99	374934.66	353.864	24/1312	19/04/2024	102	6	
117	806519.43	374962.92	353.205	24/1353	23/04/2024	97	9	
118	806503.07	374980.73	351.978	24/1353	23/04/2024	99	11	
119	806495.01	375007.45	350.784	24/1353	23/04/2024	100	10	
120	806545.16	375044.4	349.557	24/1353	23/04/2024	99	13	
121	806530.29	375062.45	349.328	24/1353	23/04/2024	98	10	
122	806533.52	375081.8	348.214	24/1353	23/04/2024	98	8	
123	806515.67	374920.64	353.638	24/1376	24/04/2024	99	9	
124	806534.92	374884.93	354.94	24/1376	24/04/2024	100	9	
125	806540.99	374864.56	355.064	24/1376	24/04/2024	98	15	
126	806531.43	374866.02	355.756	24/1422	30/04/2024	100	10	
127	806548.22	374854.42	355.545	24/1422	30/04/2024	97	14	
128	806530.35	374880.51	355.622	24/1422	30/04/2024	98	12	
129	806524.57	374902.78	354.972	24/1422	30/04/2024	99	12	
130	806527.44	374919.11	354.526	24/1422	30/04/2024	98	12	
131	806508.56	374931.98	354.681	24/1422	30/04/2024	99	13	
132	806495.33	374941.92	354.678	24/1422	30/04/2024	97	13	
133	806490.93	374987.91	352.72	24/1422	30/04/2024	101	4	
134	806480.5	375013.41	351.859	24/1422	30/04/2024	99	15	
135	806452.79	375151.24	345.779	24/1422	30/04/2024	99	8	
136	806492.06	375193.82	344.607	24/1422	30/04/2024	96	12	
137	806473.11	375201.26	345.004	24/1422	30/04/2024	98	9	
138	806458.13	375192.96	345.129	24/1422	30/04/2024	100	8	
139	806524.93	374931.77	354.77	CTS24W0595	2/05/2024	100	10	
140	806520.82	374940.4	354.956	CTS24W0595	2/05/2024	99	9	
141	806511.99	374950.41	355.088	CTS24W0595	2/05/2024	95	11	
142	806500.63	374959.93	354.921	CTS24W0595	2/05/2024	99	12	

Gully 2

Test Number	Coordinate Northing	Coordinate Easting	Coordinate Elevation	CTS report ref.	Date	Relative Compaction (%)	Air Voids (%)	Comments
143	806488.32	374968.44	354.569	CTS24W0595	2/05/2024	98	11	
144	806498.5	375148.05	344.74	CTS24W0595	2/05/2024	98	1	
145	806498.1	375163.56	344.761	CTS24W0595	2/05/2024	98	4	
146	806473.18	375180.64	345.44	CTS24W0595	2/05/2024	98	6	
147	806495.85	375177.02	344.736	CTS24W0595	2/05/2024	99	7	
148	806504.3	375171.62	344.248	CTS24W0595	2/05/2024	98	5	
149	806528.31	374959.19	353.82	CTS24W0638	7/05/2024	98	12	
150	806527.35	374976.46	353.234	CTS24W0638	7/05/2024	98	12	
151	806528.36	374996.46	352.54	CTS24W0638	7/05/2024	99	11	
152	806496.98	375027.39	351.384	CTS24W0638	7/05/2024	99	13	
153	806521.54	375011.77	352.207	CTS24W0638	7/05/2024	98	10	
154	806541.97	374976.06	352.295	CTS24W0638	7/05/2024	100	8	
155	806489.28	375149.13	345.554	CTS24W0638	7/05/2024	98	15	
156	806477.68	375162.33	346.011	CTS24W0638	7/05/2024	101	15	
157	806467.27	375174.03	346.063	CTS24W0638	7/05/2024	98	13	
158	806455.17	375171.61	346.147	CTS24W0638	7/05/2024	99	13	
159	806471.08	375121.86	345.733	CTS24W0638	7/05/2024	98	6	
160	806493.3	375124.26	345.148	CTS24W0638	7/05/2024	101	6	
161	806505.23	375135.09	344.777	CTS24W0638	7/05/2024	100	5	
162	806508.13	374960.95	356.112	CTS24W0691	10/05/2024	100	12	
163	806502.07	374936.02	357.008	CTS24W0691	10/05/2024	97	10	
164	806486.48	374954.58	356.272	CTS24W0691	10/05/2024	100	12	
165	806482.52	374981.29	355.153	CTS24W0691	10/05/2024	98	11	
166	806470.23	375026.28	352.047	CTS24W0691	10/05/2024	98	10	
167	806462.11	375041.87	350.447	CTS24W0691	10/05/2024	99	9	
168	806488.1	375038.4	351.004	CTS24W0691	10/05/2024	100	7	
169	806487.41	374929.03	357.19	CTS24W0726	14/05/2024	100	10	
170	806478.54	374997.15	354.098	CTS24W0726	14/05/2024	98	10	
171	806450.63	375034.67	351.018	CTS24W0726	14/05/2024	99	9	
172	806448.45	375049.69	350.081	CTS24W0726	14/05/2024	99	12	
173	806478.56	375047.7	350.71	CTS24W0726	14/05/2024	98	11	
174	806495.57	375054.88	349.983	CTS24W0726	14/05/2024	100	9	

Appendix 6

Schedule 2A Statement of Suitability
Statement of Suitability of Engineered Fill

SCHEDULE 2A

STATEMENT OF PROFESSIONAL OPINION ON SUITABILITY OF LAND FOR BUILDING CONSTRUCTION

Development Pembroke Heights Stages 1 and 2

Developer WFH Properties Ltd

Location 80 Northlake Drive, Wanaka

I Jana Kruyshaar of JKCM Ltd t/a Insight Engineering

(Full name) *(Name and address of firm)*

Hereby confirm that:

1. I am a geo-professional as defined in clause 1.2.2 of NZS 4404:2010 and was retained by the developer as the geo-professional on the above development.

2. The extent of my preliminary investigations are described in my Report(s) number 22016_1, dated 15/08/2022, and the conclusions and recommendations of that/those document(s) have been re-evaluated in the preparation of this report. The extent of my inspections during construction, and the results of all tests and/or re-evaluations carried out are as described in my geotechnical completion report dated 03/04/2025.

3. In my professional opinion, not to be construed as a guarantee, I consider that (delete as appropriate):

   (a) The earth fills shown on the attached Plan No 21091_39_1-14 have been placed in compliance with the requirements of the Queenstown Lakes District Council and my specification.

   (b) The completed works take into account land slope and foundation stability considerations, subject to the appended foundation recommendations and earthworks restrictions, (which should be read in conjunction with the appended final site contour plan).

   (c) Subject to 3(a) and 3(b) of this Schedule, the original ground not affected by filling is suitable for the erection of buildings designed according to NZS 3604 provided that:
   (i) Refer to the Geotechnical Completion Report dated 03/04/2025
   (ii).....

   (d) Subject to 3(a) and 3(b) of this Schedule, the filled ground is suitable for the erection of buildings designed according to NZS 3604 provided that:
   (i) Refer to the Geotechnical Completion Report dated 03/04/2025
   (ii).....

   (e).The original ground not affected by filling and the filled ground are not subject to erosion, falling debris (including soil, rock, snow and ice), subsidence (including liquefaction induced subsidence), inundation (including flooding, overland flow, storm surge, tidal effects and ponding) or slippage in accordance with the provisions of section 106 of the Resource Management Act 1991 provided that:
   (i) Refer to the Geotechnical Completion Report dated 03/04/2025
   (ii).....

NOTE – These subclauses may be deleted or added to as appropriate, to include such considerations as expansive soils where excluded from NZS 3604, and site seismic characteristics as covered in clause 3.1.3 of NZS 1170.5.

4. This professional opinion is furnished to the TA and the developer for their purposes alone on the express condition that it will not be relied upon by any other person and does not remove the necessity for the normal inspection of foundation conditions at the time of erection of any building.
5. This certificate shall be read in conjunction with my geotechnical report referred to in clause 2 above and shall not be copied or reproduced except in conjunction with the full geotechnical completion report.

Signed ..... Date 13/06/2025

Jana Kruyshaar

Principal Geotechnical Engineer

BEng (Civil), CMEngNZ, CPeng

(Name, title, and professional qualifications)

STATEMENT OF SUITABILTY OF ENGINEERED FILL FOR LIGHTWEIGHT STRUCTURES

To:	*Queenstown Lakes District Council*
Development name:	*Pembroke Heights Stages 1 and 2*
Land title(s):	*Subdivision of LOT 2 DP 529345*
Development location/address:	*Allenby Farm, 80 Northlake Drive, Wanaka*
Relevant resource consent number(s):	*RM220913*
Developers name and company:	*WFH Properties Ltd*
Geotechnical designer's name and company:	*Jana Kruyshaar* *JKCM Ltd t/a Insight Engineering*
Certifier's name and company	*Jana Kruyshaar* *JKCM Ltd t/a Insight Engineering*

Attachments (give reference numbers):

1) Site layout plan(s) *prepared by Landpro Ltd, ref number 21091_101*
2) Fill layout plan(s) *prepared by Landpro Ltd, ref number 21091_102*
3) Fill section(s) - *NA*
4) Design report – *Geotechnical Supplementary Assessment Report prepared by JKCM Ltd t/a Insight Engineering dated 15/06/2022 reference number 22016_1*
5) Earthworks completion report, *prepared by JKCM Ltd t/a Insight Engineering dated 15/06/2022 reference number 22016_5 Rev1*, including:
    a. As-built survey;
    b. Cut-fill plan (with contours);
    c. Inspection and test plan;
    d. Earthworks specification;
    e. All test results;
    f. All inspection records.

I confirm I am qualified as a certifier in NZS4431:2022.
During this work, I was retained as certifier, and I or my certifier's representative undertook inspections and testing as documented in the attached earthworks completion report.
I am satisfied that the engineered fill shown in the attached as built survey was placed, compacted and testing in accordance with the attached earthworks specification and all variations and non-compliances have been documented in the earthworks completion report.
Based on the information available, I certify that, to the best of my knowledge, the intent of the geotechnical designer (as presented in their design, drawings and earthworks specification) has been achieved.
The area shown on the as built survey plan referenced above is considered suitable for development as per NZS3604 (subject to the recommendations of the Geotechnical Completion report dated 03/04/2025.
This certification does not remove the necessity for normal inspection and design of foundations as would be made in natural ground.

Certifier's signature: 	Date: *13/06/2025*

Certifier's qualifications, professional registration type and number:

B.Eng (Civil), CMEngNZ, CPeng (1011212)

NOTE – these subclauses may be deleted or added to as appropriate, to include such considerations as expansive soils where excluded from NZS 3604, and seismic characteristics as covered in clause 3.1.3 of NZS 1170.5

Appendix 7

Stage 1 and 2 Lots Summary Sheets

Summary Sheets

These summaries are intended as a quick reference only for key geotechnical information for each lot. The summary sheets should be read in conjunction with the content of the Geotechnical Completion Report. They are not intended to provide detailed geotechnical information.

Please note that not all test results are included in the summary sheets. We have only presented tests completed on the final ground surfaces. Refer to Figures 3 and 4 of this report for other NDM and Scala test locations and distributions.

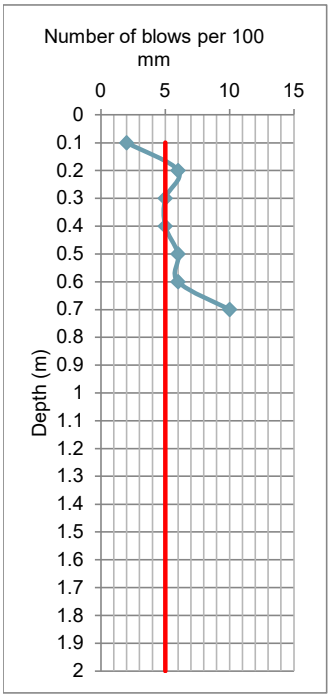
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 1

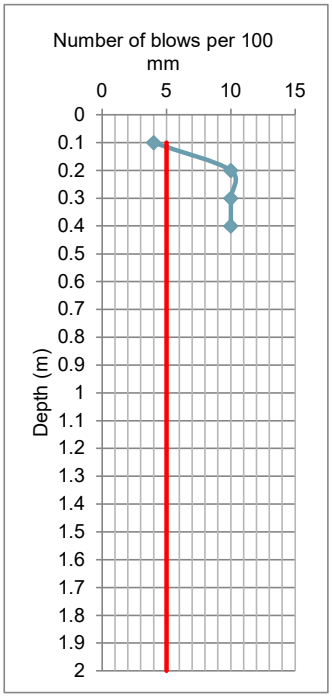
Stage number:	1	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	343 - 345 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 - 2.0 m	Geotechnical Setback requirements:	No specific requirements
Excavated ground depth range:	0 m	Additional comments:	Specific engineering advice is recommended if further earthworks are planned.

Scala Penetrometer tests

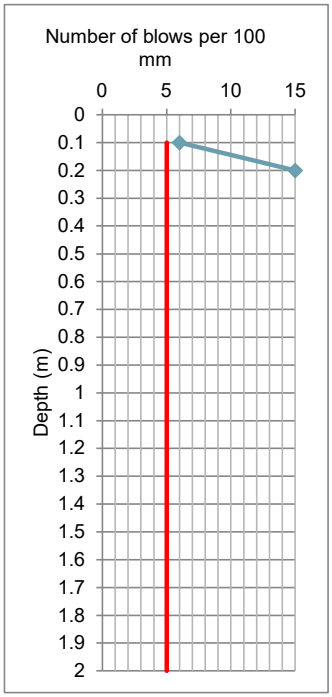
Test #:	Date:	Tested by:
SP214	29-May-24	IE



Test #:	Date:	Tested by:
SP217	5-Jun-24	IE



Test #:	Date:	Tested by:
SP226	7-Nov-24	IE



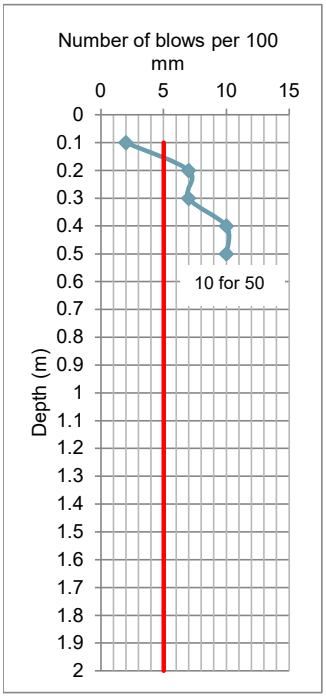
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 2

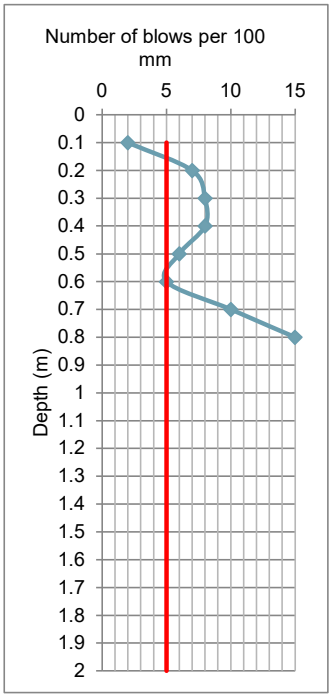
Stage number:	1	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	343.5 - 346 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 - 2.0 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	0 m	Additional comments:	Specific engineering advice is recommended if further earthworks are planned.

Scala Penetrometer tests

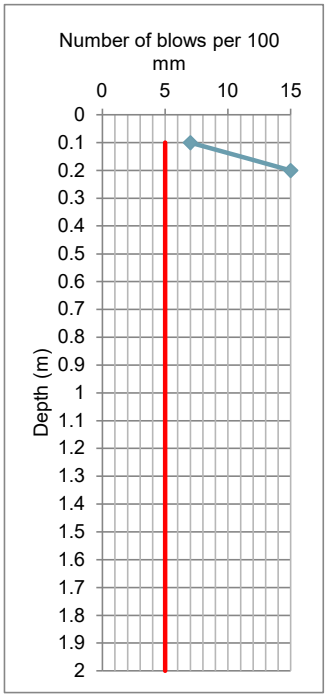
Test #:	Date:	Tested by:
SP212	29-May-24	IE



Test #:	Date:	Tested by:
SP216	5-Jun-24	IE



Test #:	Date:	Tested by:
SP227	7-Nov-24	IE



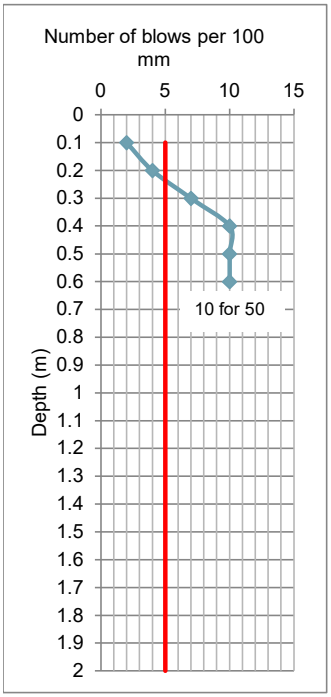
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 3

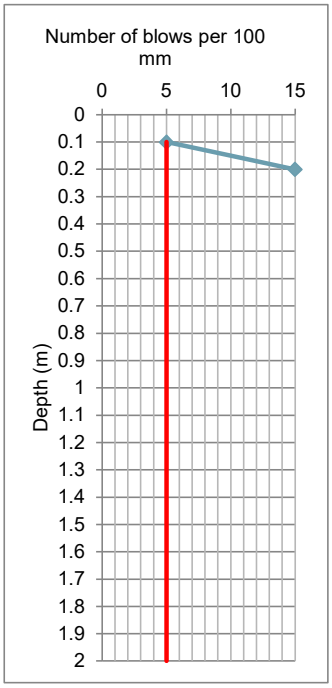
Stage number:	1	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	344.5 - 347 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 - 0.5 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	0 - 1.5 m	Additional comments:	Specific engineering advice is recommended if further earthworks are planned.

Scala Penetrometer tests

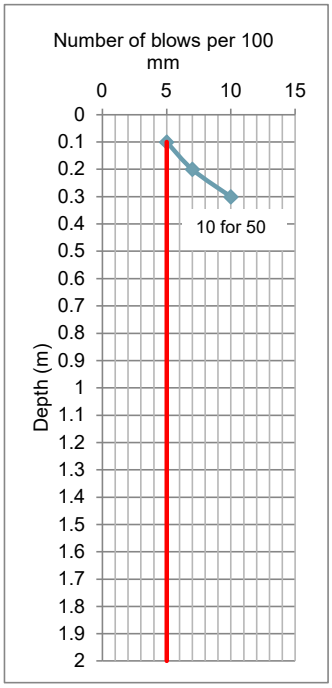
Test #:	Date:	Tested by:
SP210	29-May-24	IE



Test #:	Date:	Tested by:
SP229	7-Nov-24	IE



Test #:	Date:	Tested by:
SP230	7-Nov-24	IE



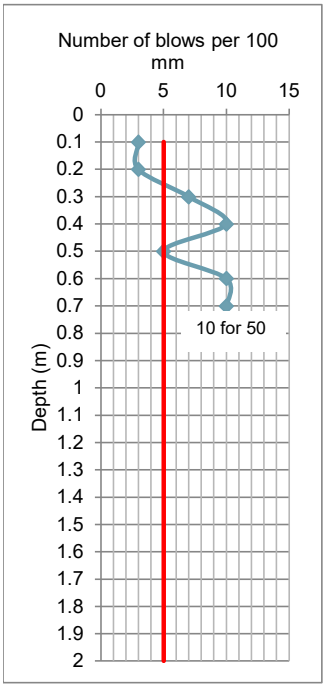
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 4

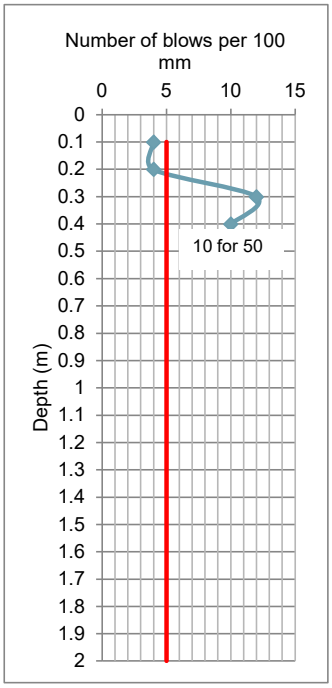
Stage number:	1	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	346 - 347.5 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 - 0.5 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	0 - 2.0 m	Additional comments:	Specific engineering advice is recommended if further earthworks are planned.

Scala Penetrometer tests

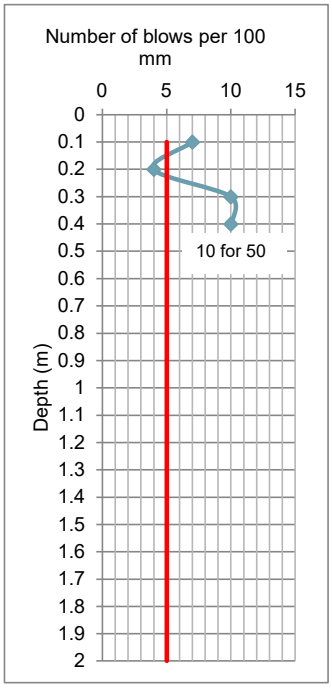
Test #:	Date:	Tested by:
SP231	7-Nov-24	IE



Test #:	Date:	Tested by:
SP232	7-Nov-24	IE



Test #:	Date:	Tested by:
SP233	7-Nov-24	IE



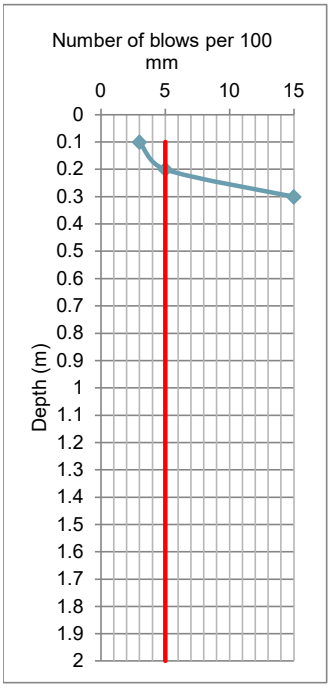
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 5

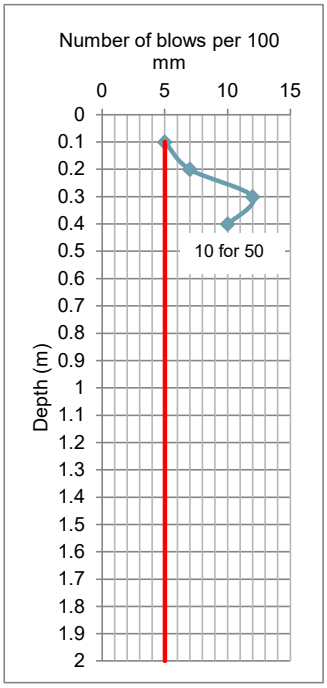
Stage number:	1	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	346 - 347.5 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	0 - 2.0 m	Additional comments:	Specific engineering advice is recommended if further earthworks are planned.

Scala Penetrometer tests

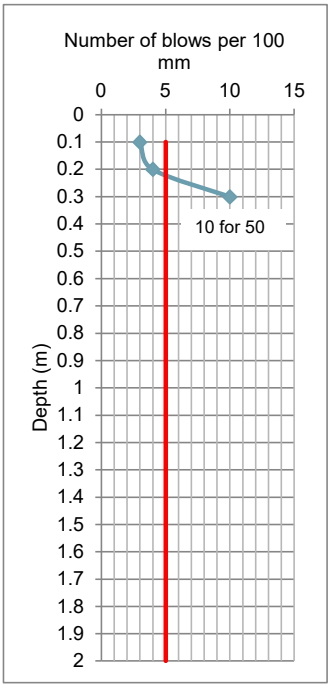
Test #:	Date:	Tested by:
SP234	7-Nov-24	IE



Test #:	Date:	Tested by:
SP235	7-Nov-24	IE



Test #:	Date:	Tested by:
SP236	7-Nov-24	IE



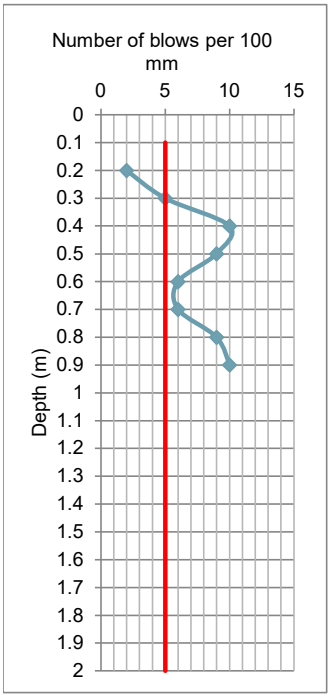
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 6

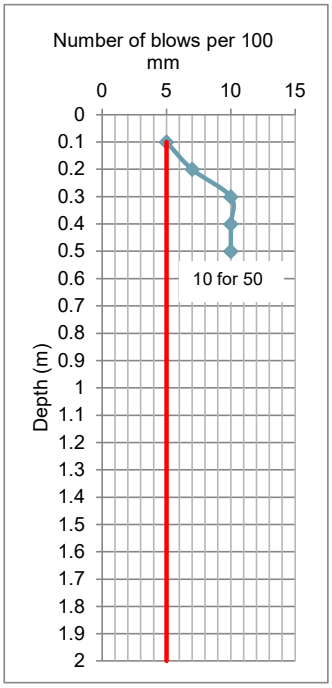
Stage number:	1	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	346.5 - 347 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 - 0.5 m	Geotechncial Set Back requirements:	No specific requirements
Excavated ground depth range:	0 - 1.0 m	Additional comments:	Specific engineering advice is recommended if further earthworks are planned.

Scala Penetrometer tests

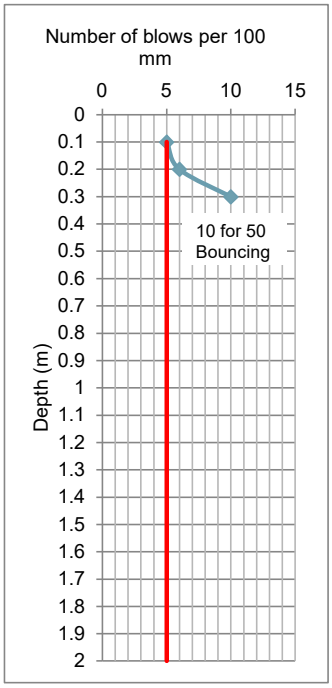
Test #:	Date:	Tested by:
SP56	7-Feb-24	IE



Test #:	Date:	Tested by:
SP224	20-Jun-24	IE



Test #:	Date:	Tested by:
SP237	7-Nov-24	IE



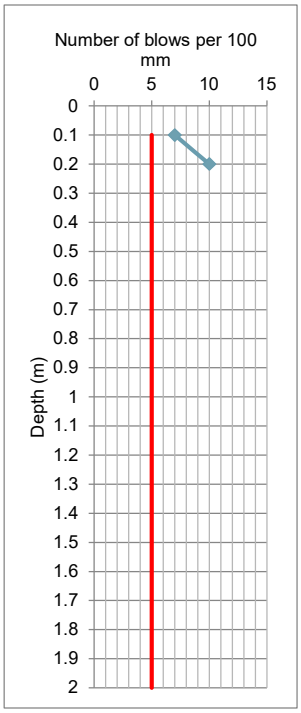
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 7

Stage number:	1
Approx ground surface elevation:	348 - 348.5
Filled ground thickness range:	0 - 0.5 m
Excavated ground depth range:	0 - 0.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal (10 blows for 50 mm). Two test locations were attempted.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP41	6-Feb-24	IE

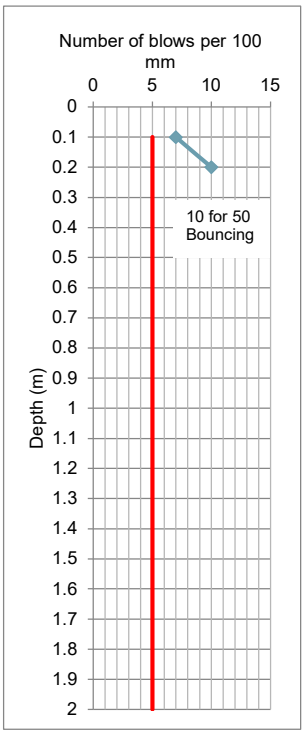


Summary of Foundation Information: Lot 8

Stage number:	1
Approx ground surface elevation:	348.5 - 349
Filled ground thickness range:	0 - 1.0 m
Excavated ground depth range:	0 - 0.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal (10 blows for 50 mm). Two test locations were attempted.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP42	6-Feb-24	IE



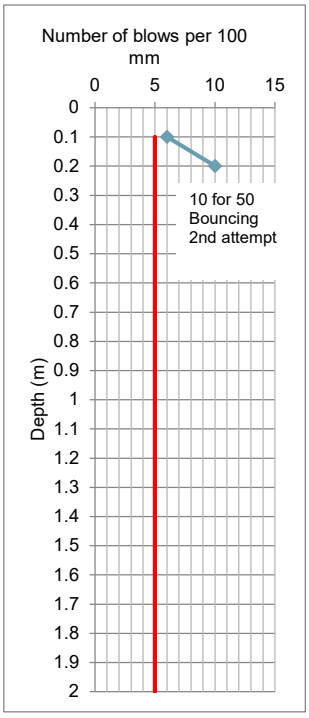
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 9

Stage number:	1
Approx ground surface elevation:	349 - 349.5
Filled ground thickness range:	0 - 1.0 m
Excavated ground depth range:	0 - 1.0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal (10 blows for 50 mm). Two test locations were attempted.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP43	6-Feb-24	IE

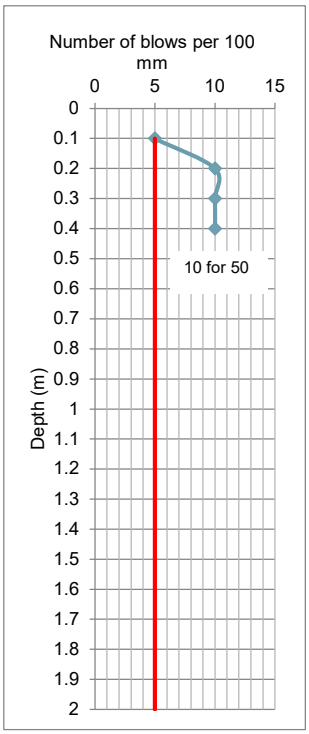


Summary of Foundation Information: Lot 10

Stage number:	1
Approx ground surface elevation:	349.5 - 350
Filled ground thickness range:	0 - 1.0 m
Excavated ground depth range:	0 - 1.0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal (10 blows for 50 mm).

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP270	14-Mar-25	IE



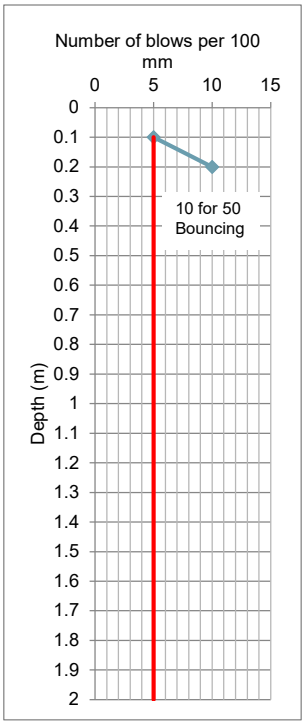
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 11

Stage number:	1
Approx ground surface elevation:	350.5 - 351
Filled ground thickness range:	0 - 1.5 m
Excavated ground depth range:	0 - 1.0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal (10 blows for 50 mm). Two test locations were attempted.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP45	6-Feb-24	IE

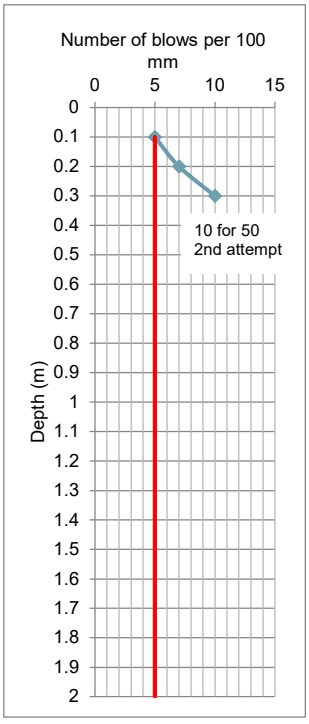


Summary of Foundation Information: Lot 12

Stage number:	1
Approx ground surface elevation:	351.5
Filled ground thickness range:	0 - 1.5 m
Excavated ground depth range:	0 - 2.0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal (10 blows for 50 mm). Two test locations were attempted.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP46	6-Feb-24	IE



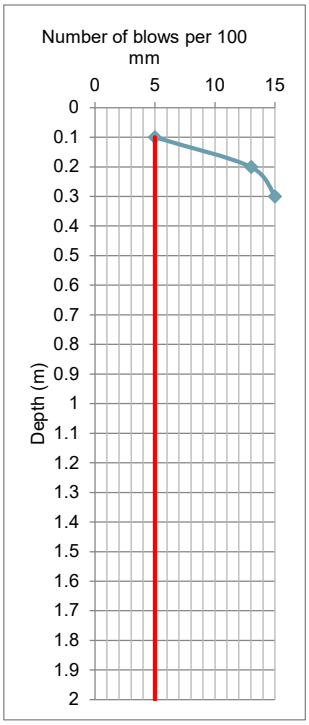
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 13

Stage number:	1
Approx ground surface elevation:	352
Filled ground thickness range:	0 - 1.0 m
Excavated ground depth range:	0 - 2.0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal (15 blows).

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP47	6-Feb-24	IE

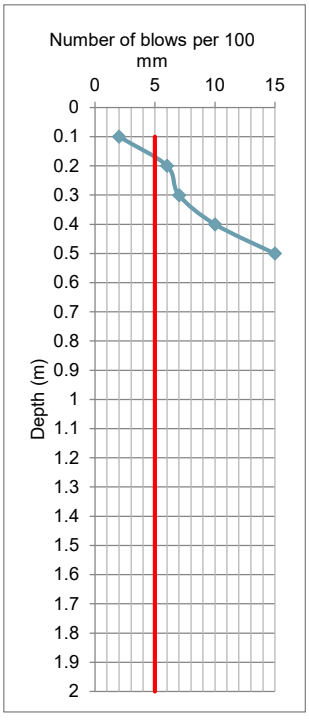


Summary of Foundation Information: Lot 14

Stage number:	1
Approx ground surface elevation:	352.5
Filled ground thickness range:	0 - 0.5 m
Excavated ground depth range:	0 - 2.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal (15 blows).

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP48	6-Feb-24	IE



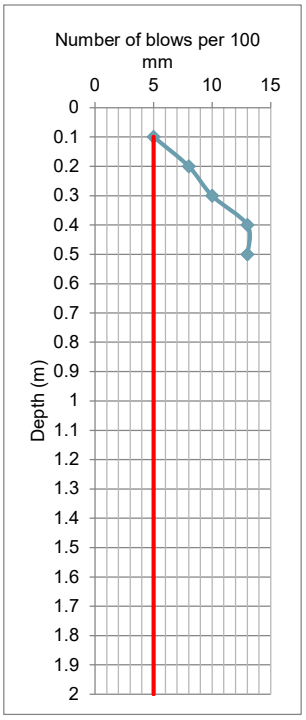
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 15

Stage number:	2
Approx ground surface elevation:	353
Filled ground thickness range:	0 m
Excavated ground depth range:	0 - 3.0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal (10+ blows for 300 mm).

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP49	6-Feb-24	IE

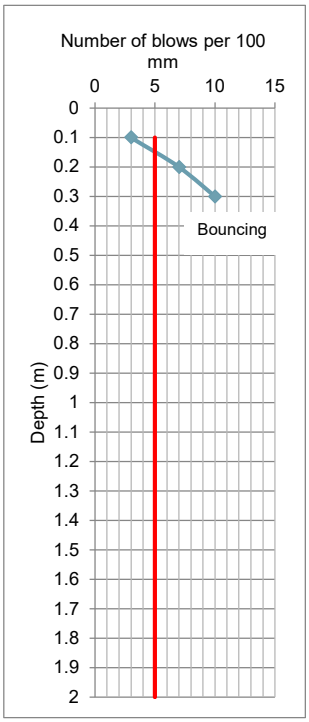


Summary of Foundation Information: Lot 16

Stage number:	2
Approx ground surface elevation:	353.5
Filled ground thickness range:	0 - 1.0 m
Excavated ground depth range:	0 - 2.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal (10+ bouncing).

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP50	6-Feb-24	IE



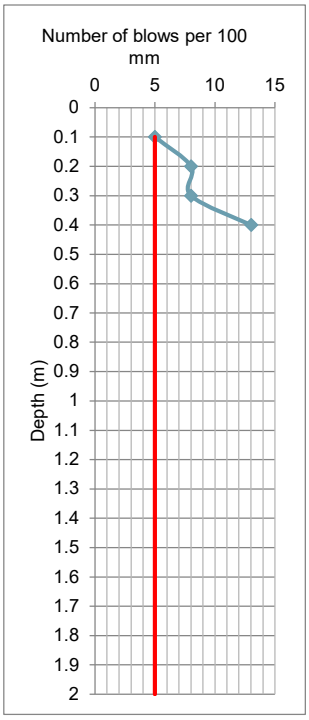
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 17

Stage number:	2
Approx ground surface elevation:	354
Filled ground thickness range:	0 - 1.5 m
Excavated ground depth range:	0 - 1.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP51	6-Feb-24	IE

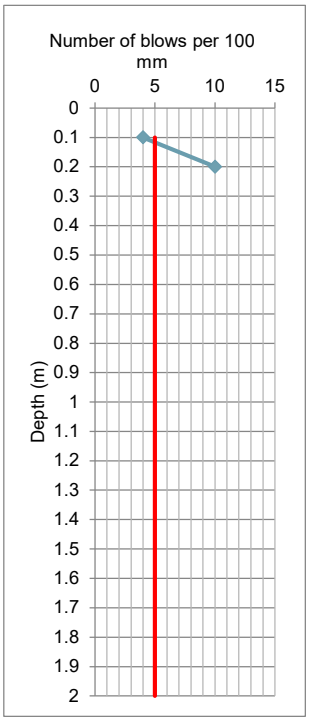


Summary of Foundation Information: Lot 18

Stage number:	2
Approx ground surface elevation:	354.5
Filled ground thickness range:	0 - 1.5 m
Excavated ground depth range:	0 - 1.0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal (10+ bounding).

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP52	6-Feb-24	IE



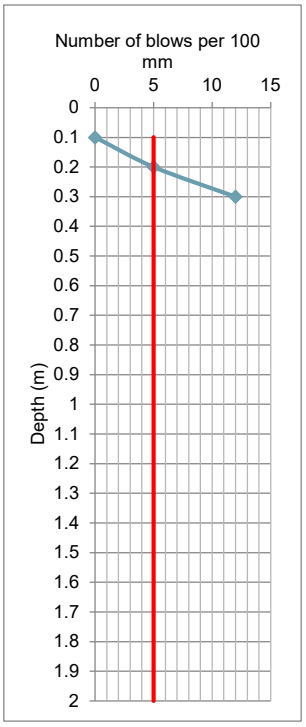
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 19

Stage number:	2
Approx ground surface elevation:	355
Filled ground thickness range:	0 - 1.5 m
Excavated ground depth range:	0 - 0.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal (10+ bounding)

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP53	6-Feb-24	IE

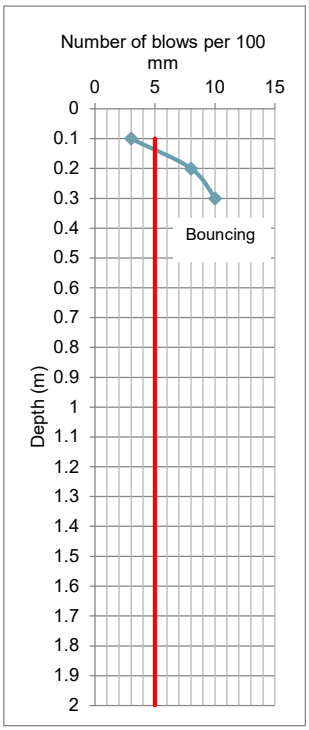


Summary of Foundation Information: Lot 20

Stage number:	2
Approx ground surface elevation:	355.5
Filled ground thickness range:	0 - 1.5 m
Excavated ground depth range:	0 - 1.0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback to be 4.5 m at the northern boundary (or 1 m from the northern batter crest) or specific foundation design
Additional comments:	Scala test termination due to effective refusal (10+ bounding).

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP54	6-Feb-24	IE



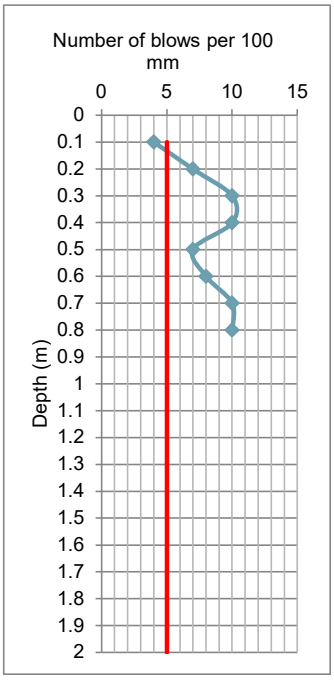
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 22

Stage number:	1
Approx ground surface elevation:	345
Filled ground thickness range:	0 - 1.5 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal (10+)

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP81	15-Feb-24	IE

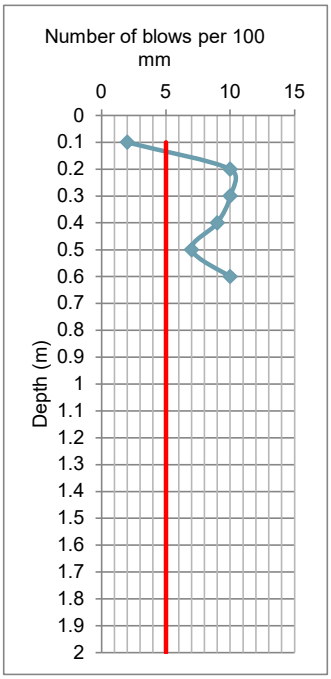


Summary of Foundation Information: Lot 23

Stage number:	1
Approx ground surface elevation:	346.5
Filled ground thickness range:	1.5 - 2.5 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal (10+).

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP80	15-Feb-24	IE



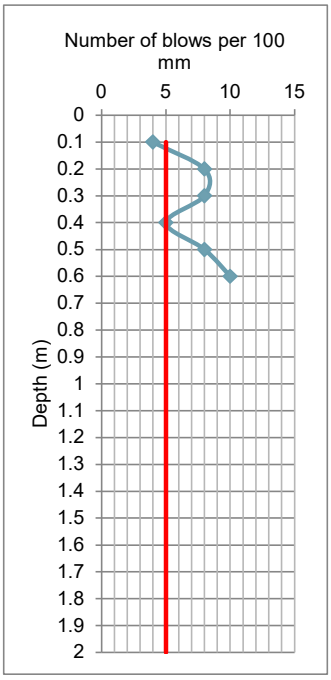
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 24

Stage number:	1
Approx ground surface elevation:	347
Filled ground thickness range:	0 - 2.0 m
Excavated ground depth range:	0 - 0.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal (10+)

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP79	15-Feb-24	IE

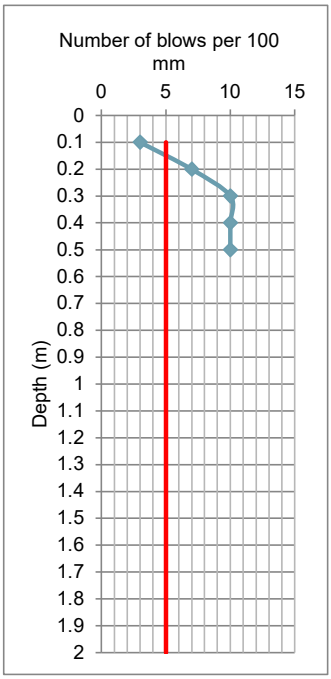


Summary of Foundation Information: Lot 25

Stage number:	1
Approx ground surface elevation:	347.5 - 348
Filled ground thickness range:	0 m
Excavated ground depth range:	0.5 - 3.0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal (10 blows for 300 mm).

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP78	15-Feb-24	IE



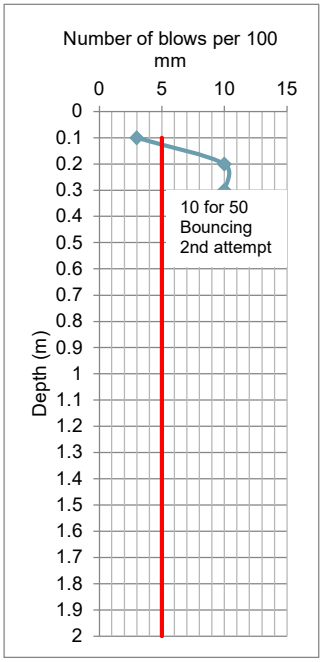
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 26

Stage number:	1
Approx ground surface elevation:	348
Filled ground thickness range:	0 m
Excavated ground depth range:	2.0 - 3.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal (10+ for 50mm). Two test locations attempted.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP65	13-Feb-24	IE

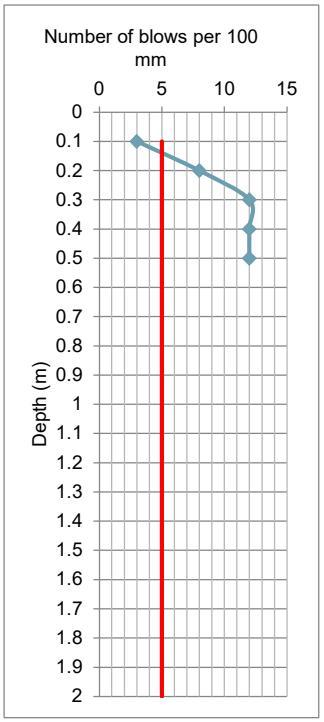


Summary of Foundation Information: Lot 27

Stage number:	1
Approx ground surface elevation:	351
Filled ground thickness range:	0 - 0.5 m
Excavated ground depth range:	0.5 - 2.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback 2.5 m at the eastern boundary or specific foundation design.
Additional comments:	Scala test termination due to effective refusal (10+ blows for 300 mm).

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP76	15-Feb-24	IE



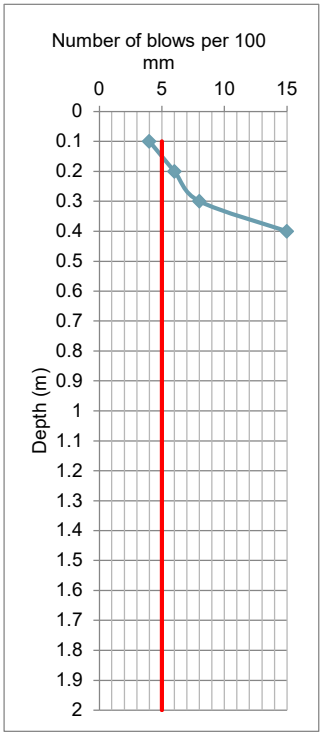
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 28

Stage number:	1
Approx ground surface elevation:	350.5
Filled ground thickness range:	1.0 - 4.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback 2.5 m at the eastern boundary or specific foundation design.
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP77	15-Feb-24	IE

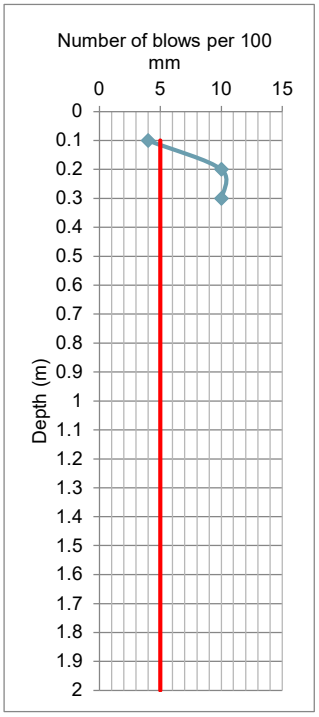


Summary of Foundation Information: Lot 29

Stage number:	1
Approx ground surface elevation:	350
Filled ground thickness range:	4.0 - 6.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Set Back requirements:	Min setback 3.0 m at the eastern boundary or specific foundation design.
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP86	15-Feb-24	IE



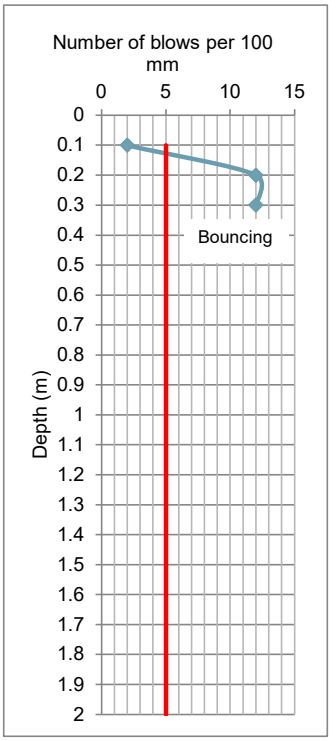
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 30

Stage number:	1
Approx ground surface elevation:	349.5
Filled ground thickness range:	4.0 - 6.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Set Back requirements:	Min setback 3.0 m at the eastern boundary or specific foundation design.
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP85	15-Feb-24	IE

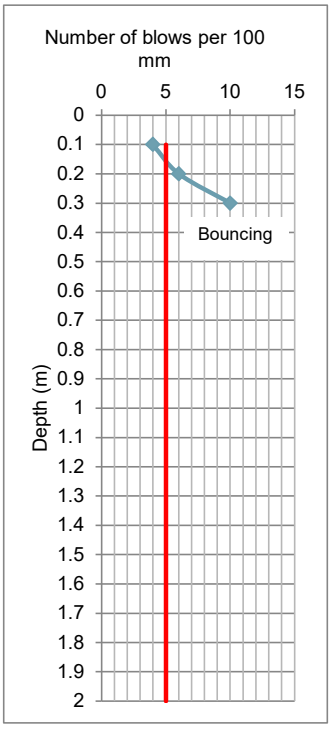


Summary of Foundation Information: Lot 31

Stage number:	1
Approx ground surface elevation:	349
Filled ground thickness range:	1.0 - 5.5 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	Min setback 2.5 m at the eastern and 2.0 m at the southern boundary or specific foundation design.
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP84	15-Feb-24	IE



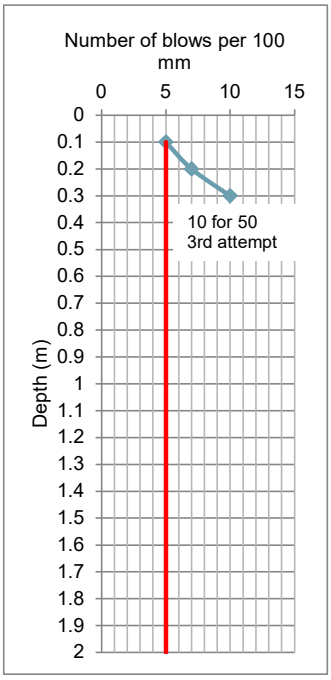
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 32

Stage number:	1
Approx ground surface elevation:	346.5
Filled ground thickness range:	0 - 3.0 m
Excavated ground depth range:	0 - 2.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal (10+ blows for 50 mm). Three tests attempted.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP83	15-Feb-24	IE

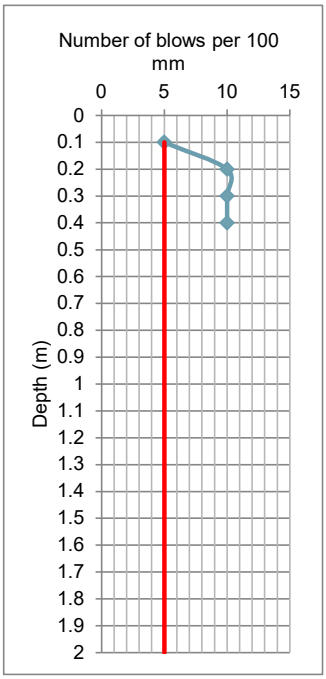


Summary of Foundation Information: Lot 33

Stage number:	1
Approx ground surface elevation:	346
Filled ground thickness range:	0 - 3.5 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal (10+ blows for 300 mm).

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP82	15-Feb-24	IE



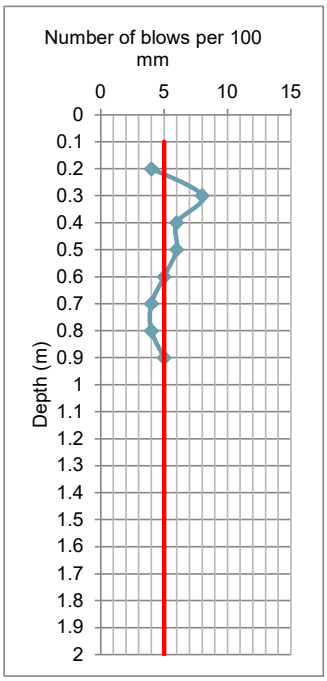
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 34

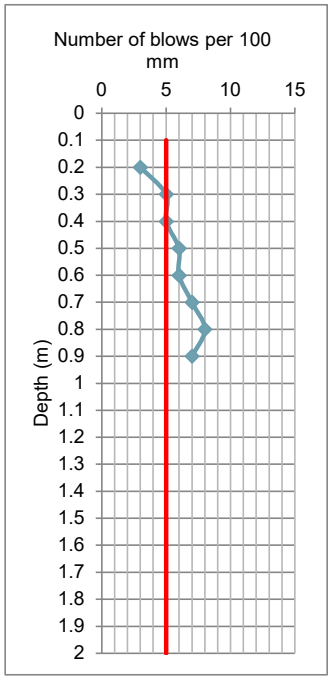
Stage number:	1	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	348.5 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	3.5 - 5 m		
		Additional comments:	Scala test results recorded below topsoil.

Scala Penetrometer tests

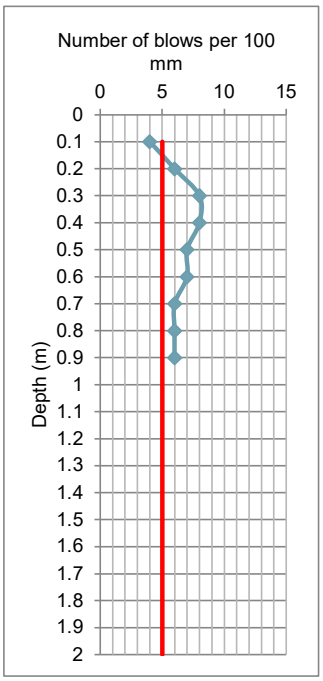
Test #:	Date:	Tested by:
SP108	28-Feb-24	IE



Test #:	Date:	Tested by:
SP109	28-Feb-24	IE



Test #:	Date:	Tested by:
SP110	28-Feb-24	IE



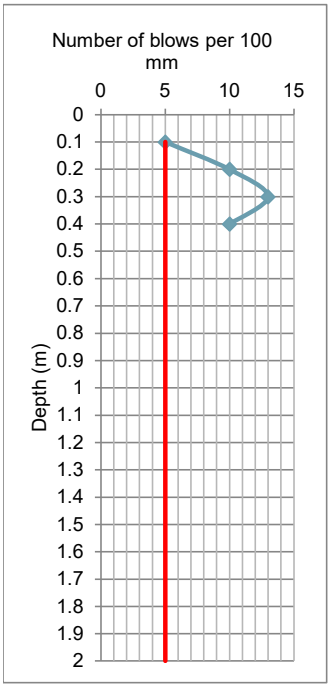
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 35

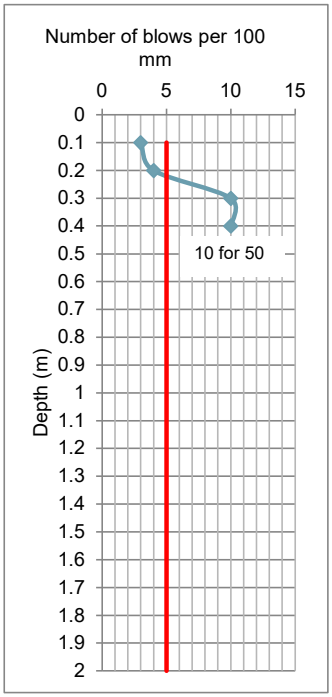
Stage number:	1	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	350.5 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 - 1.0m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	0 - 4 m	Additional comments:	NIL

Scala Penetrometer tests

Test #:	Date:	Tested by:
SP92	28-Feb-24	IE



Test #:	Date:	Tested by:
SP238	14-Jan-25	IE



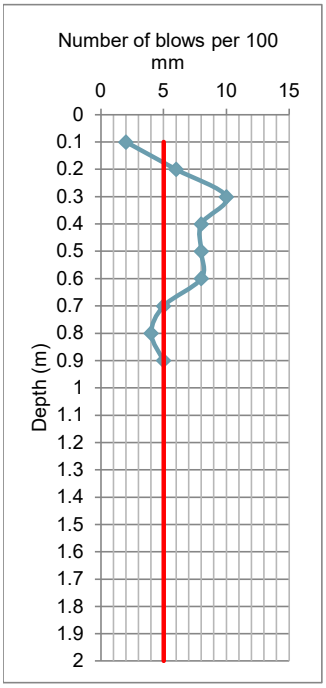
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 36

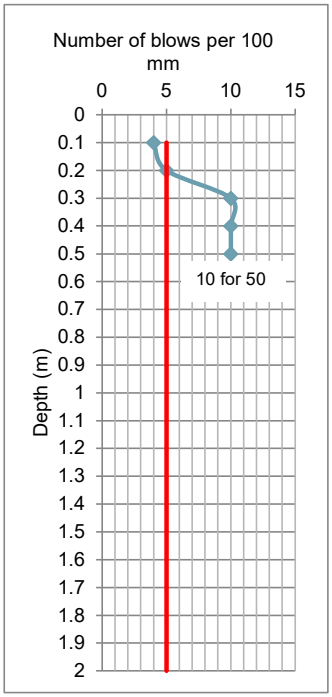
Stage number:	1	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	350.5 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 - 0.5 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	0 - 4.5 m	Additional comments:	NIL

Scala Penetrometer tests

Test #:	Date:	Tested by:
SP93	21-Feb-24	IE



Test #:	Date:	Tested by:
SP239	14-Jan-25	IE



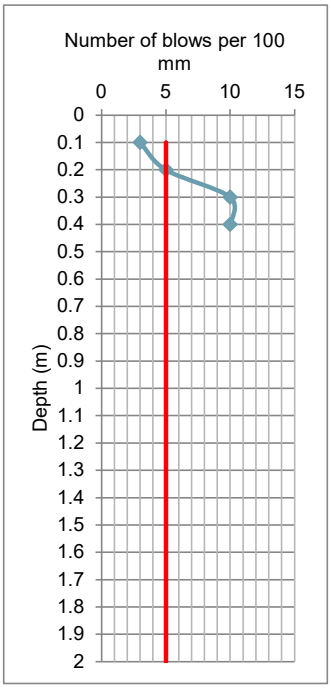
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 37

Stage number:	1
Approx ground surface elevation:	350.5
Filled ground thickness range:	1.0 - 5.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP94	21-Feb-24	IE

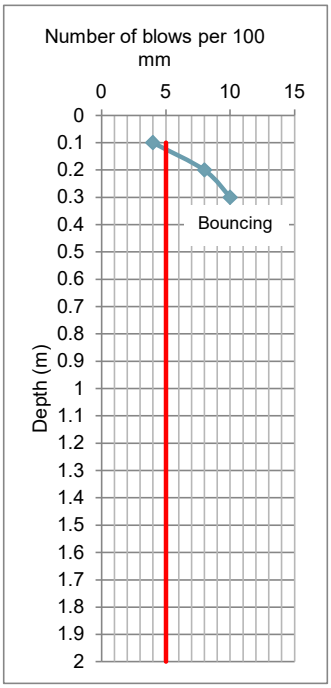


Summary of Foundation Information: Lot 38

Stage number:	1
Approx ground surface elevation:	350.5 m
Filled ground thickness range:	5.0 - 6.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP95	21-Feb-24	IE



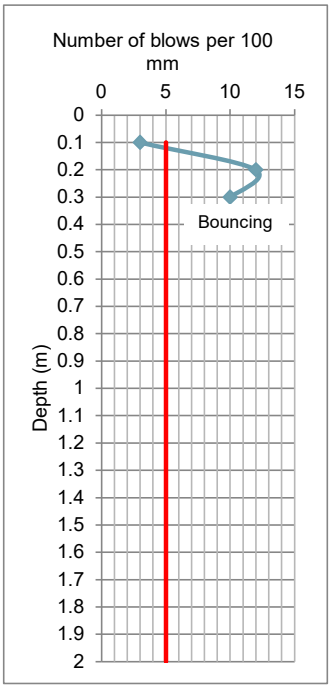
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 39

Stage number:	1
Approx ground surface elevation:	351 m
Filled ground thickness range:	4.0 - 6.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP96	21-Feb-24	IE

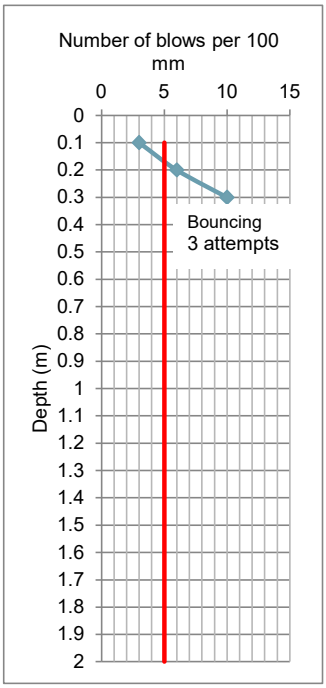


Summary of Foundation Information: Lot 40

Stage number:	1
Approx ground surface elevation:	351 m
Filled ground thickness range:	0.5 - 4.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal. Three locations attempted.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP97	21-Feb-24	IE



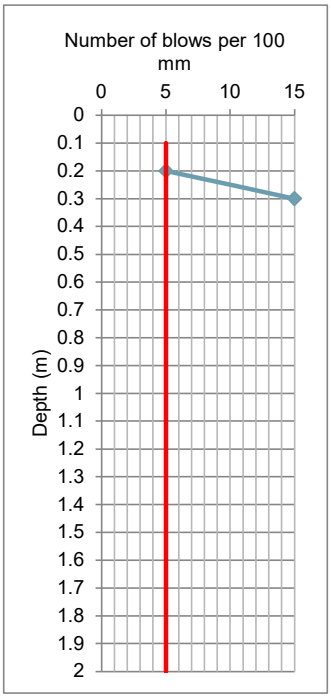
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 41

Stage number:	1
Approx ground surface elevation:	352 m
Filled ground thickness range:	0 - 2.0 m
Excavated ground depth range:	0 - 2.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP107	28-Feb-24	IE

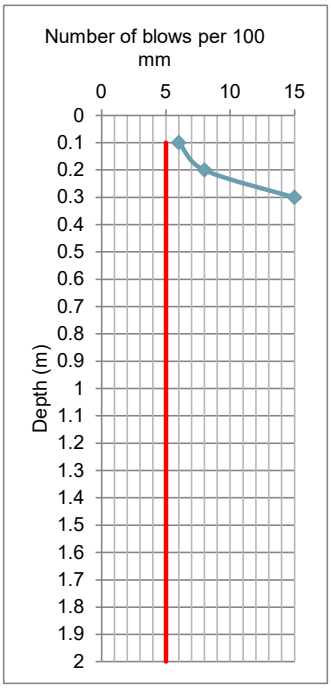


Summary of Foundation Information: Lot 42

Stage number:	2
Approx ground surface elevation:	352.5 m
Filled ground thickness range:	0 - 4.5 m
Excavated ground depth range:	0 - 0.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP66	13-Feb-24	IE



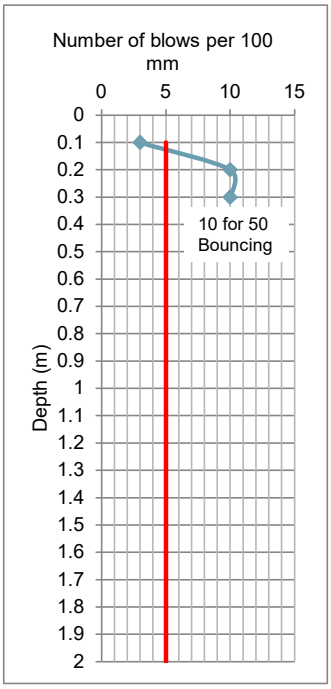
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 43

Stage number:	2
Approx ground surface elevation:	352.5 m
Filled ground thickness range:	4.0 - 6.5 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP67	13-Feb-24	IE

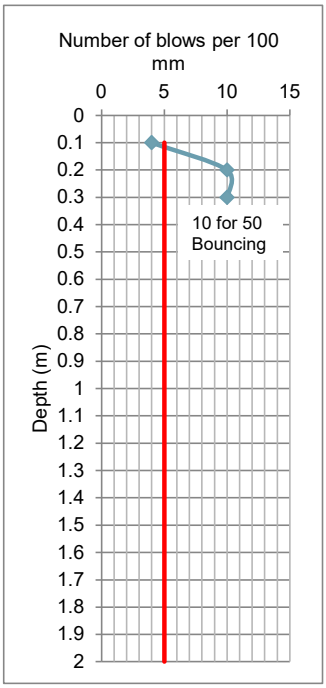


Summary of Foundation Information: Lot 44

Stage number:	2
Approx ground surface elevation:	353 m
Filled ground thickness range:	5.0 - 7.5 m
Excavated ground depth range:	0 - 0.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP68	13-Feb-24	IE



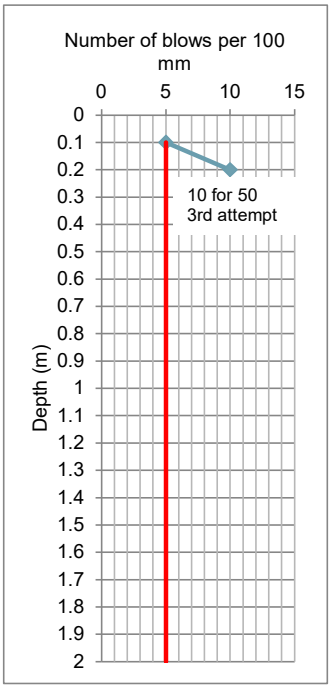
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 45

Stage number:	2
Approx ground surface elevation:	353 m
Filled ground thickness range:	2.0 - 7.5 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal. Three locations attempted.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP69	13-Feb-24	IE

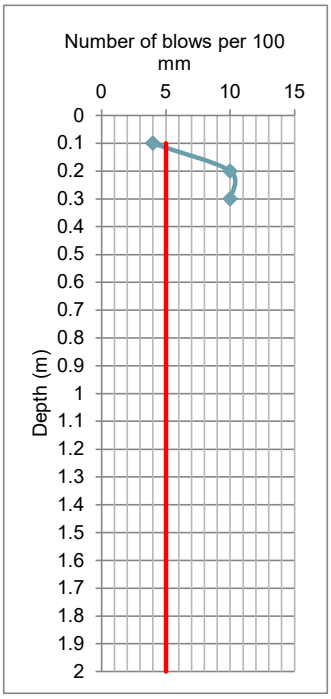


Summary of Foundation Information: Lot 46

Stage number:	2
Approx ground surface elevation:	352.5 m
Filled ground thickness range:	0 - 5.5 m
Excavated ground depth range:	0 - 1.0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP90	21-Feb-24	IE



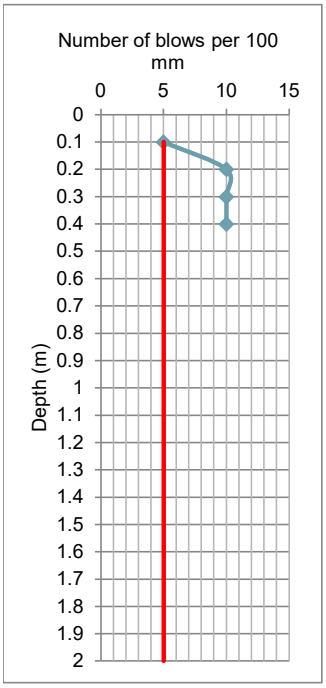
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 47

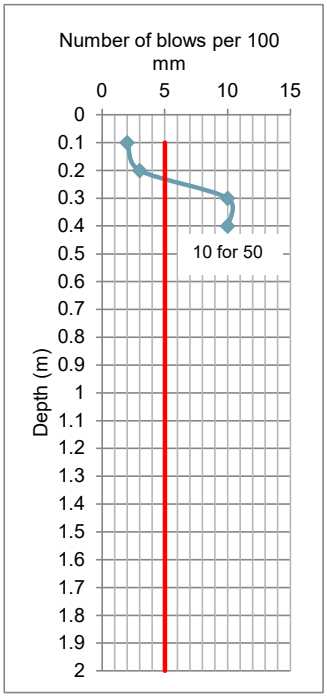
Stage number:	2	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	352 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 - 2.0 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	0 - 2.0 m	Additional comments:	NIL

Scala Penetrometer tests

Test #:	Date:	Tested by:
SP114	28-Feb-24	IE



Test #:	Date:	Tested by:
SP240	14-Jan-25	IE



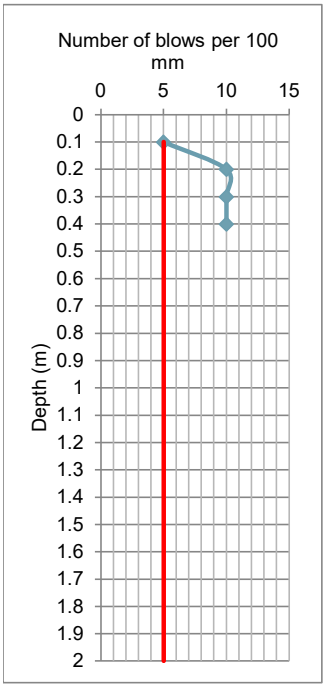
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 48

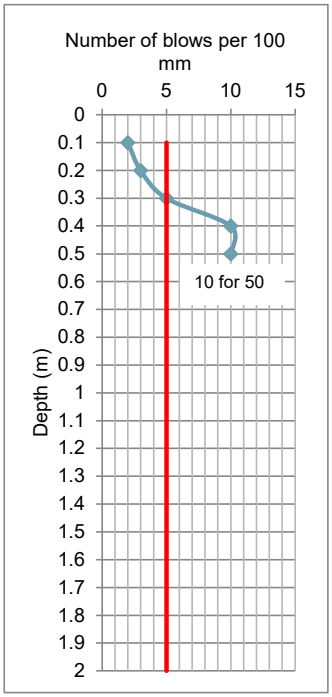
Stage number:	2	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	351.5 - 352 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	0.5 - 3 m	Additional comments:	NIL

Scala Penetrometer tests

Test #:	Date:	Tested by:
SP114	28-Feb-24	IE



Test #:	Date:	Tested by:
SP241	14-Jan-25	IE



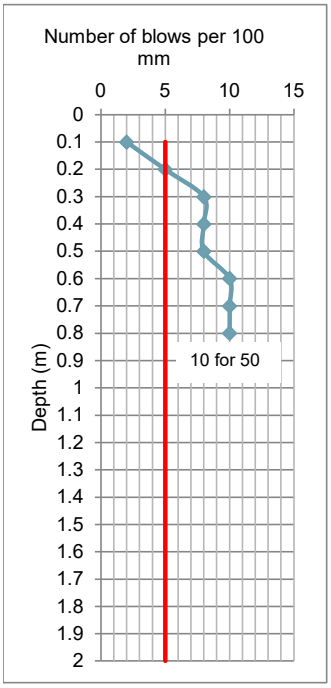
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 49

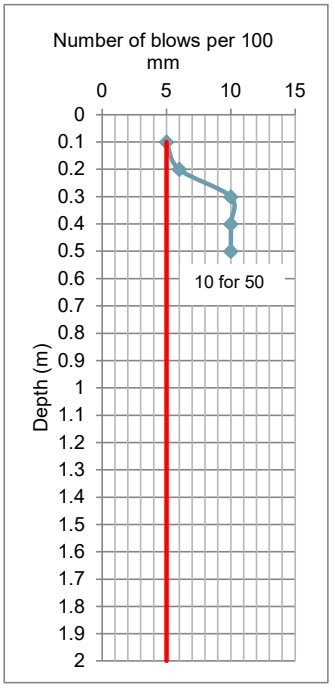
Stage number:	2	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	350.5 - 351 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	0.5 - 3 m	Additional comments:	NIL

Scala Penetrometer tests

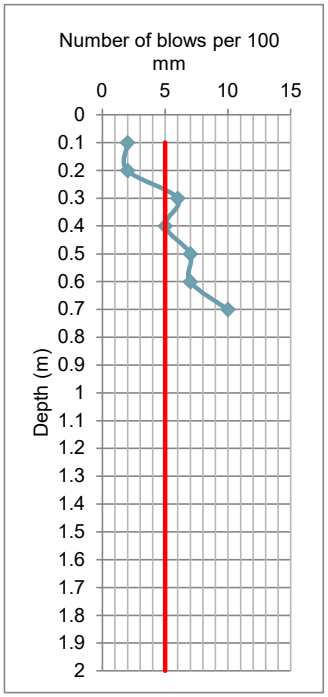
Test #:	Date:	Tested by:
SP112	28-Feb-24	IE



Test #:	Date:	Tested by:
SP113	28-Feb-24	IE



Test #:	Date:	Tested by:
SP181	2-May-24	IE



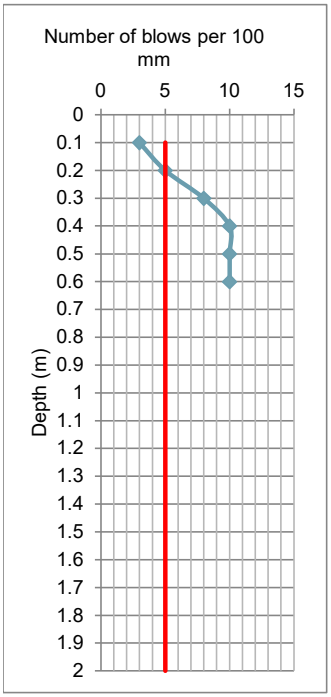
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 50

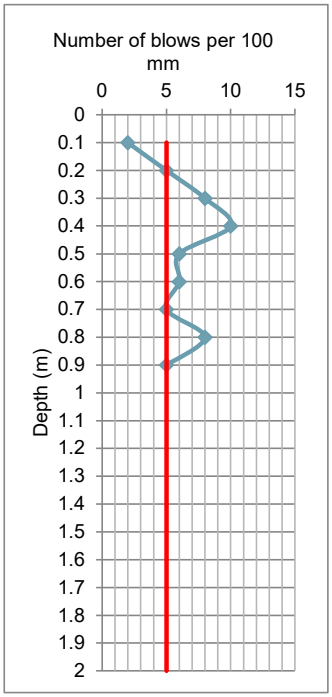
Stage number:	1	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	350.5 - 351 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0.5 - 2 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	0.5 - 2 m	Additional comments:	NIL

Scala Penetrometer tests

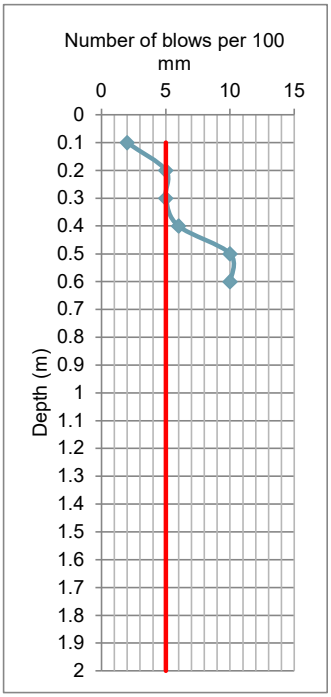
Test #:	Date:	Tested by:
SP179	2-May-24	IE



Test #:	Date:	Tested by:
SP180	2-May-24	IE



Test #:	Date:	Tested by:
SP182	2-May-24	IE



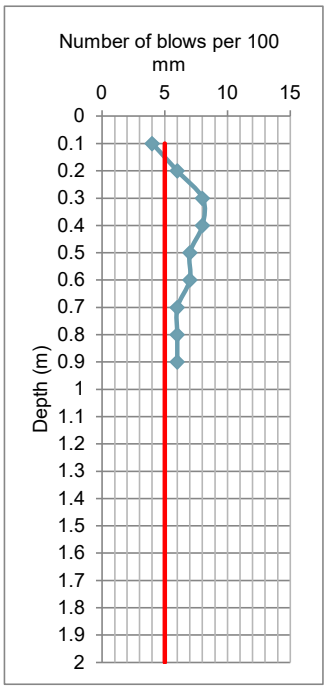
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 51

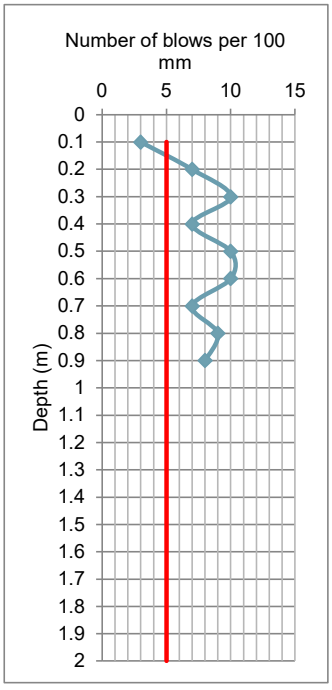
Stage number:	1	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	348.5 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	1.5 - 4 m	Additional comments:	NIL

Scala Penetrometer tests

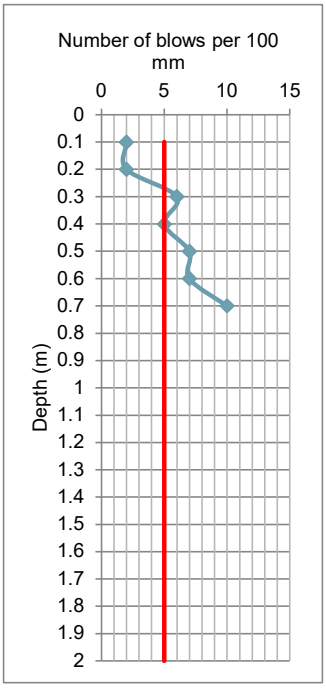
Test #:	Date:	Tested by:
SP110	28-Feb-24	IE



Test #:	Date:	Tested by:
SP111	28-Jun-24	IE



Test #:	Date:	Tested by:
SP181	2-May-24	IE



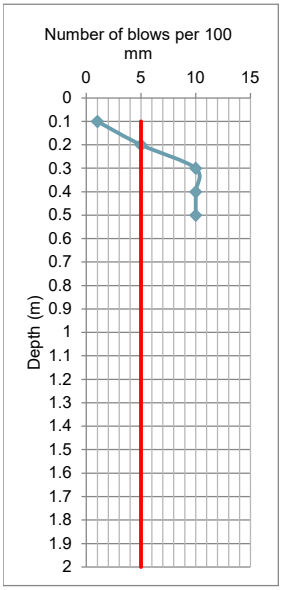
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 52

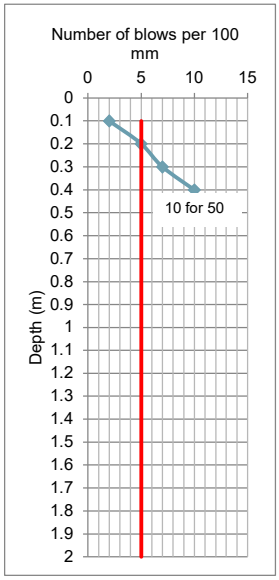
Stage number:	2	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	351.5 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	1.0 - 5.5 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	0 m	Additional comments:	Nil

Scala Penetrometer tests

Test #:	Date:	Tested by:
SP175	1-May-24	IE



Test #:	Date:	Tested by:
SP142	20-Mar-24	IE



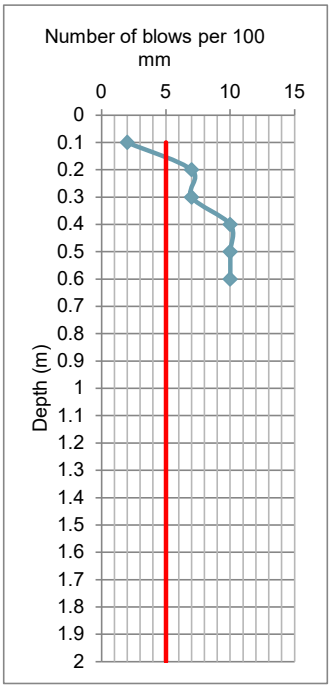
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 53

Stage number:	2
Approx ground surface elevation:	352 - 532.5 m
Filled ground thickness range:	1.5 - 5.5 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal. (30 blows for 300 mm)

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP174	1-May-24	IE

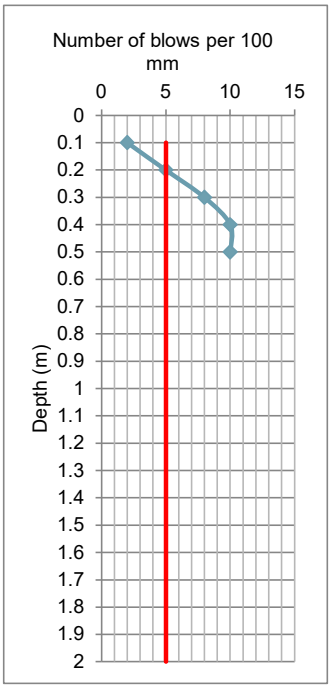


Summary of Foundation Information: Lot 54

Stage number:	2
Approx ground surface elevation:	353 - 353.5 m
Filled ground thickness range:	2.5 - 7.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP184	2-May-24	IE



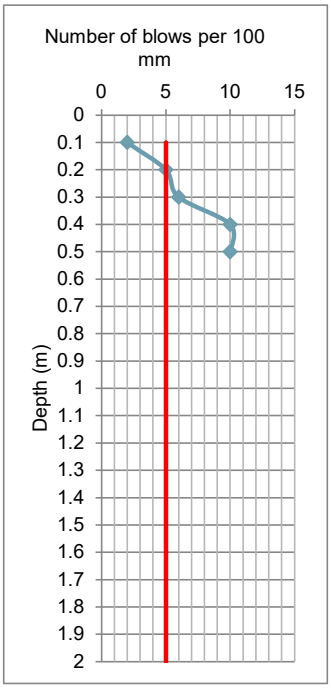
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 55

Stage number:	2
Approx ground surface elevation:	353.5 m
Filled ground thickness range:	0.5 - 4.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal. (10 blows for 50 mm)

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP183	2-May-24	IE

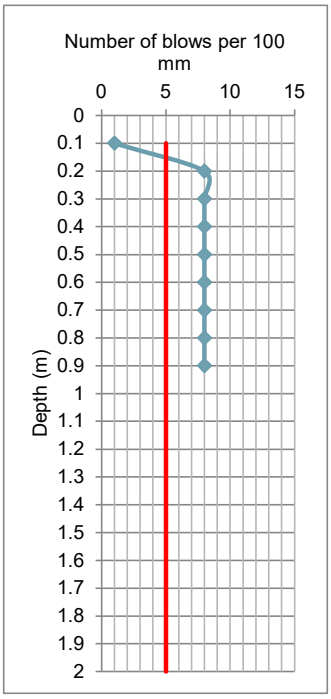


Summary of Foundation Information: Lot 56

Stage number:	2
Approx ground surface elevation:	352.5 m
Filled ground thickness range:	0 - 1.5 m
Excavated ground depth range:	0 - 1.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	NIL

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP173	1-May-24	IE



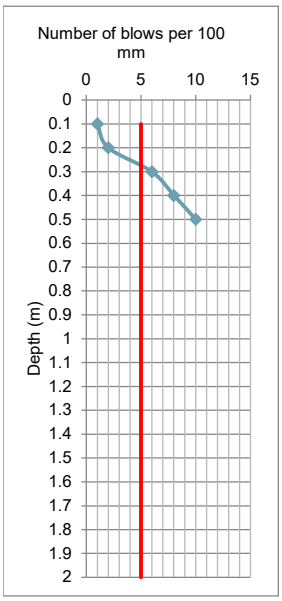
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 57

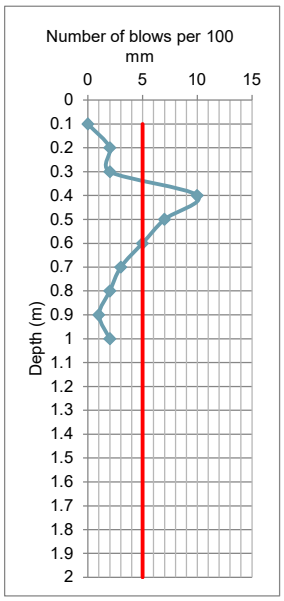
Stage number:	2	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	353 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 - 1.0 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	0 - 2.0 m	Additional comments:	Wet conditions when tested on 2 May 2024. SP140, SP171 & SP172 completed in excavated ground. SP141 & SP170 completed in filled ground.

Scala Penetrometer tests

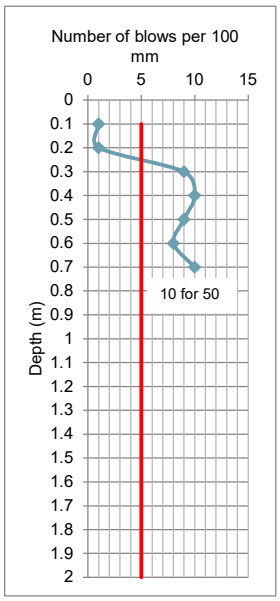
Test #:	Date:	Tested by:
SP170	2-May-24	IE



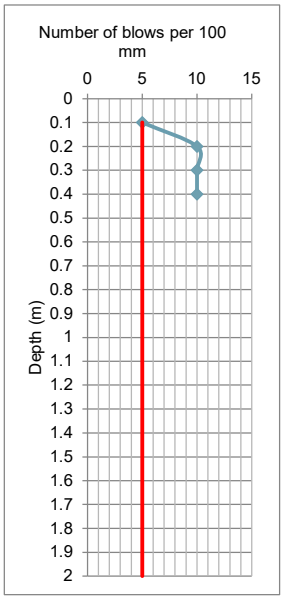
Test #:	Date:	Tested by:
SP171	2-May-24	IE



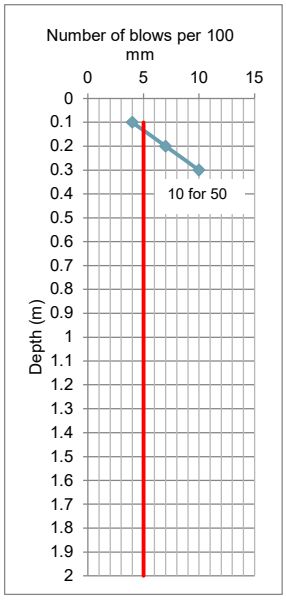
Test #:	Date:	Tested by:
SP172	2-May-24	IE



Test #:	Date:	Tested by:
SP140	20-Mar-24	IE



Test #:	Date:	Tested by:
SP141	20-Mar-24	IE



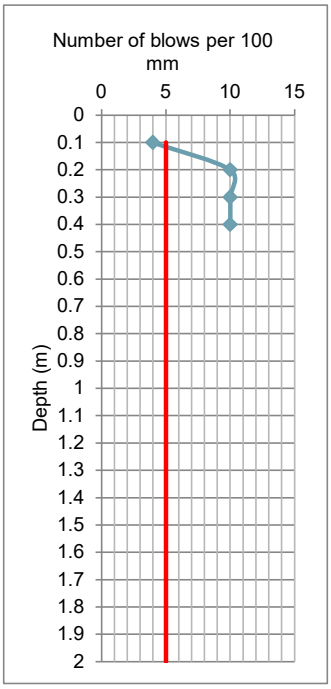
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 58

Stage number:	2
Approx ground surface elevation:	353.5 m
Filled ground thickness range:	0 - 0.5 m
Excavated ground depth range:	0 - 2.0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal. (10 blows for 50 mm)

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP100	21-Feb-24	IE

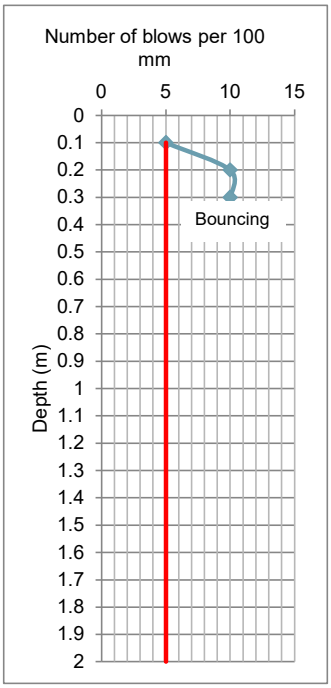


Summary of Foundation Information: Lot 59

Stage number:	2
Approx ground surface elevation:	353.5 m
Filled ground thickness range:	0 - 1.5 m
Excavated ground depth range:	0 - 1.0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP99	21-Feb-24	IE



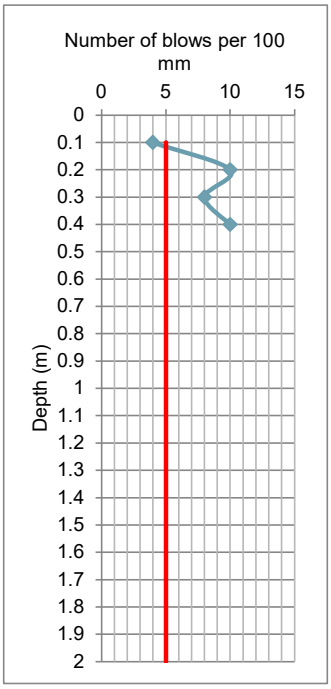
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 60

Stage number:	2
Approx ground surface elevation:	353.5 m
Filled ground thickness range:	1.0 - 4.5 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP98	21-Feb-24	IE

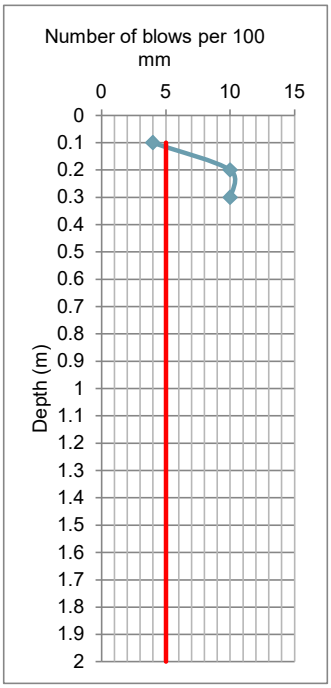


Summary of Foundation Information: Lot 61

Stage number:	2
Approx ground surface elevation:	353.5 - 354 m
Filled ground thickness range:	2.0 - 5.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP70	13-Feb-24	IE



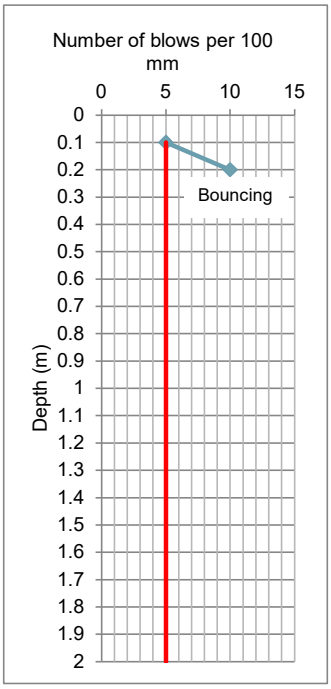
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 62

Stage number:	2
Approx ground surface elevation:	353.5 - 354 m
Filled ground thickness range:	5.0 - 6.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP71	13-Feb-24	IE

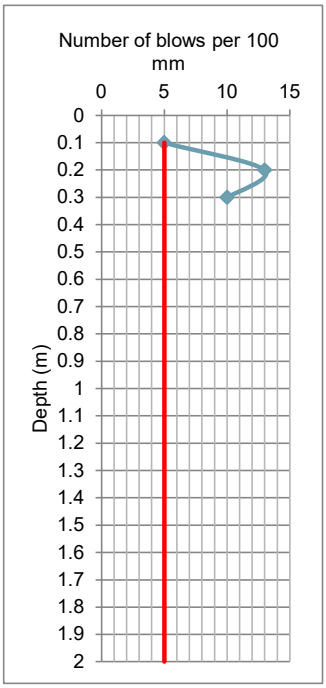


Summary of Foundation Information: Lot 63

Stage number:	2
Approx ground surface elevation:	354.5 m
Filled ground thickness range:	2.0 - 5.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP72	13-Feb-24	IE



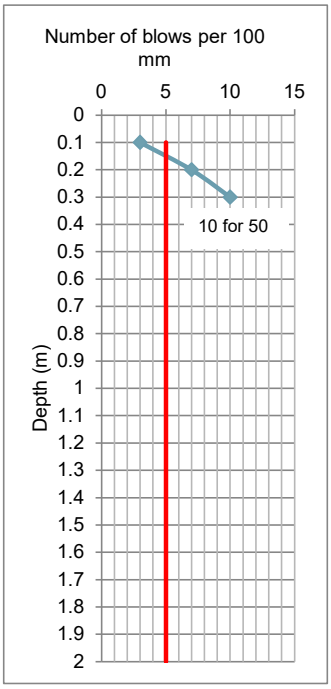
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 77

Stage number:	2
Approx ground surface elevation:	353 m
Filled ground thickness range:	5.5 - 7.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal. (10 blows for 50 mm)

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP178	1-May-24	IE

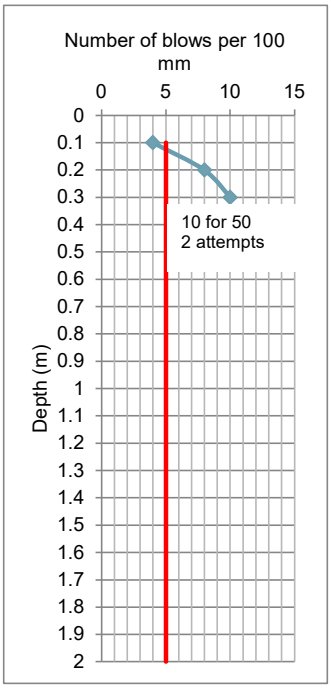


Summary of Foundation Information: Lot 78

Stage number:	2
Approx ground surface elevation:	352.5 m
Filled ground thickness range:	5.5 - 7.5 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal. Two locations attempted.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP177	1-May-24	IE



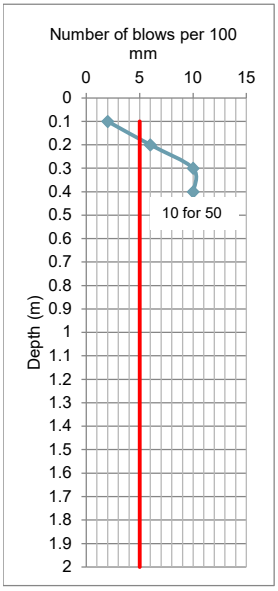
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 79

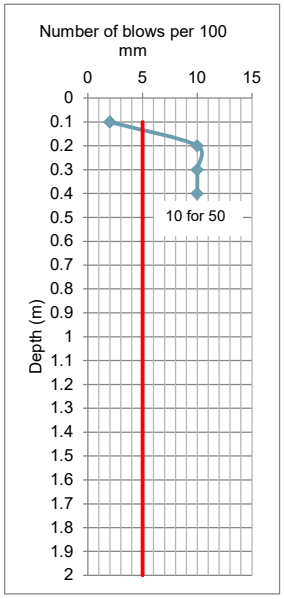
Stage number:	2	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	352 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	4.0 - 7.0 m	Geotechnical Set Back requirements:	No specific requirements
Excavated ground depth range:	0 m	Additional comments:	Nil

Scala Penetrometer tests

Test #:	Date:	Tested by:
SP176	1-May-24	IE



Test #:	Date:	Tested by:
SP136	15-Mar-24	IE



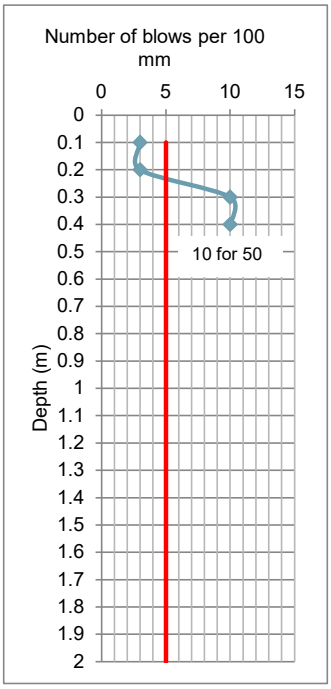
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 356

Stage number:	2
Approx ground surface elevation:	346 m
Filled ground thickness range:	0 - 2.0 m
Excavated ground depth range:	0 - 0.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal. (10 blows for 50 mm)

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP202	########	IE

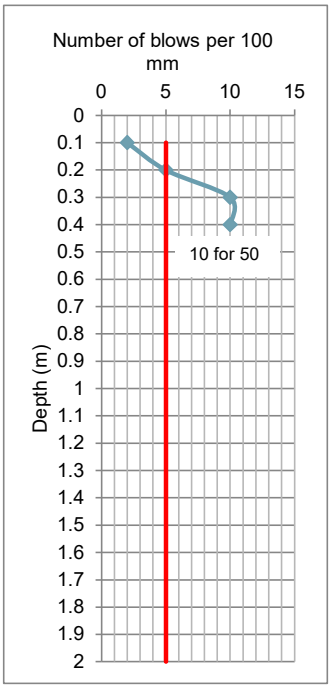


Summary of Foundation Information: Lot 357

Stage number:	2
Approx ground surface elevation:	345 - 345.5 m
Filled ground thickness range:	0 - 1.5 m
Excavated ground depth range:	0 - 0.5 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP203	########	IE



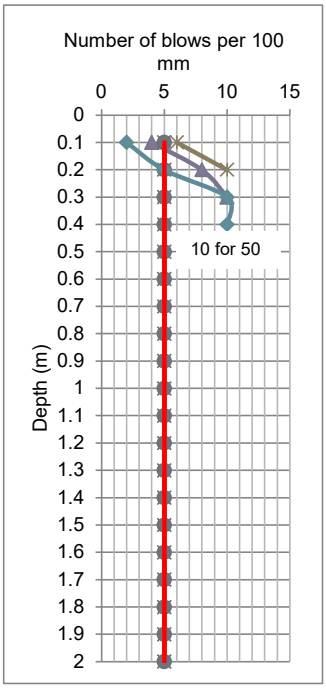
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 358

Stage number:	2
Approx ground surface elevation:	345 - 345.5 m
Filled ground thickness range:	0.5 - 2.5 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal. (10 blows for 50 mm)

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP204/163	########	IE

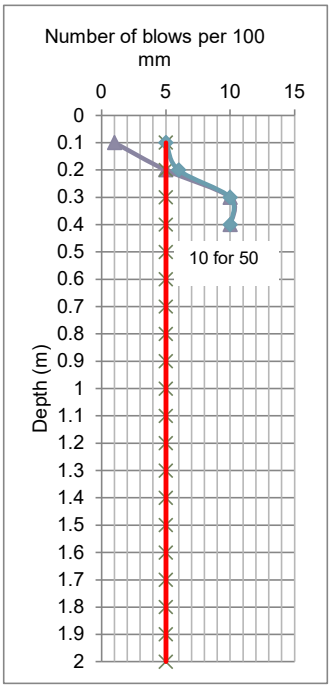


Summary of Foundation Information: Lot 359

Stage number:	2
Approx ground surface elevation:	345 - 345.5 m
Filled ground thickness range:	0.5 - 2.5 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP205/162	########	IE



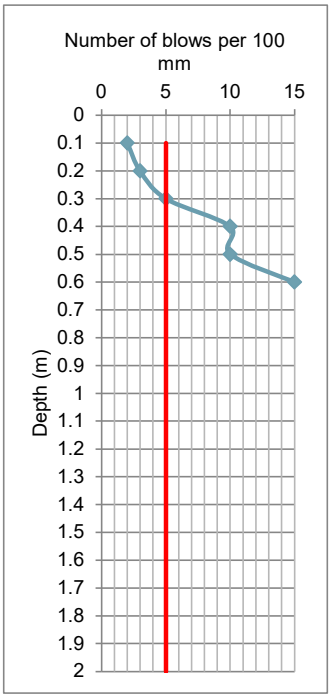
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 383

Stage number:	2
Approx ground surface elevation:	346.5 m
Filled ground thickness range:	1.0 - 2.5 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal. (10 blows for 50 mm)

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP201	########	IE

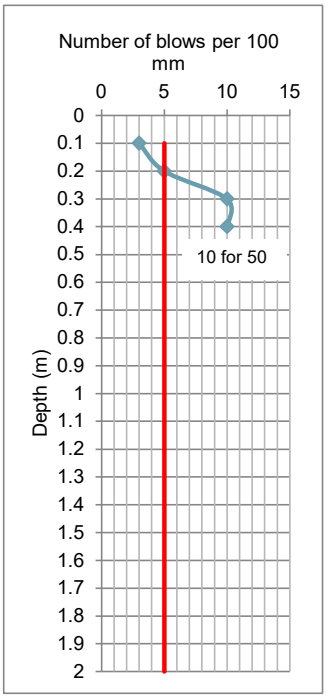


Summary of Foundation Information: Lot 384

Stage number:	2
Approx ground surface elevation:	348 m
Filled ground thickness range:	4.0 - 5.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP200	########	IE



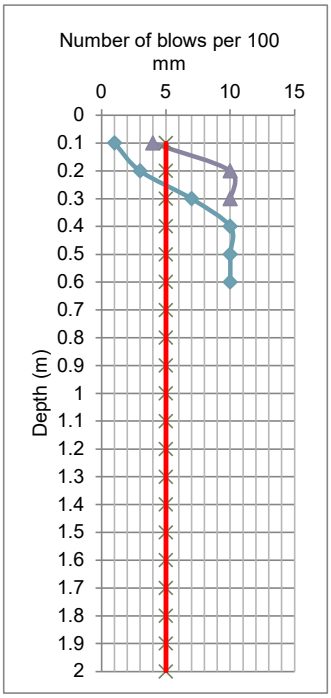
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 385

Stage number:	2
Approx ground surface elevation:	349.5 m
Filled ground thickness range:	5.0 - 6.0 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal. (10 blows for 50 mm)

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP199/130	########	IE

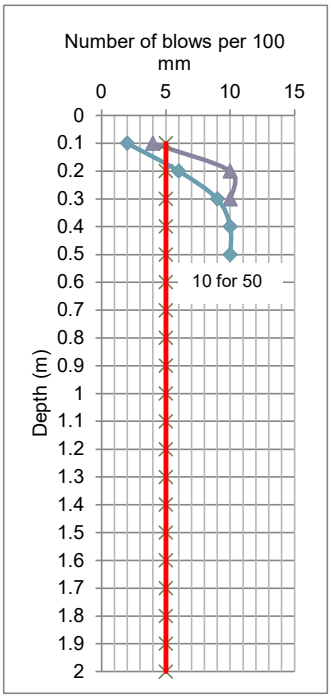


Summary of Foundation Information: Lot 386

Stage number:	2
Approx ground surface elevation:	350.5 m
Filled ground thickness range:	5.5 - 6.5 m
Excavated ground depth range:	0 m
Geotechnical ultimate bearing capacity:	300 kPa
Foundation type:	Standard NZS3604:2011
Geotechnical Set Back requirements:	No specific requirements
Additional comments:	Scala test termination due to effective refusal.

Scala Penetrometer Tests

Test #:	Date:	Tested by:
SP198/125	########	IE



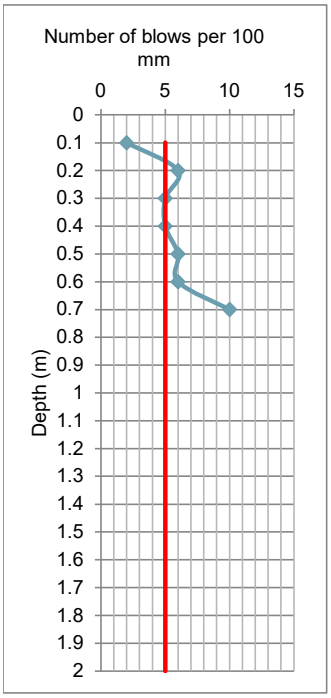
Pembroke Heights Subdivision, Wanaka

Summary of Foundation Information: Lot 397

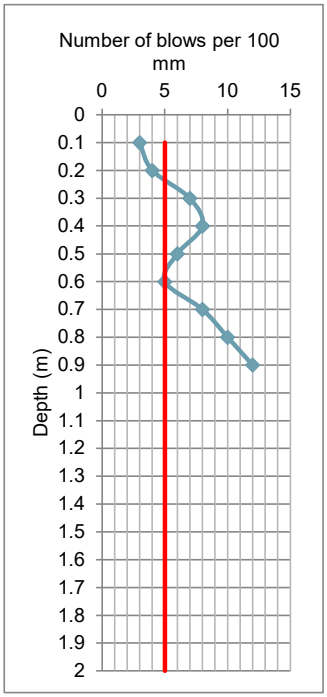
Stage number:	1	Geotechnical ultimate bearing capacity:	300 kPa
Ground surface elevation:	342 - 344.5 m	Foundation type:	NZS3604:2011
Filled ground thickness range:	0 - 1.5m	Geotechnical Setback requirements:	No specific requirements
Excavated ground depth range:	0 - 0.5 m	Additional comments:	Specific engineering advice is recommended if further earthworks are planned.

Scala Penetrometer tests

Test #:	Date:	Tested by:
SP214	########	IE



Test #:	Date:	Tested by:
SP218	5-Jun-24	IE



Test #:	Date:	Tested by:
SP225	7-Nov-24	IE