Geotechnical Completion Report

Millwater Arran Hills Precinct 6 – Stage 3

WFH Properties Limited

Reference: 773-AKLGE206639-CK

22 August 2025

MILLWATER ARRAN HILLS RESIDENTIAL SUBDIVISION, PRECINCT 6, STAGE 3

Geotechnical Completion Report

Report reference number: 773-AKLGE206639-CK

8 August 2025

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This Geotechnical Completion Report presents all supporting geotechnical data, Woods Limited as-built plans, and our Suitability Statement in relation to land development works undertaken to form Stage 3 of the Millwater Arran Hills Precinct 6 residential subdivision.

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

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

For and on behalf of Tetra Tech Coffey

Stephen Parkes

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QUALITY INFORMATION

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Revision	Description	Date	Author	Reviewer	Approver
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The professional opinion contained within this report is furnished to Auckland Council and WFH Properties Limited for their purposes alone on the express condition that it will not be relied upon by any other person. Prospective purchasers should satisfy themselves as to any specific conditions pertaining to their particular land interest.

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APPENDICES

1. INTRODUCTION

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

It contains Tetra Tech Coffey's Suitability Statement, relevant test data, and the Woods Limited as-built plan set relating to Stage 3 of the Millwater Arran Hills, Precinct 6 residential subdivision. The Woods Limited as-built plan set is listed below in Table 1.

Table 1: Schedule of Woods Limited Precinct 6 - Stage 3 Subdivision As-Built Plans

Title	Reference No.	Date
Final Surface As-built Plans	P22-437-03-1000-AB	15/08/2025
Cut and Fill As-built Plan – Sheet 1 of 3 – Original Topographic Surface to Lowest Surface	P22-437-03-1100-AB	11/08/2025
Cut and Fill As-built Plan – Sheet 2 of 3 - Lowest Surface to Final Surface	P22-437-03-1101-AB	11/08/2025
Cut and Fill As-built Plan – Sheet 3 of 3 - Original Topographic Surface to Final Surface	P22-437-03-1102-AB	11/08/2025
Subsoils As-Built Plan	P22-437-03-1200-AB	11/08/2025
Palisade Wall As-built Sheets 1 to 3	37600-00-1300 to 1302-AB	05/09/2022
Stormwater As-Built Plans	P22-437-03-3000 to 3003-AB	15/08/2025
Wastewater As-Builts	P22-437-00-4000 to 4004-AB	15/08/2025

The following Tetra Tech Coffey (formerly Coffey) and Woods Limited (Woods) Precinct 6 construction drawings, and Auckland Council Standard Details are presented in Appendix B for reference.

Table 2: Summary of Appended Reference Drawings

Title	Reference No.	Date
Tetra Tech Coffey Geotechnical Building Limitation Zone Plans	CK/001	04/08/2025
Tetra Tech Coffey Geotechnical Site Investigation Plan(1)	CK/002	08/08/2025
Tetra Tech Coffey Geotechnical Works Plan(2)	CK/003	07/08/2025
Tetra Tech Coffey Subsoil Drainage Standard Details Rev. C	AG/007	18/06/2021
Tetra Tech Coffey Undercut Detail Plan Rev. D	AG/008	27/09/2022
Coffey Reinforced Earth Slope Fill Batter Design Detail Rev. D	AF/001	14/06/2022
Coffey Reinforced Earth Slope – Cut Batter Design Detail Rev. D	AF/002	14/06/2022
Tetra Tech Coffey Geotechnical Remediation Plan – Western Section Rev. B	AY/003	30/09/2021
PW805 Geotechnical Design Drawing Rev. C	AY/004	12/11/2021

Auckland Council Stormwater Pipe and Manhole Construction Clearance Requirements Rev. 3	AC-STD-SW22	17 January 2022
Watercare Pipe and Manhole Construction Clearance	WW26	04-12-2017
Watercare Building Close to or Over Local Network Wastewater	WW27	04-12-2017
Watercare Guideline for Building Close to or Over Transmission Wastewater	WW28	03-07-2018

Notes (relating to Table 2)

(1) Depicts Tetra Tech Coffey Geotechnical Investigation locations, carried out at the completion of Stage 3 subdivision works to assess ultimate bearing capacity, soil expansivity and topsoil depths on the completed lots.

(2) Depicts all geotechnical works carried out within the subdivision boundary.

This GCR covers the construction period April 2019 to July 2025 and is intended to be used for certification purposes for the following lots associated with subdivision consent SUB60446569:

- 21 residential lots numbered Lots 8 to 18 (inclusive) and Lots 52 to 61 (inclusive);
- One new section of public road named Skulander Crescent (previously Road 01); and
- One new Jointly Owned Access Lot (JOAL) numbered lot 507.

Stage 3 is bound by completed subdivision stages (Stages 2, 2A and 2B) to the north, an in progress subdivision stage (Stage 4) to the east, Goodson Scenic Reserve, a department of conservation owned lot comprising dense native bush to the south and public land adjoining State Highway 1 to the west.

The earthworks detailed and certified in this report were carried out under Resource Consents LUC60305555 and LUC60447131.

2. RELATED REPORTS

The following geotechnical reports have been prepared by Tetra Tech Coffey (formerly Coffey) for various aspects of the subdivision:

- 773-AKLGE204203-AA, dated 25 May 2017 – Geotechnical Investigation Report for Millwater Precinct 6;
- 773-AKLGE206639-AC Rev. 2, dated 29 November 2019 – Geotechnical Works Specification
- 773-AKLGE206639-AD Rev. 1, dated 24 October 2019 – Geotechnical Design Philosophy for Millwater Precinct 6;
- 773-AKLGE206639-AE Rev.1, dated 29 November 2019 – Geotechnical Design Report for Shear Key 2;
- 773-AKLGE206639-AF Rev.2, dated 11 May 2022 – Geotechnical Design Report for RE600 to RE603;
- 773-AKLGE206639-AG Rev. 1, dated 25 August 2020 – General Earthworks Design Report
- 773-AKLGE206639-AI, dated 9 December 2019 – Settlement Analysis Report;
- 773-AKLGE2066369-AN Rev.2, dated 13 May 2020 – Geotechnical Monitoring Protocol;
- 773-AKLGE206639-AY Rev. 1, dated 12 November 2021 – Geotechnical Design Report for Western Boundary;
- 773-AKLGE206639 NTE38, dated 15 October 2021 – Upper Gully 2 Additional Underfill Drainage;
- 773-AKLGE206639 NTE48, dated 1 February 2023 – Proposed Additional Counterfort Drain;
- 773-AKLGE206639-NTE49, dated 28 March 2023 – Benching of Western Fill Area Natural Slope
- 773-AKLGE206639 NTE52, dated 6 July 2023 - Expansive Soil Assessment

The following report was prepared by Tonkin and Taylor (T&T) to certify an enabling works package carried out prior to the main Precinct 6 contract commencing. These works partially encroach within the eastern boundary of Stage 3.

- 21854.0034/AHP6EW.v1, dated June 2019 – Millwater Precinct 6 Enabling Works Geotechnical Completion Report

3. CONSTRUCTION WORKS

3.1 PLANT

The main items of plant used by the contractor, Hick Bros. Civil Construction Limited, included:

- D8 Bulldozer and scoop
- D7 Bulldozer and scoop
- D6 Bulldozer and scoop
- Reticulated Dump Trucks
- 623 Motor scraper
- 36-tonne excavator
- 30-tonne excavator
- 20-tonne excavator
- 8-tonne excavator
- 5-tonne excavator
- 815 compactors
- Padfoot roller
- 25-tonne water truck
- Front-end loader
- Tractor and pulled discs

3.2 CONSTRUCTION PROGRAMME

3.2.1 Enabling Earthworks (March to November 2017)

Prior to commencement of the main bulk earthworks contract, an enabling earthworks package of work was completed between March and November 2017, under the supervision of Tonkin & Taylor(T&T). This work is detailed and certified in the T&T Geotechnical Completion Report referenced 21854.0034/AHP6EW.v1, dated June 2019.

In summary, the enabling earthworks carried out within Stage 3 and adjoining land involved:

- Stripping of vegetation and organic material; and
- Earthworks involving fill placement to depths of up to 6.5m.

Engineered fills placed as part of these works are certified in the T&T GCR.

3.2.2 Bulk Earthworks (April 2019 to October 2024)

Bulk Earthworks carried out under the main earthworks contract encompassing Stage 3 commenced in April 2019 with the stripping of topsoil and stockpiling of clay excavated from elsewhere on Precinct 6.

The stockpile placed that extended into Stage 3 was significant, consisting of volumes up to 40,000m^3. This remained in place for the majority of the first earthworks season (2019 to 2020), and helped to accelerate consolidation of the underlying natural soils.

Season 2 (2020-2021) involved cuts and fills the gradual removal of stockpiles over the lots, and the formation of the rear undercut surface of future RE602, including the fill and settlement within most of Stage 3 area.

To maintain suitable long-term factors of safety against global instability, a Shear Key (SK2) was constructed adjacent to the northern boundary of Stage 2B (the adjoining subdivision stage to the north of Stage 3). Construction of the shear key involved excavation of the overburden soils and upper 1m of the bedrock, which in doing-so simultaneously removed linear planes of weakness within the soil and rock on which slope failures can occur. The excavated material was replaced with drainage and engineered fill.

Construction of the shear key commenced in March 2020 and was progressed from east to west in 25m open sections (i.e. 25m excavated and fully backfilled prior to commencement of the following 25m section), eventually reaching completion at the northwest corner of Stage 2B in March 2023. The final sections of SK2 to be completed support the global Stage 3 landform.

Season 3 (2021-2022) initially involved the gradual removal of the Gully 2 stockpile, which was placed as fill elsewhere in Precinct 6. Upon complete removal of the stockpile, filling of the Stage 3 east area commenced. As the level of the fill was raised, more topsoil was progressively stripped from the existing gully flanks. Several groundwater springs were observed seeping from the natural ground in October 2021 as more of the fill area was opened up. These springs were intercepted with subsoil drainage installed beneath the fill. The subsoil drainage falls from south to north and discharges into the RE601 blanket drain downslope (as shown in appended drawing CK/003).

The western boundary of Stage 3, which adjoins publicly owned land adjacent to State Highway 1, was identified during previous geotechnical investigations to encompass historically unstable ground. For this reason, an in-ground pile (Palisade) wall, namely PW805, was prescribed to support a part of the Stage 3 western boundary. The wall involved installation of steel reinforced concrete piles at lateral centres of 1.5m, to depths of up to 12m below ground level, to arrest potential movement of the upslope land. PW805 was constructed between March and August 2022.

A network of Counterfort and Underfill drains were installed across the western portion of Stage 3 to relieve pore water pressures within the highly saturated natural soils. The general construction details for these drains are shown on the Tetra Tech Coffey Subsoil Drain Standard Details plan referenced AG/007 in Appendix B. All of the drains discharge to a watercourse north of the stage boundary via specifically designed outfall structures.

All counterfort drains were flush tested upon completion to confirm their function by connecting a water truck to the exposed end of the Novaflo pipe at the southern drain extent within Lot 69 (stage 2A) and turning on the taps until water was observed discharging at the drain outlet.

Cutting of the western ridgeline was commenced in August 2022 and continued throughout the following earthworks season to bring the main fill area beneath Stage 3 east up to design level.

Season 5 (2023-2024) involved the completion of Undercut 9, the undercut designed to provide suitable bearing conditions beneath the section of RE603 founded in natural soils. The drainage blanket for RE603 was extended to the base of Undercut 9 and connected to the end of the counterfort drain constructed in November 2022, to form a continuous drainage path from RE603 to the outfall structure at the northern subdivision boundary.

PW805 alone was insufficient to provide adequate factors of safety against instability on the western boundary. For this reason, an additional stability enhancing undercut key was excavated in the mid-slope in January 2024. The undercut involved excavation to 5m below original ground, installation of drainage and backfill to design level with engineered clay fill. The drainage was connected to the southern end of the western underfill drain.

RE603, the western undercut key and the general fill area in the eastern extent of Stage 3 were gradually progressed until all were at design level by the end of 2024.

To preserve topsoil and vegetation on the face of RE603, a Geoweb cellular slope stabilisation system was installed on the slope face. This comprises 100mm deep HDPE cells fixed via Platypus anchors at the slope crest to maintain a permanent depth of topsoil on the slope. The slope was planted in May 2025.

Several lots identified to comprise highly expansive soils were undercut to 1.5m below finished ground level and replaced with less expansive clay soils from elsewhere on Precinct 6. These undercuts were carried out in April 2024 and topsoiled.

Monitoring of settlement in backfill areas within Stage 3 was completed in March 2024, and all lots were topsoiled by the end of April 2024.

3.2.3 Civil Works (November 2024 to July 2025)

Stage 3 civil works commenced in November 2024 with the gulletting of Skulander Crescent to subgrade and installation of underchannel drains. All necessary road undercuts were completed and backfilled prior to subgrade testing in the new year.

Stormwater and wastewater drainage was completed in January 2025 including installation of catchpits on Skulander Crescent. Services were installed by the end of February 2025.

Subbase course aggregate was placed and compacted throughout March and April, followed by placement of basecourse aggregate. The compaction of both pavement layers was tested via Nuclear Densometer Test at a frequency of 1 test per linear 10m of road pavement, and the basecourse layer deflections were also assessed via Benkelman Beam Testing to confirm performance criteria. Asphalt was placed across all roads in late June 2025.

JOAL 507 subgrade was trimmed and metalled prior to pouring of concrete in July 2025.

Other concrete works including kerbing, parking bays, vehicle crossings and footpaths were poured throughout April and May, eventually reaching completion in June 2025.

All services including electricity, gas, water, telecommunications and fibre were connected by the end of July 2025.

4. QUALITY ASSURANCE AND CONTROLS

4.1 CONSTRUCTION OBSERVATIONS

Construction observations were undertaken during the earthworks and civil works on a near daily basis to assess compliance with NZS 4431 and our project specific recommendations and specifications presented in the various geotechnical reports referenced above in Section 2. Our site observation work included:

- Topsoil stripping and benching of slopes prior to the placement of earth fills;
- Observations of exposed ground conditions and founding materials exposed in the Western Undercut Key, and in Undercut 9;
- Placement of geogrid reinforcement and drainage for reinforced earth slope RE603, including connection of subsoil drainage to the downslope outlet line;
- Construction of counterfort and underfill drains;
- Flush testing of the counterfort drains upon completion;
- Exposed ground conditions and pile hole specifications for construction of Palisade Wall PW805

Tests measurements undertaken during site inspections included:

- Compaction testing of clay fill and hardfill in accordance with the Tetra Tech Coffey Geotechnical Works Specification;
- Dynamic Cone Penetrometer Tests (Scala's) on natural and stabilised road and JOAL pavement subgrades in accordance with NZS 4402: 1998 Test 6.5.2 – Hand method using a Dynamic Cone Penetrometer.
- Nuclear Densometer (NDM) Compaction testing of subbase course and basecourse aggregates for public roads.

4.2 EARTH FILL QUALITY CONTROL CRITERIA

The quality control criteria for compaction testing of earth fills were based on minimum allowable shear strength and maximum allowable air voids in accordance with the Tetra Tech Coffey Geotechnical Works Specification for Millwater as follows:

Air Voids Percentage (as defined in NZS 4402:1986) taken as 1 test per 1500 m^3 of fill placed and not less than 1 test per 500mm lift of fill per fill area.

- Maximum Single Value: 12%
- Average Value: 10%

Undrained Shear Strength (measured by calibrated shear vane to BS1337 method)

- Minimum Single Value: 110kPa
- Average Value: 140kPa

In-situ density, shear strength and water contest test were carried out in areas of filling at or in excess of the frequency recommended by NZS 4431. Test results are IANZ (International Accreditation New Zealand) endorsed and fill details are appended.

5. PROJECT EVALUATION

5.1 STABILITY EVALUATION

Global stability conditions in Stage 3 have been assessed under a range of groundwater conditions and seismic loading. The soil parameters used for the analyses (as referred to in the Tetra Tech Coffey Design Philosophy Report referenced 773-AKLGE20639-AD) were adopted based on extensive investigation and modelling of the site.

The stability analysis results have demonstrated factors of safety against instability in accordance with the requirements of the Auckland Council Code of Practice for Land Development and Subdivision – Section 2 Earthworks and Geotechnical Requirements Version 1.6 dated 24 September 2013.

We consider that the results are acceptable, and we are therefore satisfied that the building platform areas in all lots within Stage 3 are not subject to the hazards described in Section 106 of the Resource Management Act 1991 and Section 71 (3) of the Building Act 2004.

To the best of our knowledge, there have been no significant departures to the landform that was considered in the aforementioned Tetra Tech Coffey investigation and design reports (referenced in Section 2). Furthermore, observations of earthworks and undercuts have confirmed that the ground model forming the basis of the stability analysis presented in these reports is applicable.

On this basis, the stability analysis conclusions presented in the Tetra Tech Coffey reports may continue to be relied upon.

Notwithstanding the above, the Tetra Tech Coffey Geotechnical Building Limitation Zones Plan, referenced CK/001, presented in Appendix B, shows the extent of a series of zones which are intended to, among other things, maintain long term factors of safety against instability.

The Building Limitation Zones shown on the plan include:

- No-build Zone; and
- Specific Design Zone (Slope).

Full description of the limitations associated with each of these zones are presented in the Suitability Statement and Section 5.3 below.

5.2 REINFORCED EARTH (RE) SLOPES

The finished lot contours have generally been eased across the subdivision by the construction of a 1V:1.5H gradient RE slope up to 6m in vertical height.

Table 3 below summarises the RE slope construction details.

Table 3: Summary of RE Slope Construction Details

RE Slope #	Max. Vertical Slope Height (m)	Geogrid Type	Geogrid Embedment Lengths	Design Surcharge Load at Slope Crest (kPa)
603	6	Tensar SS20	Alternating 2m and 5m lengths at 0.5m vertical centres	12

The RE slope was constructed with subsoil drainage comprising a 300mm wide SAP50 scoria blanket drain behind the geogrid reinforced fill, with regular outlet connections into the sealed public stormwater drainage network or to existing subsoil drains at the locations shown on the Woods Limited as-built drawings referenced P22-437-03-1200-AB.

If any of the RE Slope drains are intercepted by future construction works, they should be reinstated under the supervision of a Chartered Professional Engineer familiar with the contents of this report. The capacity of the

subsoil drains to function should not be reduced nor compromised as blocked RE Slope drainage can in some circumstance, lead to failure of the slope.

All of the RE Slopes were installed with a Geoweb topsoil retention system to reduce the risk of scour and erosion on the slope face. The Geoweb is fixed into position via Platypus anchors installed into the ground at approximately 1.3m lateral centres at the slope crest. It is important that no drainage or service trenches are excavated immediately behind the slope crests on the residential lots as this may cause damage to the anchors resulting in surficial slumping of the topsoil on the batter faces. Likewise, deck piles or fence posts should not be installed immediately behind the slope crest.

Further details relating to building limitations on lots adjoining the RE slopes is provided below in Section 5.4 and in the Suitability Statement (Section 6).

The RE slope design drawings are included in Appendix B for reference.

5.3 RETAINING WALLS

Retaining walls to be constructed on the residential lots may be designed in accordance with the soil parameters provided in Table 4 below:

Table 4: Summary of Retaining Wall Design Parameters

Soil Unit Weight, γ (kN/m^3)	Effective Cohesion, c' (kPa)	Effective Internal Angle of Frictional Resistance, ϕ' (degrees)	Undrained Shear Strength of Foundation Soils, s_u (kPa)
18	0	30	50

Retaining wall designs should keep in consideration any sloping ground above or below the proposed wall locations and make appropriate allowances for traffic and building surcharge loads.

The retaining wall designs should, where applicable, be carried out in accordance with the Specific Design Zone building requirements discussed in Section 5.4 and the Suitability Statement.

5.4 BUILDING LIMITATION ZONES

The steeper areas of Stage 3 and adjoining land parcels are more sensitive to future changes in geometry, groundwater and surface water than other less steep areas. Accordingly, the appended Suitability Statement and the following sub-sections contain details of building restrictions in the form of designated No Build Zones, and of Specific Design Zones pertaining to cutting near batter toes or filling/loading near batter crests to maintain the long-term integrity of these areas.

The Building Limitation Zones are shown on Tetra Tech Coffey drawing CK/001 in Appendix B.

Further details follow;

5.4.1 No Build Zone

From a geotechnical perspective, future building should be avoided on land having slope gradients steeper than 1V:2H or on the embankments that were constructed with geogrid reinforcement to maintaining long term factors of safety against instability. For these reasons, the RE slope (RE603) in Stage 3 has been designated as No Build Zone.

Building slabs may be suspended and cantilevered into the No Build Zone but no foundations and no earthworks are permitted.

To reduce the potential for scour and erosion of the RE slope faces, topsoil has been placed on the batter faces and fixed in place by the Geoweb Erosion Control System. These features should be able to remain in place long term without any significant maintenance.

Any vegetation cleared beyond the immediate area of building platforms for temporary construction purposes should be replanted or replaced as soon as possible. It is important that no excavations, even of minimal depths or temporary in nature, are carried out on the batter faces as this will result in damage to the Geoweb

and potentially lead to failure of the Geoweb across a large portion of the slope. This restriction also applies to excavations at the batter crest, where anchors to fix the Geoweb in place have been installed.

The contribution of appropriate vegetation cover to erosion control should not be underestimated. Weeds are permitted to the removed, but landscaped vegetation in the No Build Zones should be protected and preserved.

5.4.2 Specific Design Zone (Slope)

Specific Design Zone (Slope) has been applied to all sloping lot areas having gradients of 1V:4H or steeper which are not reinforced with geogrid, or land located immediately upslope of steeper areas. Any future buildings or earthworks within the Specific Design Zone (Slope) should be the subject of a specific engineering design carried out by a Chartered Professional Engineer experienced in geomechanics and who is familiar with the contents of this report. This will also require an assessment of natural hazards as detailed in Section 71(3) of the Building Act, 2004. The design engineer should consider the implications on stability of filling or loading behind the batter crests or cutting at batter toes.

Individual lot developers should take particular care when planning any unsupported cuts (e.g. for retaining walls or benched platforms), even of a temporary nature on or near these batters. Risk reduction methods that should be employed include (but are not limited to) staging of excavation works along slopes, covering excavations with polythene to prevent ingress of rainfall, installation of temporary retention piles prior to excavation works (i.e. top-down construction methodologies), careful planning of works to avoid periods of inclement weather, and ensuring that open excavations are only left unsupported for short periods of time. This is of particular relevance to the Specific Design Zone (Slope) in Lot 8, where failures of temporary excavations have the potential to extend beyond the lot boundary and affect vested roading and services.

In addition, it is important that neither groundwater nor surface water is concentrated on or near these areas. Any future development on or close to batter crests will need to ensure that temporary works and landscaping does not result in land shaping that directs surface water over the batters. On no account should unlined stormwater soakage pits (or similar) be located on lots above the batters or in designated other areas as described in the appended Suitability Statement.

5.5 FILL INDUCED SETTLEMENT

The subdivision bulk earthworks included mucking out of organic and soft deposits from gully inverts prior to placement of Engineered fill, the installation of underfill drainage, and quality control testing during the placement of fill to confirm compliance with the fill compaction specification. These works have been undertaken as part of the normal earthworks process and, among other things, served to reduce the magnitude and time for post-construction settlements to attenuate.

Several settlement monitoring devices were installed in the vicinity of Stage 3 to measure induced ground settlements. The locations of the monitoring devices are shown in the Settlement Monitoring Location plan in Appendix E. Settlement plates were placed on the stripped natural ground beneath fill areas prior to fill placement and brought up to ground level as filling progressed to monitor the consolidation of the underlying natural soils. In addition, settlement markers were installed into the finished ground surface to monitor surface movements upon completion of the earthworks.

As shown in the settlement monitoring graphs in Appendix E, we are satisfied that at the time of preparing this report, fill induced settlements had attenuated to acceptable levels for NZS3604 type dwellings to be constructed.

5.6 PALISADE WALL PW805

Palisade Wall PW805 was constructed adjacent to the western Stage 3 boundary to maintain adequate global stability factors of safety. The location of the wall is shown on the Woods Limited Palisade Wall As-built Plans referenced 37600-00-1300 to 1302-AB.

The palisade wall comprises bored in-situ steel reinforced concrete piles installed into the ground to resist upslope destabilising forces.

The Palisade Wall was constructed under Building Consent BCO10301029-8. The Producer Statement – Construction Review (PS4) for the wall is provided in Appendix F.

The construction details for the wall are provided in Table 5 as follows:

Table 5: PW805 Construction Details

Wall I.D	Wall Length	Lots Intersected	Min. Pile Depth (m)	Pile Diameter (mm)	Pile Spacing, c-c (m)	Steel Section	Design Surcharge (kPa)
PW805-A	150*	8,9,10,11, 12 (partial)	12.0	600	1.5	310 UC 158	10

*Includes total length of wall section across stages 2 and 3.

5.7 SUBSOIL DRAINAGE

The following subsections contain a description of the underfill and counterfort drains (collectively referred to as subsoil drains) installed during bulk earthworks to control groundwater levels and allow for the dissipation of generated pore water pressures within the natural soils beneath Stage 3. The drain locations are shown on the Woods Subsoil Drainage as-built plan referenced P22-437-03-1200-AB in Appendix A. The subsoil drain design details are shown on the Coffey Subsoil Drainage Standard Details drawings ref: AG/007 in Appendix B.

The capacity of the subsoil drains to function as intended should not be reduced or compromised, as blocked subsoil drainage may, in certain circumstances, have a detrimental effect on site stability.

Where any subsoil drain is intercepted by building or landscaping works it must be reinstated under the direction of a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report, to ensure the integrity and long-term function of the subsoil drainage system is maintained.

5.7.1 Underfill Drains

Perforated underfill drains were placed in mucked out gully inverts and in gully flanks prior to placement of Engineered fill to tap groundwater seepage and springs, as required by NZS 4431, to reduce settlement times and to divert connecting subsoil drains to appropriate outfall structures.

The locations of the underfill drains are shown on Woods drawing P22-437-03-1200-AB and Tetra Tech Coffey drawing CK/003. These drains have been installed beneath several metres of fill or within designated front yard areas. As such, no engineering solution is required to bridge these drains where they pass beneath residential lots, and they are unlikely to be intercepted by future building works.

The underfill drain shown on Woods Drawing P22-437-03-1200-AB passing through Lots 8 to 12 (inclusive) should be beyond the extent of any retaining wall excavations that may be carried out on the new lots. Despite this, if the drain is exposed by any excavation, Tetra Tech Coffey should be notified immediately to ensure it is properly reinstated.

5.7.2 Counterfort Drains

During earthworks construction, two counterfort drains were installed under the direction of Tetra Tech Coffey within lots 52 and 55, to assist in controlling local groundwater levels. The typical trench excavation depth for the counterfort drain was up to 5m from the finished ground level, and a typical width of 600mm. Drainage aggregate used for the counterfort drain was SAP50 scoria. A 2m deep engineered clay fill capping was placed at the top of the drains.

The counterfort drains were placed 0.5m inside the northern boundaries of lots 52 and 55, within the designated side yard areas. Waffle slab type foundations are be recommended as the preferred foundation system on these lots to prevent application of house loads to the counterfort drains scoria backfill.

If retaining wall excavations on Lot 54 expose the drain, the issue should be relayed back to us immediately to ensure the drain is suitably reinstated.

5.7.3 Flushing of Subsoil Drains

Upon completion, all subsoil drains were successfully flush tested to confirm their function. The flush testing was undertaken by connecting a water truck and hose to the exposed subsoil drainage Novaflo pipes. A Tetra Tech Coffey engineer was on-site to observe water discharging at the drainage outlets.

5.8 FOUNDATIONS AND BEARING CAPACITY

Following the completion of earthworks operations, a series of hand auger boreholes were drilled in appropriate areas of cut and filled ground to assess representative finished subsurface conditions and hence evaluate likely foundation options for future residential building development. Our resulting bearing capacity recommendations are presented in the appended Suitability Statement.

At current subgrade levels, all cut, filled and undisturbed original ground has a geotechnical ultimate bearing capacity of 300kPa (as required by NZS3604:2011) within the zone of influence of conventional shallow residential building foundation loads.

Where a geotechnical ultimate bearing capacity greater than 300kPa is required (i.e. outside the limits of NZS 3604:2011, such as when piling is undertaken), site-specific investigation and design of foundations should be carried out prior to Building Consent application.

It should be noted that NZS 3604 only allows a maximum fill depth of 600mm above finished ground level across the building platform or a dwelling unless an Engineering design solution is proposed, due to the risk of induced settlement or instability of the subsoils caused by the weight of the fill.

On sloping lots, piled foundations may be the most appropriate foundation system. Pile foundations on this subdivision may be designed in accordance with the following design parameters:

Table 6: Suggested Pile Design Parameters

Effective Internal Angle of Frictional Resistance, ϕ' (degrees)	Soil Unit Weight, γ (kN/m^3)	Undrained Shear Strength, s_u (kPa)	Ultimate side adhesion beyond 1.0m depth (kPa)*
28	18	60	30

*Side adhesion to be ignored within the upper 1m of soil

The structural designer should attend to the details of pile type, depth, spacing, diameter and load capacity, and also ensure there is allowance in the design for any differential movements that may occur between piled and unpiled portions of the dwelling.

Soil creep on sloping ground should be mitigated by designing piles to resist lateral loads over the upper 1.0m of pile equivalent to 3 x pile diameters.

5.9 EXPANSIVE SOILS

Thirteen sets of Laboratory Expansive Soil Tests were carried out on soil samples retrieved from Lot 9, 12, 15, 16, 17, 18, 52, 53, 54, 55, 56, 58 and lots 61 (as shown on Tetra Tech Coffey drawing CK/002 in Appendix B, results in Appendix C).

Testing to assess the soil Shrink Swell Index (I_{SS}) was carried out in accordance with AS1289 Test 7.1.1 and was used in conjunction with the advice in Acceptable Solution B1/AS1 of the New Zealand Building Code and BRANZ Addendum Study 120A (2008) *Soil Expansivity in the Auckland Region* to calculate the characteristic surface movement (y_s) and expansive soil class.

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

Based on the results of laboratory testing, plus our visual and tactile assessment for the soils on site, we have assessed the AS2870 expansive site class as S (Slightly reactive), M (Moderately reactive) or H (Highly reactive) for all residential lots.

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

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

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

Thorough soaking (in the form of low flow sprinklers for an extended period rather than flooding of the surface with a hose once, is recommended) of the exposed building platform area, a few days before hardfill placement, can help to reduce the problem and is strongly recommended. Careful detailing of construction joints in brittle building elements can also be of benefit. Alternatively, removal and replacement of the desiccated surface layers is recommended.

It is also recommended that site specific testing is carried out by individual lot owners to ascertain the expansive site class for each individual lot.

Methods of downgrading the expansive site class (i.e. from Highly to Moderately expansive), such as saturation of the building platform prior to placement of the floor slab or replacement of surficial clay layers with compacted hardfill, may be appropriate in some circumstances, but should only be performed under the instruction, supervision and certification of a Chartered Professional Engineer, familiar with the contents of this report.

5.10 STORMWATER CONTROLS

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

Uncontrolled stormwater discharges onto the ground surface or into soakage pits can cause erosion, scour and/or instability on sloping land and are not permitted on any of the residential lots.

5.11 SERVICE TRENCHES

As is normal on all subdivisions, construction of foundations within the 45-degree zone of influence from 0.5m below pipe inverts will require engineering input. The Auckland Council drawing referenced SW22 provided in Appendix B extracted from Chapter 4 of the Auckland Council Code of Practice for Land Development and Subdivision, version 3.0, January 2022, depicts bridging requirements for stormwater pipes. Details for water and wastewater pipes are shown in drawings WW26, WW27 and WW28 extracted from Watercare CoP 1.

A number of the lots have public drainage trenches within their boundaries as shown on the Woods Stormwater and Wastewater as-built plans referenced P22-437-03-3000 to 3003-AB, and P22-437-00-4000 and 4001-AB, respectively, in Appendix A. The resulting limitations are discussed in the following Suitability Statement.

5.12 TOPSOIL

Upon completion of the subdivisional works a series of shallow hand auger boreholes were drilled at the locations of each likely building platform (as shown on Tetra Tech Coffey drawing CK/002 in Appendix B) to assess indicative topsoil depths on all residential lots.

Depths of topsoil were found to range from 100 to 250mm, however, due to the nature of the method of investigation, variation in topsoil depths across the lots should be expected.

Site specific findings are presented in the Suitability Statement Summary (Table 8) in Section 6. However, we strongly recommend that prospective lot purchasers complete their own checks of actual topsoil depths across their specific lot.

5.13 PUBLIC ROAD AND JOAL SUBGRADES

Scala Penetration Resistance (Dynamic Cone Penetrometer) Tests were undertaken at regular intervals along the road and JOAL subgrades in Stage 3. The test results were subsequently forwarded to Woods for pavement design validation purposes. Areas demonstrating low equivalent CBR values were typically either reworked with lime/cement stabilisation treatment or undercut and replaced with hardfill or engineered clay fill.

5.14 CONTRACTORS WORK

We have relied on the Contractor's work practices and assume that the works have been carried out in accordance with:

- The approved Contract drawings and design details;
- The approved Contract specifications;
- Authorised Variations issued during the execution of the works;
- The conditions of Resource, Earthworks and Building Consents where applicable; and
- The relevant Tetra Tech Coffey reports, recommendations, specifications and site instructions.

In addition, we assume that all As-Built information and other details provided to the Client and/or Tetra Tech Coffey by the Contractor and other consultants are accurate and correct in all aspects.

6. STATEMENT OF PROFESSIONAL OPINION AS TO THE SUITABILITY OF LAND FOR BUILDING DEVELOPMENT

I, Stephen Parkes of Tetra Tech Coffey (NZ) Limited, Auckland, hereby confirm that:

1. I am a Chartered Professional Engineering Geologist experienced in the field of geotechnical engineering as defined in Section 1.2.3 of NZS 4404 and was retained by the Owner/Developer as the Geotechnical Engineer on Stage 3 within Precinct 6 of the Millwater residential subdivision
2. The extent of investigations carried out to date are described in the Geotechnical Investigation Report referenced 773-AKLGE204203-AA, dated 25 July 2017, and the geotechnical design reports referenced in Section 2.

   The Tonkin and Taylor Geotechnical Completion Report referenced 21854.0034/AHP6Ew.v1, dated June 2019 provides earthworks certification for the enabling works package, completed at the site prior to the works detailed within this report.

   The conclusions and recommendations of these documents have been re-evaluated as part of the preparation of this report.
3. Engineered fill placed as part of the Precinct 6 Stage 3 construction works and shown on the appended Woods Limited as-built plans, excluding fills placed during enabling earthworks under the direction of Tonkin & Taylor, is certified herein.
4. In my professional opinion, not to be construed as a guarantee, I consider that:
   a) The completed earthworks give due regard to land, slope and foundation stability considerations within the residential lots.

      As is shown on the appended Woods Limited Final Surface As Built Plan, ref P22-437-03-1000-AB, areas on some lots have gradients steeper than 1(v) in 4(h) and generally up to 1(v) in 1.5(h)) or are adjacent to land having such gradients.

      Additionally, some sloping areas contain geogrid reinforcement whose structural integrity is critical in maintaining long term slope stability.

      Accordingly, limitations to future building by way of designated No Build Zone and Specific Design Zone (Slope) have been applied as depicted on Tetra Tech Coffey Geotechnical Building Limitation Zone Plan CK/001, dated 04/08/25, and described as follows:

      i. **No Build Zone** has been applied to portions of Lots 54 to 61 (inclusive) and encompasses land containing geogrid reinforced earth (RE) slope RE603. No building and no earthworks are permitted within the designated No Build Zones as development in these areas could have a detrimental effect on land stability.

      ii. **Specific Design Zone (Slope)** has been applied to Lot 8, and to portions of Lots 52 to 61 (inclusive), due to the presence of slope gradients of 1(v) in 4(h) to 1(v) in 1.5(h) or adjoining slopes having such gradients.

      No building construction and no earthworks (i.e. cut or fills of any depth) should take place within designated Specific Design Zone (Slope) areas unless endorsed by geotechnical design of all earthworks, foundations and retaining walls and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics and who is familiar with the contents of this report, as such operations may, in certain circumstances, have detrimental effects on site stability. The endorsing Engineer will need to assess natural hazards under Section 71(3) of the Building Act 2004, and consider the implications of temporary (i.e. construction case) and long-term stability conditions and soil creep on the development proposals, including the impact of surcharge loads from the land above batters, ancillary structures such as water tanks, effects of services and associated trench backfills and control of surface water.

      This limitation also applies to long term landscaping works and vegetation change, including any proposed minor cuts either on the batter slopes or at their toes, which are to be retained by landscaping walls that might not normally require specific engineering input. Risk

mitigation measures to prevent initiating instability in upslope batters during construction of these works should also be considered.

Foundations constructed within the Specific Design Zone (Slope) in Lots 8 and 52 to 61 should include the piling of leading (downslope) edge foundations and deck foundations. Suggested parameters for design of pile foundations are as follows:

Table 7: Pile Design Parameters

Effective Internal Angle of Frictional Resistance, ϕ' (degrees)	Soil Unit Weight, γ (kN/m^3)	Undrained Shear Strength, s_u (kPa)	Ultimate side adhesion beyond 1.0m depth (kPa)*
28	18	60	30

*Side adhesion to be ignored within the upper 1m of soil

The structural designer should attend to the details of pile type, depth, spacing, diameter and load capacity, and also ensure there is allowance in the design for any differential movements that may occur between piled and unpiled portions of the dwelling.

b) A geotechnical ultimate bearing capacity of 300kPa may be assumed for shallow foundation design on all residential lots in Stages 3.

Where a geotechnical ultimate bearing capacity greater than 300kPa is required (i.e. outside the limits of NZS 3604), further specific site investigation and foundation design should be carried out prior to Building Consent application.

c) The function of the subsoil drains, as depicted on the appended Woods Limited Subsoil Drainage as-built plan referenced P22-437-03-1200-AB, should not be compromised by any future building development nor landscaping works. Any bored or driven piles should be positioned to avoid damaging the drains. **Where any subsoil drain is intercepted by building works, it must be reinstated under the direction of a Chartered Professional Engineer to ensure the long-term function and integrity of the subsoil drainage system is maintained.**

d) Due to the potential for counterfort drains installed beneath lots 52 and 55 to be within the zone of influence of strip footings, it is recommended that waffle slab type foundations are utilised on these lots.

e) The backfilling and compaction of the stormwater and wastewater trenches on this subdivision has where possible, been carried out to appropriate standards having regard for the prevailing ground conditions and associated compaction induced pipe loadings.

Nevertheless, no building development should take place within the 45° zone of influence extrapolated from 0.5m beneath drain inverts unless endorsed by a Chartered Professional Engineer experienced in geomechanics to ensure that lateral stability and differential settlement issue as are addressed, and that building loads are transferred beyond the influence of the pipe and beyond the extent of the trench backfill.

Woods as-built plans P22-437-03-3000 to 3003-AB and P22-437-00-4000 to 4001-AB should be referred to the locations of public drainage on all lots.

A copy of drawing SW22 extracted from Chapter 4 of Auckland Council Code of Practice of Land Development and Subdivision is provided in Appendix A for reference. Details pertaining to building over or adjacent to public wastewater pipes are shown on Watercare drawingsWW26, WW27 and WW28, also provided in Appendix B.

f) On no account should stormwater be concentrated into pits (including stormwater detention or bio-retention treatment type pits) near sloping ground or batters or in areas of sandy soils or fractured rock unless endorsed by specific designs and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics to ensure that appropriate permanent impervious lining of the pit is incorporated so that long term infiltration into the surrounding soils is not increased on account of its potentially adverse impact on local and global stability.

g) The assessed AS2870 Expansive Site Class is class M (moderately reactive) for lots 13-18 (inclusive), 52, 53, 57 and 58, and H (Highly Reactive) for lots 8-12 (inclusive), 55, 56, 59, 60 and 61. It is recommended that site specific testing is carried out by individual lot owners to ascertain the Expansive Site Class on each individual lot.

h) The seismic site subsoil category on all residential lots is assessed to be Class C (shallow soil site) in accordance with NZS1170.5

i) Subject to the geotechnical limitations, recommendations and expansive soil assessments associated with Section 6, Items 4(a), 4(b), 4(c), 4(d), 4(e), 4(f), 4(g) and 4(h) above:

   i) The cut, filled and undisturbed original ground with residential lot boundaries is generally suitable for residential buildings constructed in accordance with NZS 3604:2011 (that incorporate specific foundation and associated structural design considering the expansive soils site class) and related documents.

   ii) On all lots in Stage 3, shallow foundation design may be carried out in accordance with AS2870 (Class M or Class H), or alternatively, a specific foundation and structural design may be undertaken for NZS3604 type foundations by a Chartered Professional Engineer who should allow for expansive soil effects in the design. In this latter case, the minimum foundation embedment depth below cleared ground level may be ascertained from Table 7.4A or 7.4B in Amendment 19 to the Acceptable Solutions and Verification Methods to Clause B1 Structure of the New Zealand Building Code, dated 28 November 2019.

Table 8 below summarises the status of each residential lot covered by this Suitability Statement.

7. LIMITATIONS

The professional opinion contained within this report is furnished to Auckland Council and WFH Properties Limited for their purposes alone on the express condition that it will not be relied upon by any other person. Prospective purchasers should satisfy themselves as to any specific conditions pertaining to their particular land interest.

This opinion does not remove the necessity for the normal inspection of ground conditions and the design of foundations as would be made under all normal conditions.

For and on behalf of Tetra Tech Coffey

Prepared by:

Fernanda Soto
Engineering Geologist
MSc Geology

Stephen Parkes
Associate Engineering Geologist
CMEngNZ, PEngGeol

Reviewed / Authorised by:

Chris Armstrong
Principal Geotechnical Engineer
CPEng / CMEngNZ

Table 8: Suitability Statement Summary

Lot #	Comments	Indicative Topsoil Depth (mm)	Ultimate Bearing Capacity (kPa)	AS2870 Expansive Site Class
8	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a) (ii)) Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip of pad foundations.	100	300	H
9	Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip of pad foundations.	150	300	H
10	Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip of pad foundations.	100	300	H
11	Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e)	100	300	H

	Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip of pad foundations.			
12	Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip of pad foundations.	100	300	H
13	Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip of pad foundations.	100	300	H
14	Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip of pad foundations.	150	300	H
15	Sewer/Stormwater line limitations apply (refer to Clause 6.4(e)	100	300	M

	Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip of pad foundations.			
16	Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip of pad foundations.	150	300	M
17	Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip of pad foundations.	200	300	M
18	Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip of pad foundations.	200	300	M
52	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a) (ii)) Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Waffle slab type foundation systems recommended (refer to Clause 6.4 (d)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e)	200	300	M

	Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip of pad foundations.			
53	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a) (ii)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip of pad foundations.	100	300	M
54	No Build Zone limitations apply (refer to Clause 6.4(a) (i)) Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a) (ii)) Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip of pad foundations.	100	300	M
55	No Build Zone limitations apply (refer to Clause 6.4(a) (i)) Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a) (ii)) Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Waffle slab type foundation systems recommended (refer to Clause 6.4 (d)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f)	100	300	H

	The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip of pad foundations.			
56	No Build Zone limitations apply (refer to Clause 6.4(a)(i)) Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a) (ii)) Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip of pad foundations.	150	300	H
57	No Build Zone limitations apply (refer to Clause 6.4(a)(i)) Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a) (ii)) Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip of pad foundations.	100	300	M
58	No Build Zone limitations apply (refer to Clause 6.4(a)(i)) Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a) (ii)) Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f)	250	300	M

	The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip of pad foundations.			
59	No Build Zone limitations apply (refer to Clause 6.4(a)(i)) Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a) (ii)) Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip of pad foundations.	100	300	H
60	No Build Zone limitations apply (refer to Clause 6.4(a)(i)) Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a) (ii)) Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip of pad foundations.	100	300	H
61	No Build Zone limitations apply (refer to Clause 6.4(a)(i)) Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a) (ii)) Protection of the function of subsoil drains required (refer to Clause (6.4(c)) Sewer/Stormwater line limitations apply (refer to Clause 6.4(e) Care required with Stormwater disposal (refer to Clause 6.4(f)	200	300	H

	The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip of pad foundations.			

APPENDIX A: WOODS AS-BUILT DRAWINGS

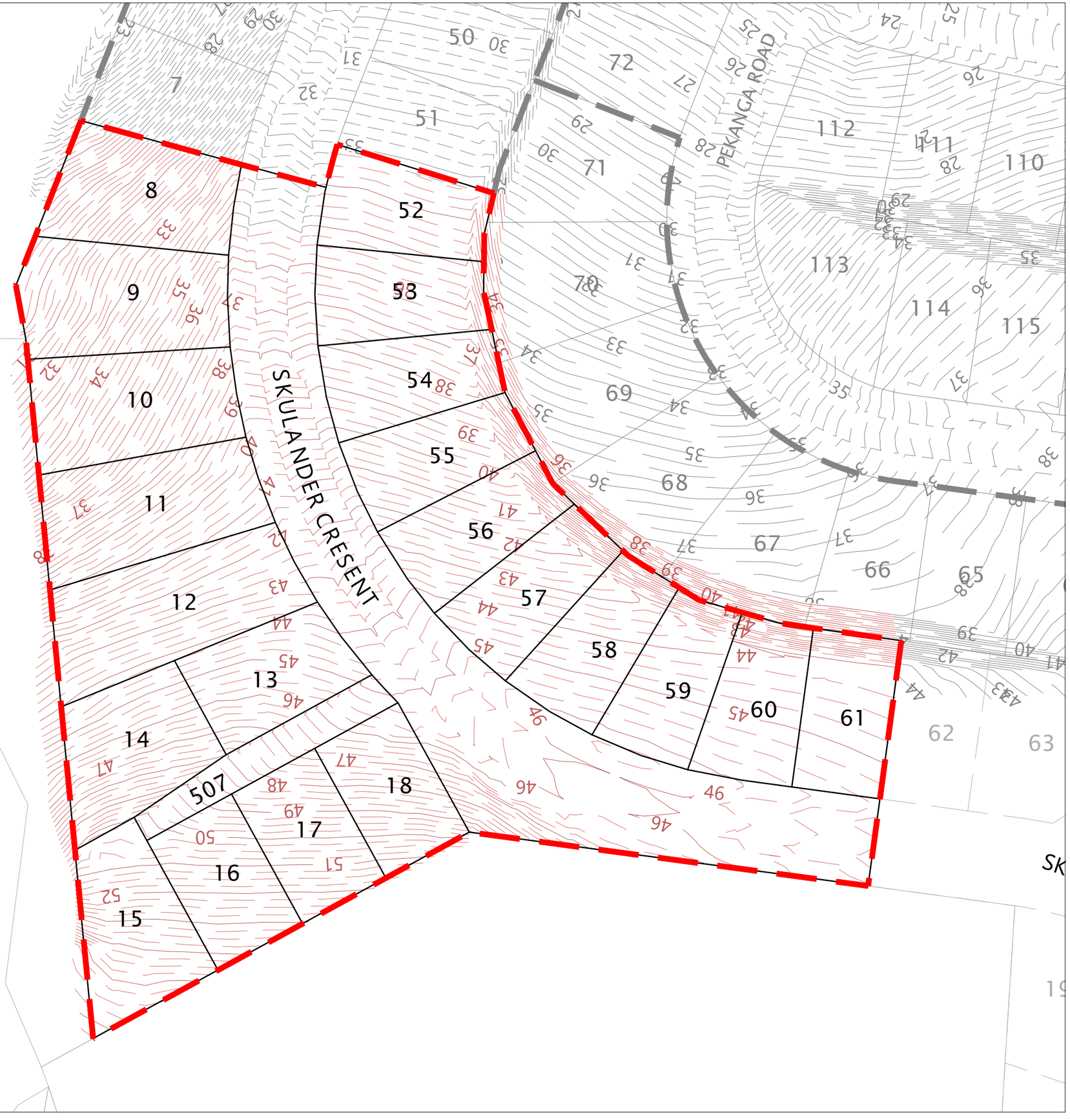
I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: _____
Licensed Cadastral Surveyor

Date: 15/08/2025

Name: SAM MUIRHEAD



NOTES

1. COORDINATES ARE IN TERMS OF NZTM. ORIGIN OF COORDINATES ALP 10 DP 537959 SOURCED FROM LINZ DATABASE.
   ~ 5948844.96mN 1749267.16mE
2. LEVELS ARE IN TERMS OF AVD46. ORIGIN OF LEVELS IS CA 15 (GD CODE B3BQ), RL = 24.82m, SOURCED FROM LINZ DATABASE.
3. CONVERSION FACTOR FROM AVD46 TO NZVD16 IS -0.310m.
4. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
5. CONTOURS ARE AT 0.25m INTERVALS.

LEGEND

- MAJOR CONTOURS
- MINOR CONTOURS
- EXISTING CONTOURS
- LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY
- STAGE BOUNDARY

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	15/08/25

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	COFFEY	
APPROVED	SM	WOODS.CO.NZ

N

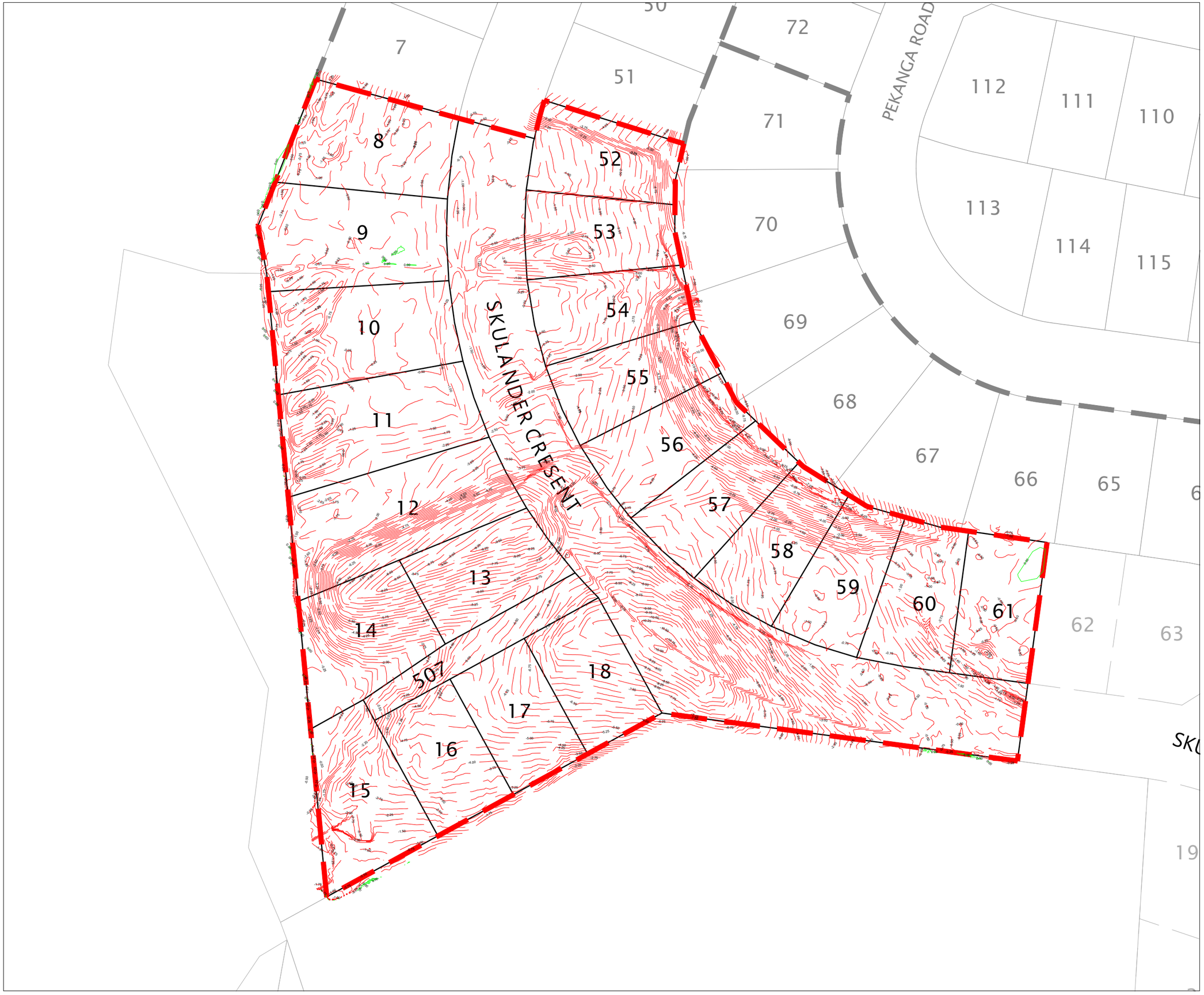
MILLWATER OREWA WEST PRECINCT 6 - STAGE 3

FINAL SURFACE ASBUILT

STATUS	AS BUILT	REV
SCALE	1:750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-437-03-1000-AB	

Plot Date: 2:41:34 pm,15 August 2025, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-437 - P6 STAGE 3 AND 4_21253\CAD\SURV\ABS3\P22-437-03-1000-AB FINAL SURFACE.DWG



WOODS
Est.1970

Plot Date: 2:53:39 pm,15 August 2025, SAMANTHAM

NOTES

1. COORDINATES ARE IN TERMS OF NZTM.
2. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
3. CONTOURS ARE AT 0.25m INTERVALS.
4. PLANS SHOULD BE READ IN CONJUNCTION WITH GCR.

LEGEND

ZERO CONTOUR	0.0
CUT CONTOUR	-1.0
FILL CONTOUR	1.0
LOT BOUNDARY	
EXISTING LOT BOUNDARY	
FUTURE LOT BOUNDARY	
STAGE BOUNDARY	

DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION BASED ON THIS DRAWING FILE.

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	11/08/25

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	CMW	
DRAWN	EC	
CHECKED	COFFEY	
APPROVED	SM	WOODS.CO.NZ

N

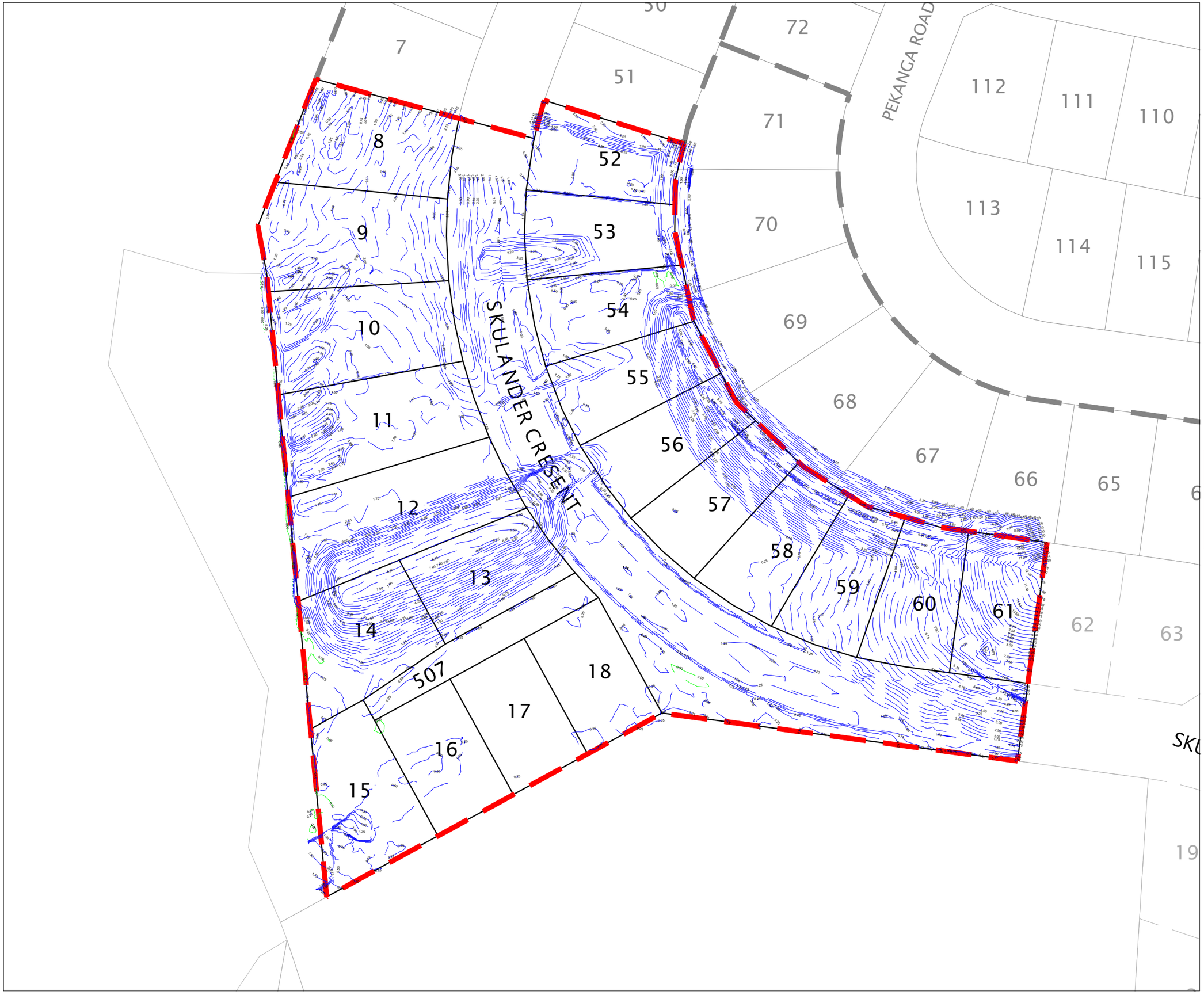
WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 3

CUT AND FILL ASBUILT
ORIGINAL TOPOGRAPHIC SURFACE
TO LOWEST SURFACE

STATUS	FOR INFORMATION	REV
SCALE	1:750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-437-03-1100-AB	

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-437 - P6 STAGE 3 AND 4_2125\3\CAD\SURV\ABS3\P22-437-03-1100-AB CUT FILLS.DWG



WOODS
Est.1970

NOTES

1. COORDINATES ARE IN TERMS OF NZTM.
2. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
3. CONTOURS ARE AT 0.25m INTERVALS.
4. PLANS SHOULD BE READ IN CONJUNCTION WITH GCR.

LEGEND

ZERO CONTOUR	0.0
CUT CONTOUR	-1.0
FILL CONTOUR	1.0
LOT BOUNDARY	
EXISTING LOT BOUNDARY	
FUTURE LOT BOUNDARY	
STAGE BOUNDARY	

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	11/08/25

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	CMW	
DRAWN	EC	
CHECKED	COFFEY	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

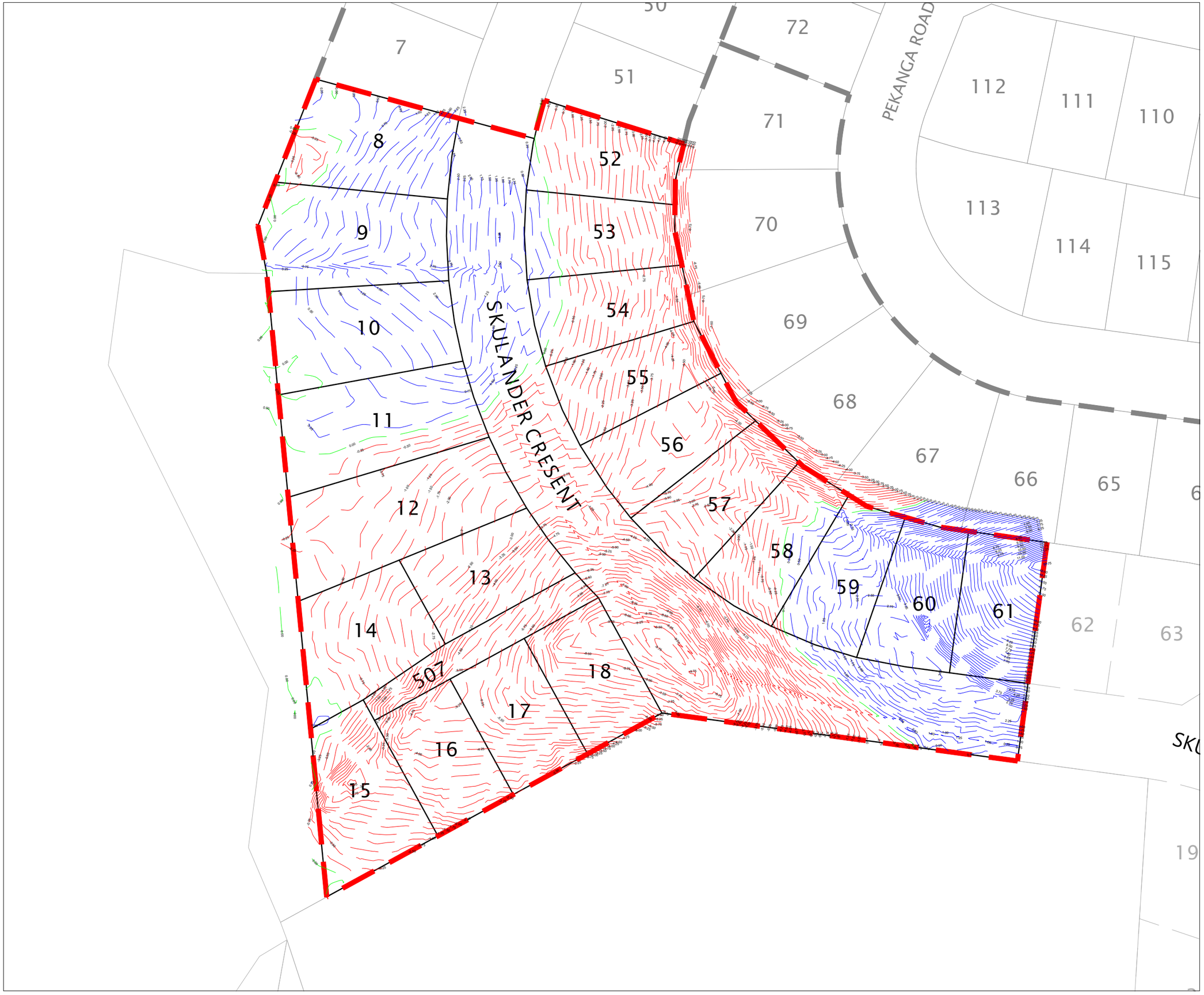
MILLWATER OREWA WEST PRECINCT 6 - STAGE 3

CUT AND FILL ASBUILT
LOWEST SURFACE TO
FINAL SURFACE

STATUS	FOR INFORMATION	REV
SCALE	1:750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-437-03-1101-AB	

Plot Date: 253:42 pm,15 August 2025, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-437 - P6 STAGE 3 AND 4_21253\CAD\SURV\ABS\P22-437-03-1100-AB CUT FILLS.DWG



WOODS
Est.1970

Plot Date: 2:53:44 pm,15 August 2025, SAMANTHAM

NOTES

1. COORDINATES ARE IN TERMS OF NZTM.
2. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
3. CONTOURS ARE AT 0.25m INTERVALS.
4. PLANS SHOULD BE READ IN CONJUNCTION WITH GCR.

LEGEND

ZERO CONTOUR	0.0
CUT CONTOUR	-1.0
FILL CONTOUR	1.0
LOT BOUNDARY	
EXISTING LOT BOUNDARY	
FUTURE LOT BOUNDARY	
STAGE BOUNDARY	

DISCLAIMER:
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REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	11/08/25

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	CMW	
DRAWN	EC	
CHECKED	COFFEY	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 3

CUT AND FILL ASBUILT
ORIGINAL TOPOGRAPHIC SURFACE
TO FINAL SURFACE

STATUS	FOR INFORMATION	REV
SCALE	1:750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-437-03-1102-AB	

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-437 - P6 STAGE 3 AND 4_21253\CAD\SURV\ABS3\P22-437-03-1100-AB CUT FILLS.DWG

DISCLAIMER:
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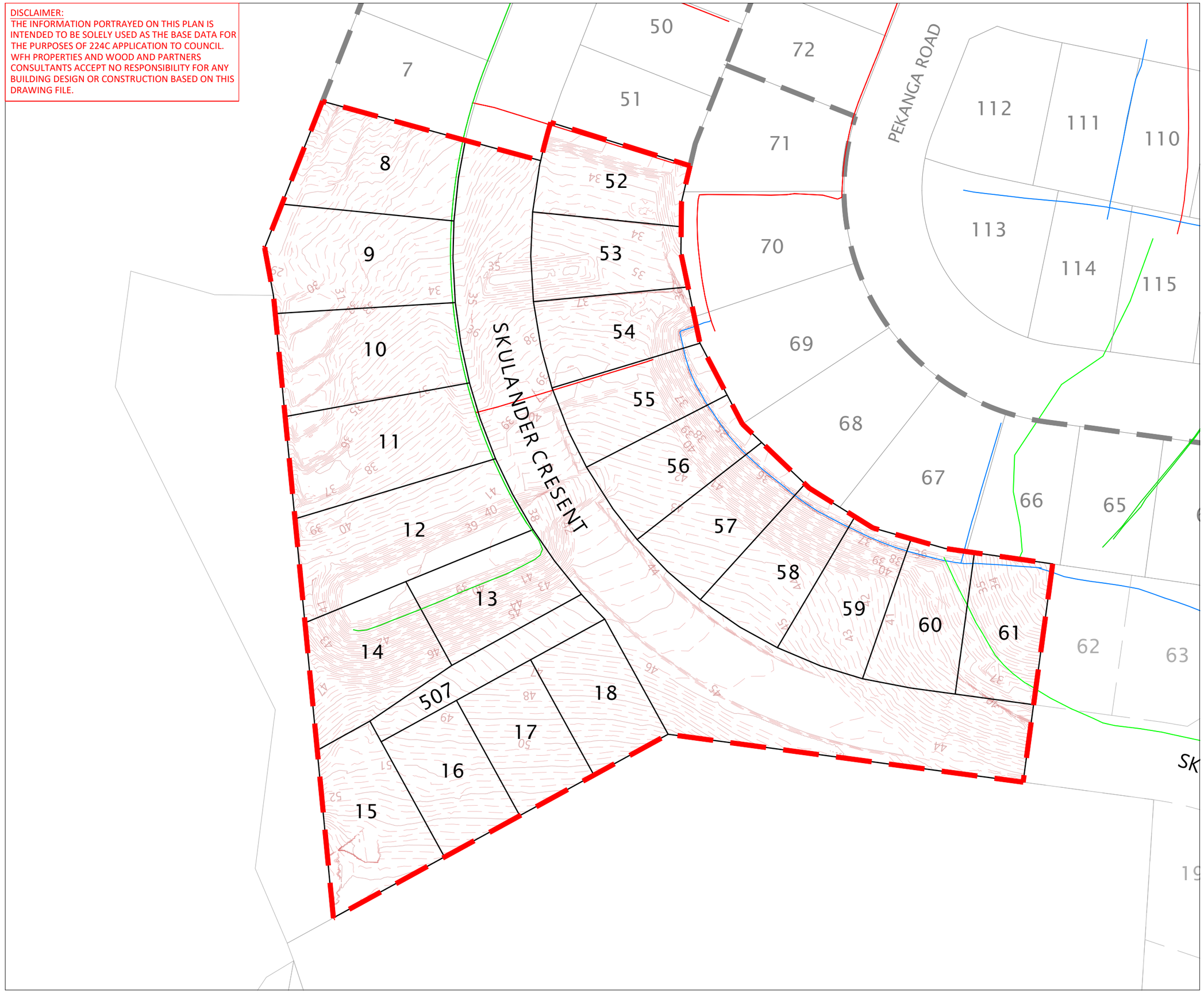


NOTES

1. COORDINATES ARE IN TERMS OF NZTM.
2. LEVELS ARE IN TERMS OF AVD46.
3. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
4. SUBSOIL DATA SUPPLIED BY CONTRACTOR.
5. CONTOURS ARE OF LOWEST SURFACE AND AT 0.25m INTERVALS.
6. CONVERSION FACTOR FROM AVD46 TO NZVD16 IS -0.310m.
7. PLANS SHOULD BE READ IN CONJUNCTION WITH GCR.

LEGEND

- RE SLOPE/ RETAINING WALL DRAINAGE
- COUNTERFORT DRAINS
- UNDERFILL DRAINS
- STAGE BOUNDARY
- LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY
- LOWEST SURFACE MAJOR CONTOURS
- LOWEST SURFACE MINOR CONTOURS

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	11/08/25

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	COFFEY	
APPROVED	SM	WOODS.CO.NZ

N

MILLWATER OREWA WEST PRECINCT 6 - STAGE 3

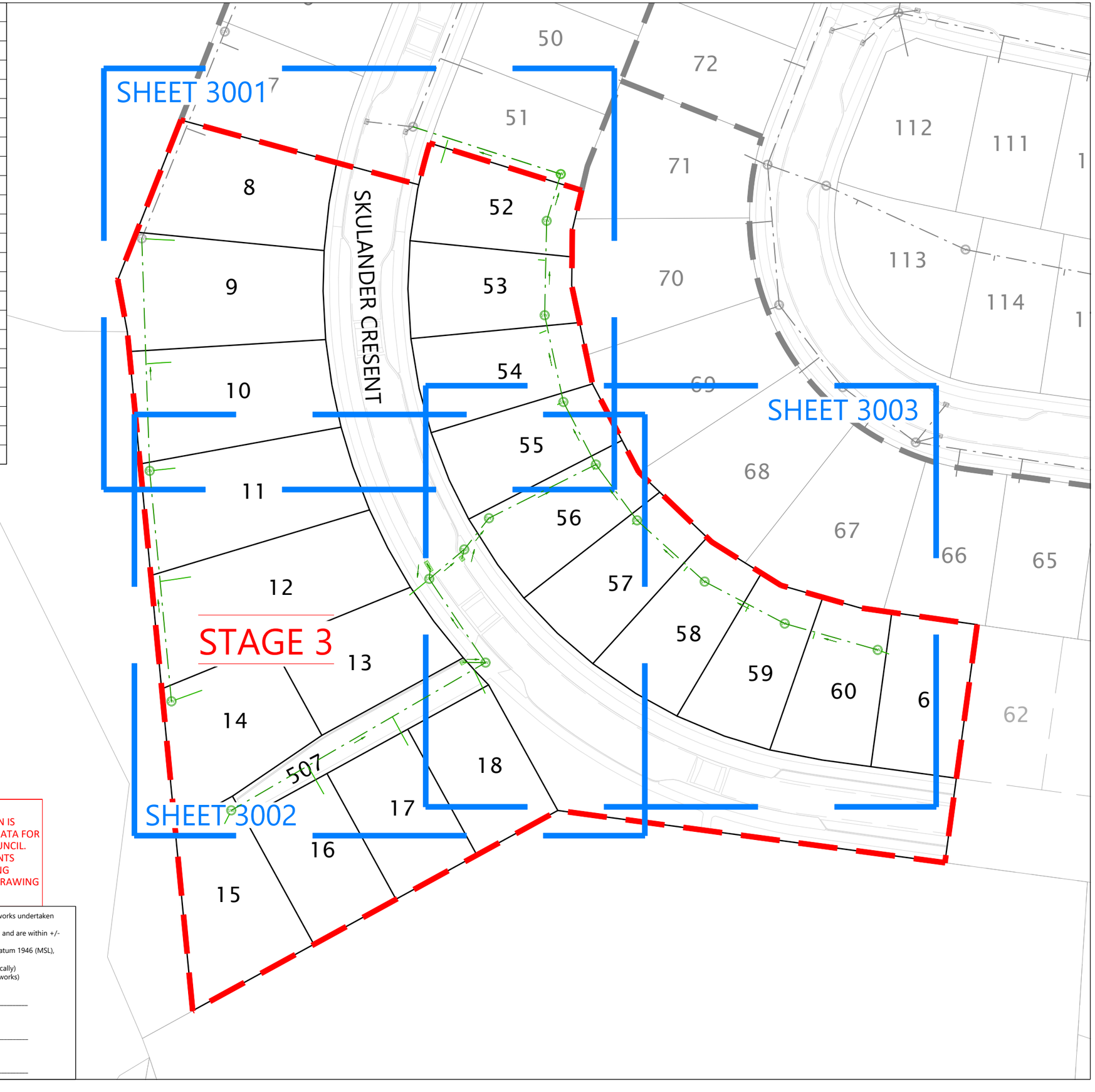
SUBSOILS ASBUILT PLAN

STATUS	FOR INFORMATION	REV
SCALE	1:750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-437-03-1200-AB	

Plot Date: 2:54:02 pm,15 August 2025, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-437 - P6 STAGE 3 AND 4_21253\CAD\SURV\ABS3\P22-437-03-1200-AB SUBSOILS.DWG

SCHEDULE OF COORDINATES		
STORMWATER LOT CONNECTIONS		
ID	EASTING	NORTHING
LOT 8	1748821.80	5948968.78
LOT 9	1748815.78	5948948.30
LOT 10	1748815.12	5948924.51
LOT 11	1748815.92	5948903.85
LOT 12	1748818.94	5948882.64
LOT 13	1748861.67	5948879.11
LOT 14	1748821.13	5948860.51
LOT 15	1748825.55	5948834.50
LOT 16	1748844.91	5948840.29
LOT 17	1748861.35	5948849.79
LOT 18	1748876.41	5948859.91
LOT 52	1748867.79	5948963.42
LOT 53	1748886.77	5948944.49
LOT 54	1748887.02	5948930.16
LOT 55	1748890.53	5948916.24
LOT 56	1748897.51	5948903.57
LOT 57	1748905.13	5948892.95
LOT 58	1748915.20	5948883.82
LOT 59	1748927.24	5948875.90
LOT 60	1748940.38	5948870.59
LOT 61	1748955.19	5948867.61



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I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
- The Levels (Z) are in terms of the LINZ Auckland Vertical Datum 1946 (MSL), and are within the following tolerances:
  - For all pipe inverts & channels to be within +/- 10mm (locally)
  - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed: _____
Licensed Cadastral Surveyor

Date: 15/08/2025

Name: SAM MUIRHEAD

WOODS
Est.1970

LEGEND

- NEW STORMWATER MANHOLE
- NEW STORMWATER CESSPIT
- NEW STORMWATER
- EXISTING STORMWATER
- LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY
- STAGE BOUNDARY

NOTES

1. APPROVED EPA NUMBER: ENG60362263
2. COORDINATES ARE IN TERMS OF NZTM. ORIGIN IS ALP 10 DP 537959 SOURCED FROM LINZ DATABASE.
   ~ 5948844.96mN 1749267.16mE
3. LEVELS ARE IN TERMS OF AVD46. ORIGIN IS CA 15 (GD CODE B3BQ), RL = 24.82m, SOURCED FROM LINZ DATABASE.
4. CONVERSION FACTOR FROM AVD46 TO NZVD16 IS -310mm.
5. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
6. ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY DATA AND CONTRACTOR RECEIVED DATA.
7. MANHOLE COORDINATES ARE TO CENTRE OF CONCRETE MANHOLE CHAMBER.
8. ALL PIPES ARE RCRRJ AND PIPE AND MH DIAMETERS ARE INTERNAL AND SHOWN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
9. ALL MANHOLES ARE REINFORCED CONCRETE UNLESS OTHERWISE SPECIFIED.
10. ALL PRIVATE LOT CONNECTIONS ARE 100mmØ uPVC.
11. LOT CONNECTION LENGTHS ARE 2D LENGTHS CALCULATED FROM CONTRACTOR DATA WHERE THE LOT CONNECTION ENTERS THE MAIN LINE TO IT'S TERMINATION COORDINATE WITHIN THE LOT.

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	HD	15/08/25

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	RV	
DRAWN	HD	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 3

STORMWATER ASBUILT PLAN
SHEET 1 OF 4

STATUS	AS BUILT	REV
SCALE	1:750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-437-03-3000-AB	

Plot Date: 313:50 pm,15 August 2025, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-437 - P6 STAGE 3 AND 4_21253\CAD\SURV\ABS3\P22-437-03-3000-AB STORMWATER.DWG

DISCLAIMER:
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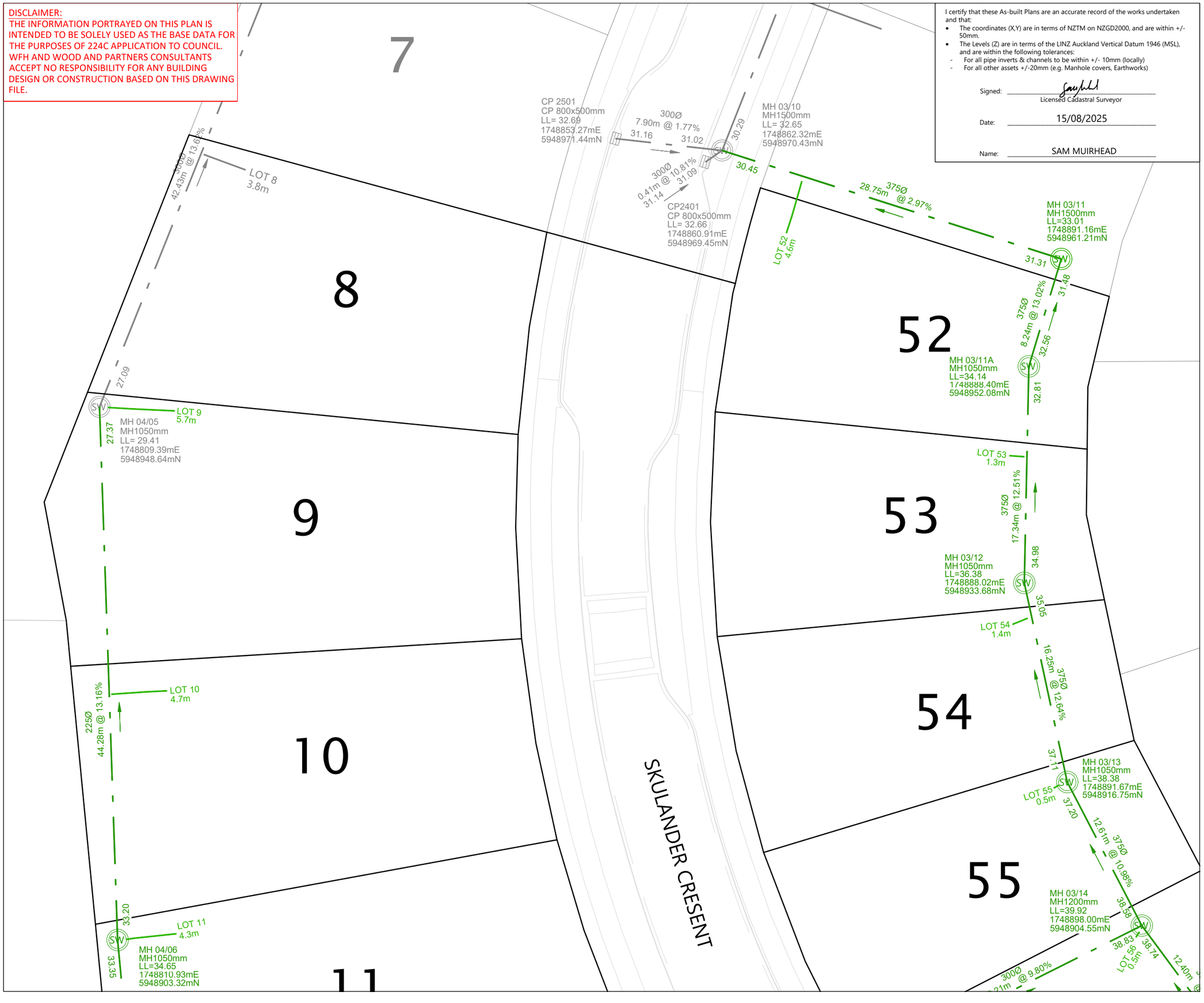
- The Levels (Z) are in terms of the LINZ Auckland Vertical Datum 1946 (MSL), and are within the following tolerances:
  - For all pipe inverts & channels to be within +/- 10mm (locally)
  - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed: _____ Licensed Cadastral Surveyor

Date: 15/08/2025

Name: SAM MUIRHEAD

WOODS Est.1970



LEGEND

- NEW STORMWATER MANHOLE
- NEW STORMWATER CESSPIT
- NEW STORMWATER
- EXISTING STORMWATER
- LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY
- STAGE BOUNDARY

NOTES

1. APPROVED EPA NUMBER: ENG60362263
2. COORDINATES ARE IN TERMS OF NZTM. ORIGIN IS ALP 10 DP 537959 SOURCED FROM LINZ DATABASE.
   ~ 5948844.96mN 1749267.16mE
3. LEVELS ARE IN TERMS OF AVD46. ORIGIN IS CA 15 (GD CODE B3BQ), RL = 24.82m, SOURCED FROM LINZ DATABASE.
4. CONVERSION FACTOR FROM AVD46 TO NZVD16 IS -310mm.
5. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
6. ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY DATA AND CONTRACTOR RECEIVED DATA.
7. MANHOLE COORDINATES ARE TO CENTRE OF CONCRETE MANHOLE CHAMBER.
8. ALL PIPES ARE RCRRJ AND PIPE AND MH DIAMETERS ARE INTERNAL AND SHOWN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
9. ALL MANHOLES ARE REINFORCED CONCRETE UNLESS OTHERWISE SPECIFIED.
10. ALL PRIVATE LOT CONNECTIONS ARE 100mmØ uPVC.
11. LOT CONNECTION LENGTHS ARE 2D LENGTHS CALCULATED FROM CONTRACTOR DATA WHERE THE LOT CONNECTION ENTERS THE MAIN LINE TO IT'S TERMINATION COORDINATE WITHIN THE LOT.

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	HD	15/08/25

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	RV	
DRAWN	HD	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

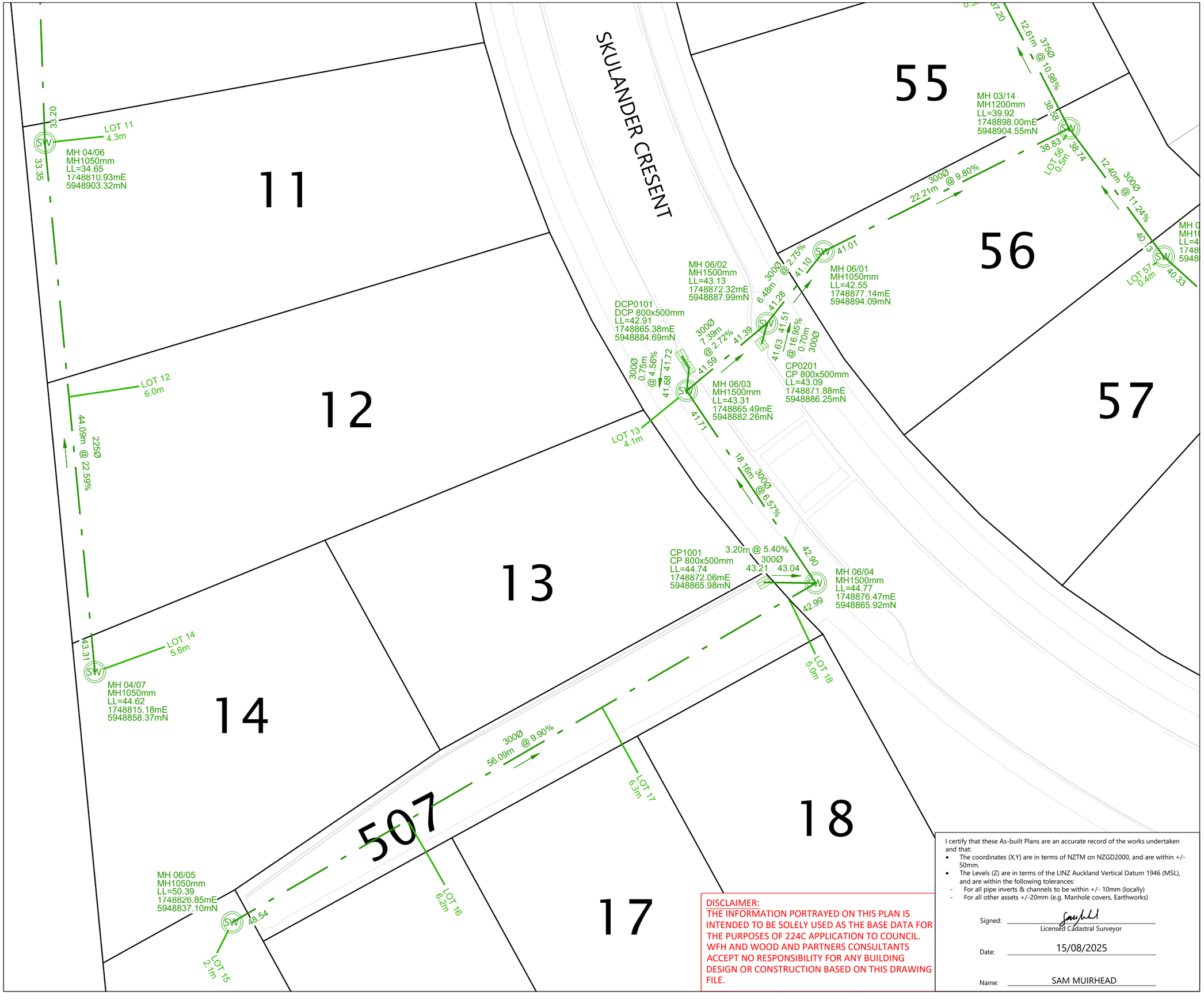
MILLWATER OREWA WEST PRECINCT 6 - STAGE 3

STORMWATER ASBUILT PLAN
SHEET 2 OF 4

STATUS	AS BUILT	REV
SCALE	1:300 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-437-03-3001-AB	

Plot Date: 313:50 pm,15 August 2025, SAMANTHAM

File: C:\2DSYNERGY\DATA\WP-PEN-APP-01\P22-437 - P6 STAGE 3 AND 4_21253\CAD\SURV\ABS3\P22-437-03-3000-AB STORMWATER.DWG



WOODS
Est.1970

LEGEND

- NEW STORMWATER MANHOLE
- NEW STORMWATER CESSPIT
- NEW STORMWATER
- EXISTING STORMWATER
- LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY
- STAGE BOUNDARY

NOTES

1. APPROVED EPA NUMBER: ENG60362263
2. COORDINATES ARE IN TERMS OF NZTM. ORIGIN IS ALP 10 DP 537959 SOURCED FROM LINZ DATABASE.
   ~ 5948844.96mN 1749267.16mE
3. LEVELS ARE IN TERMS OF AVD46. ORIGIN IS CA 15 (GD CODE B3BQ), RL = 24.82m, SOURCED FROM LINZ DATABASE.
4. CONVERSION FACTOR FROM AVD46 TO NZVD16 IS -310mm.
5. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
6. ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY DATA AND CONTRACTOR RECEIVED DATA.
7. MANHOLE COORDINATES ARE TO CENTRE OF CONCRETE MANHOLE CHAMBER.
8. ALL PIPES ARE RCRRJ AND PIPE AND MH DIAMETERS ARE INTERNAL AND SHOWN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
9. ALL MANHOLES ARE REINFORCED CONCRETE UNLESS OTHERWISE SPECIFIED.
10. ALL PRIVATE LOT CONNECTIONS ARE 100mmØ uPVC.
11. LOT CONNECTION LENGTHS ARE 2D LENGTHS CALCULATED FROM CONTRACTOR DATA WHERE THE LOT CONNECTION ENTERS THE MAIN LINE TO IT'S TERMINATION COORDINATE WITHIN THE LOT.

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	HD	15/08/25

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	RV	
DRAWN	HD	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 3

STORMWATER ASBUILT PLAN SHEET 3 OF 4

STATUS	AS BUILT	REV
SCALE	1:300 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-437-03-3002-AB	

DISCLAIMER:
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I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
- The Levels (Z) are in terms of the LINZ Auckland Vertical Datum 1946 (MSL), and are within the following tolerances:
  - For all pipe inverts & channels to be within +/- 10mm (locally)
  - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

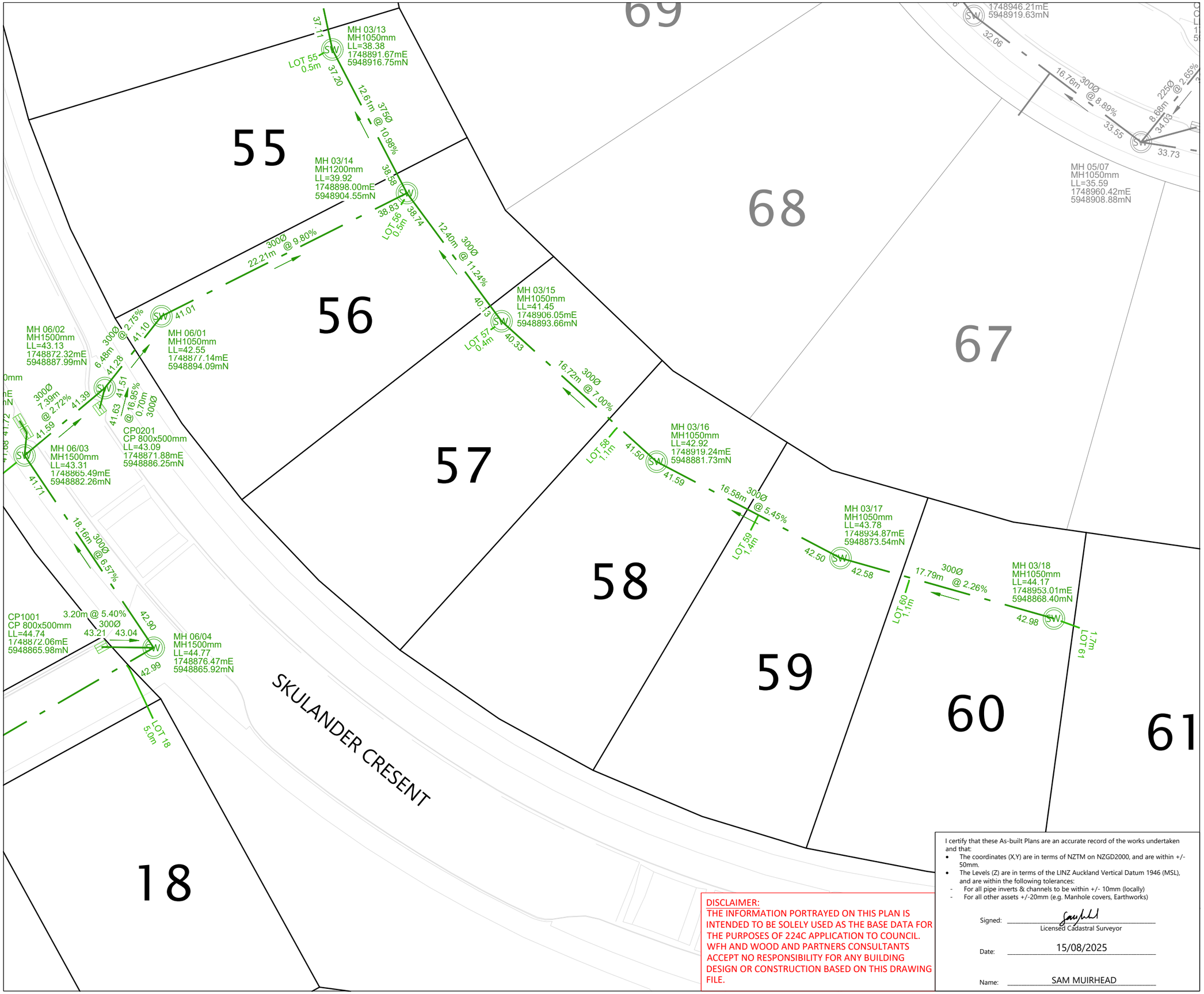
Signed: _____ Licensed Cadastral Surveyor

Date: 15/08/2025

Name: SAM MUIRHEAD

Plot Date: 3:13:51 pm,15 August 2025, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-437 - P6 STAGE 3 AND 4_2125\CAD\SURV\ABS3\P22-437-03-3000-AB STORMWATER.DWG



DISCLAIMER:
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- The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
- The Levels (Z) are in terms of the LINZ Auckland Vertical Datum 1946 (MSL), and are within the following tolerances:
  - For all pipe inverts & channels to be within +/- 10mm (locally)
  - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed: _____ Licensed Cadastral Surveyor

Date: 15/08/2025

Name: SAM MUIRHEAD

WOODS
Est.1970

LEGEND

- NEW STORMWATER MANHOLE
- NEW STORMWATER CESSPIT
- NEW STORMWATER
- EXISTING STORMWATER
- LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY
- STAGE BOUNDARY

NOTES

1. APPROVED EPA NUMBER: ENG60362263
2. COORDINATES ARE IN TERMS OF NZTM. ORIGIN IS ALP 10 DP 537959 SOURCED FROM LINZ DATABASE.
   ~ 5948844.96mN 1749267.16mE
3. LEVELS ARE IN TERMS OF AVD46. ORIGIN IS CA 15 (GD CODE B3BQ), RL = 24.82m, SOURCED FROM LINZ DATABASE.
4. CONVERSION FACTOR FROM AVD46 TO NZVD16 IS -310mm.
5. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
6. ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY DATA AND CONTRACTOR RECEIVED DATA.
7. MANHOLE COORDINATES ARE TO CENTRE OF CONCRETE MANHOLE CHAMBER.
8. ALL PIPES ARE RCRRJ AND PIPE AND MH DIAMETERS ARE INTERNAL AND SHOWN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
9. ALL MANHOLES ARE REINFORCED CONCRETE UNLESS OTHERWISE SPECIFIED.
10. ALL PRIVATE LOT CONNECTIONS ARE 100mmØ uPVC.
11. LOT CONNECTION LENGTHS ARE 2D LENGTHS CALCULATED FROM CONTRACTOR DATA WHERE THE LOT CONNECTION ENTERS THE MAIN LINE TO IT'S TERMINATION COORDINATE WITHIN THE LOT.

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	HD	15/08/25

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	RV	
DRAWN	HD	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 3

STORMWATER ASBUILT PLAN SHEET 4 OF 4

STATUS	AS BUILT	REV
SCALE	1:300 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-437-03-3003-AB	

Plot Date: 313:51 pm,15 August 2025, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-437 - P6 STAGE 3 AND 4_2125\CAD\SURV\ABS3\P22-437-03-3000-AB STORMWATER.DWG

SCHEDULE OF COORDINATES		
WASTEWATER LOT CONNECTIONS		
ID	EASTING	NORTHING
LOT 8	1748821.70	5948968.54
LOT 9	1748816.47	5948946.88
LOT 10	1748818.12	5948925.51
LOT 11	1748817.91	5948903.58
LOT 12	1748819.22	5948883.34
LOT 13	1748861.29	5948873.13
LOT 14	1748820.97	5948861.15

LOT 15	1748825.60	5948834.32
LOT 16	1748846.12	5948839.36
LOT 17	1748862.50	5948848.81
LOT 18	1748876.89	5948856.90
LOT 19	1749005.66	5948817.84
LOT 20	1749027.98	5948805.10
LOT 21	1749043.89	5948799.06
LOT 22	1749057.27	5948796.63
LOT 23	1749043.89	5948773.91
LOT 24	1749031.78	5948755.96

LOT 25	1749016.48	5948732.86
LOT 26	1749030.45	5948753.87
LOT 27	1749014.79	5948730.49
LOT 52	1748873.10	5948963.48
LOT 53	1748867.77	5948946.41
LOT 54	1748869.72	5948928.13
LOT 55	1748873.72	5948911.33
LOT 56	1748880.96	5948896.87
LOT 57	1748891.79	5948883.34
LOT 58	1748903.93	5948870.89

LOT 59	1748918.95	5948861.33
LOT 60	1748936.23	5948857.32
LOT 61	1748957.11	5948847.10
LOT 62	1748980.33	5948864.26
LOT 63	1749008.68	5948860.87
LOT 140	1749031.32	5948857.75
LOT 141	1749050.06	5948825.39
LOT 142	1749074.30	5948822.55
LOT 143	1749090.30	5948816.96
LOT 144	1749105.23	5948810.75

LOT 145	1749129.27	5948804.56
LOT 146	1749146.05	5948805.83
LOT 147	1749164.17	5948808.28
LOT 148	1749186.15	5948814.16
LOT 149	1749202.13	5948823.99
LOT 150	1749215.17	5948841.05
LOT 151	1749225.42	5948853.08

SKULANDER CRESCENT
KAUPEKA ROAD
PEKANGA ROAD
HAUHERE ROAD
KOWHAI ROAD
SHEET 4001
SHEET 4002
SHEET 4003
SHEET 4004
STAGE 3
STAGE 4

DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION BASED ON THIS DRAWING FILE.

I certify that these As-Built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
- The Levels (Z) are in terms of the LINZ Auckland Vertical Datum 1946 (MSL) and are within the following tolerances:
  - For all pipe inverts & channels to be an within +/- 10mm (locally)
  - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed: _____
Licensed Cadastral Surveyor

Date: 15/08/2025

Name: SAM MUIRHEAD

WOODS
Est.1970

LEGEND

- NEW SANITARY SEWER MANHOLE
- NEW SANITARY SEWER
- NEW RISING MAIN
- NEW OUTLET CARBON FILTER VENT (V)
- EXISTING SANITARY SEWER MANHOLE
- EXISTING SANITARY SEWER
- EXISTING SANITARY SEWER REMOVED
- LOT BOUNDARIES
- FUTURE LOT BOUNDARIES
- STAGE BOUNDARY
- DROP-PROTECTION STRUCTURE (DPS)
- UPDATED EXISTING LID LEVEL UDLL

NOTES

1. APPROVED EPA NUMBER: ENG60362263
2. ORIGIN OF COORDINATES ALP 10 DP 537959 SOURCED FROM LINZ DATABASE ~ 5948844.96mN 1749267.16mE
3. ORIGIN OF LEVELS IS CA 15 (GD CODE B3BQ), RL = 24.82m, SOURCED FROM LINZ DATABASE.
4. CONVERSION FACTOR FROM AVD46 TO NZVD16 IS -310mm.
5. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
6. ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY DATA AND CONTRACTOR RECEIVED DATA.
7. ALL PIPES ARE uPVC SN16 UNLESS OTHERWISE SPECIFIED.
8. ALL PRIVATE LOT CONNECTIONS ARE 100mmØ uPVC SN16.
9. ALL PIPE AND MH DIAMETERS ARE INTERNAL AND SHOWN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
10. ALL MANHOLES ARE REINFORCED CONCRETE UNLESS OTHERWISE SPECIFIED.
11. MANHOLE COORDINATES SHOWN ARE TO CENTRE OF CONCRETE MANHOLE CHAMBER.

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	15/08/25

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	RV	
DRAWN	HD	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

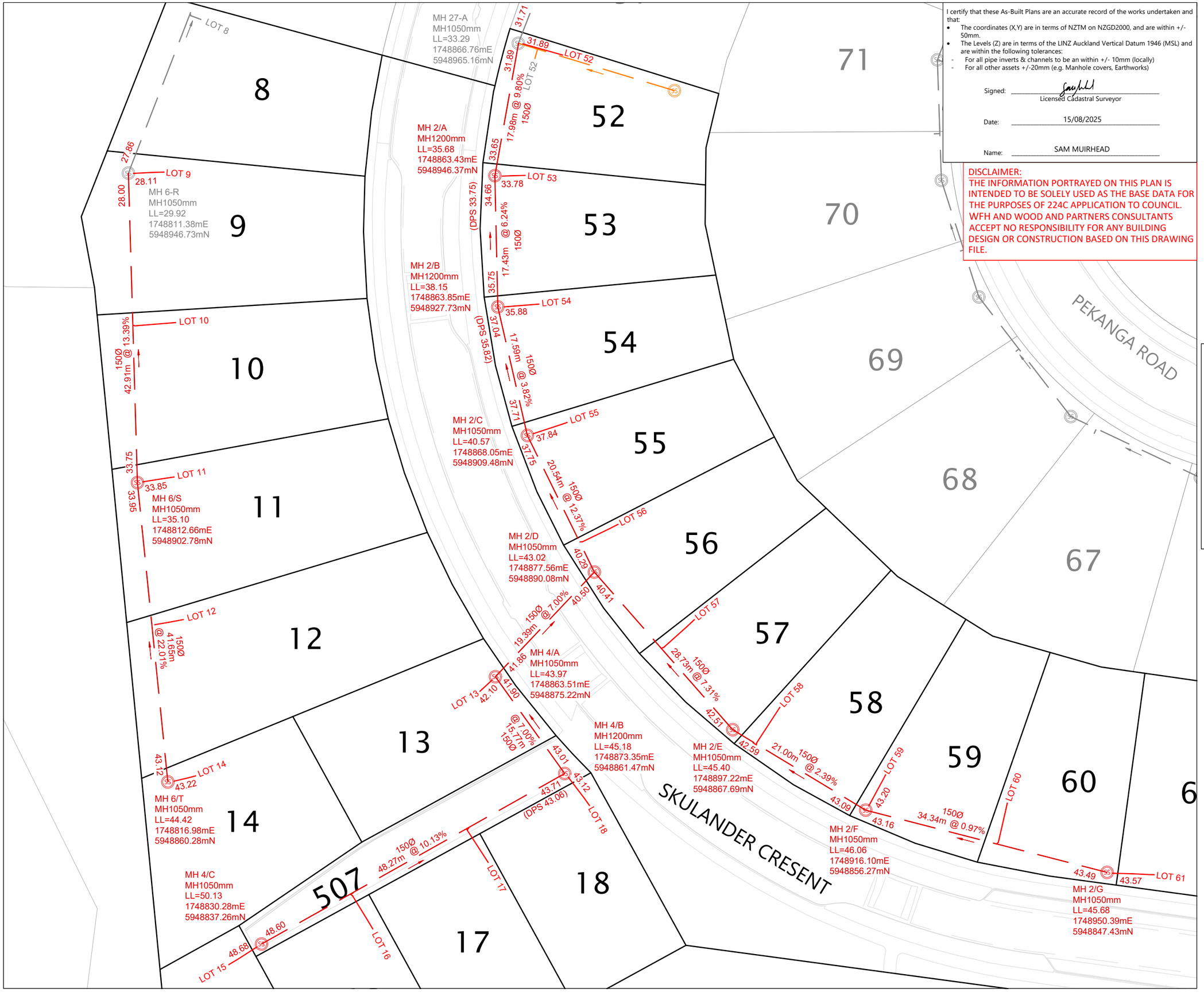
MILLWATER OREWA WEST PRECINCT 6 - STAGE 3 AND 4

WASTEWATER ASBUILT PLAN
SHEET 1 OF 5

STATUS	AS BUILT	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-437-00-4000-AB	

Plot Date: 3:46:03 pm,15 August 2025, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-437 - P6 STAGE 3 AND 4_2125\CAD\SURV\ABS3\P22-437-00-4000-AB WASTEWATER.DWG



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- The Levels (Z) are in terms of the LINZ Auckland Vertical Datum 1946 (MSL) and are within the following tolerances:
  - For all pipe inverts & channels to be an within +/- 10mm (locally)
  - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed: _____
Licensed Cadastral Surveyor

Date: 15/08/2025

Name: SAM MUIRHEAD

DISCLAIMER:
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WOODS
EST.1970

LEGEND

NEW SANITARY SEWER MANHOLE	SS
NEW SANITARY SEWER	
NEW RISING MAIN	
NEW OUTLET CARBON FILTER VENT	V
EXISTING SANITARY SEWER MANHOLE	SS
EXISTING SANITARY SEWER	
EXISTING SANITARY SEWER REMOVED	SS
LOT BOUNDARIES	
FUTURE LOT BOUNDARIES	
STAGE BOUNDARY	
DROP-PROTECTION STRUCTURE	(DPS)
UPDATED EXISTING LID LEVEL	UDLL

NOTES

1. APPROVED EPA NUMBER: ENG60362263
2. ORIGIN OF COORDINATES ALP 10 DP 537959 SOURCED FROM LINZ DATABASE ~ 5948844.96mN 1749267.16mE
3. ORIGIN OF LEVELS IS CA 15 (GD CODE B3BQ), RL = 24.82m, SOURCED FROM LINZ DATABASE.
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10. ALL MANHOLES ARE REINFORCED CONCRETE UNLESS OTHERWISE SPECIFIED.
11. MANHOLE COORDINATES SHOWN ARE TO CENTRE OF CONCRETE MANHOLE CHAMBER.

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	15/08/25

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	RV	
DRAWN	HD	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 3 AND 4

WASTEWATER ASBUILT PLAN
SHEET 2 OF 5

STATUS	AS BUILT	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-437-00-4001-AB	

Plot Date: 3:46:04 pm,15 August 2025, SAMANTHAM

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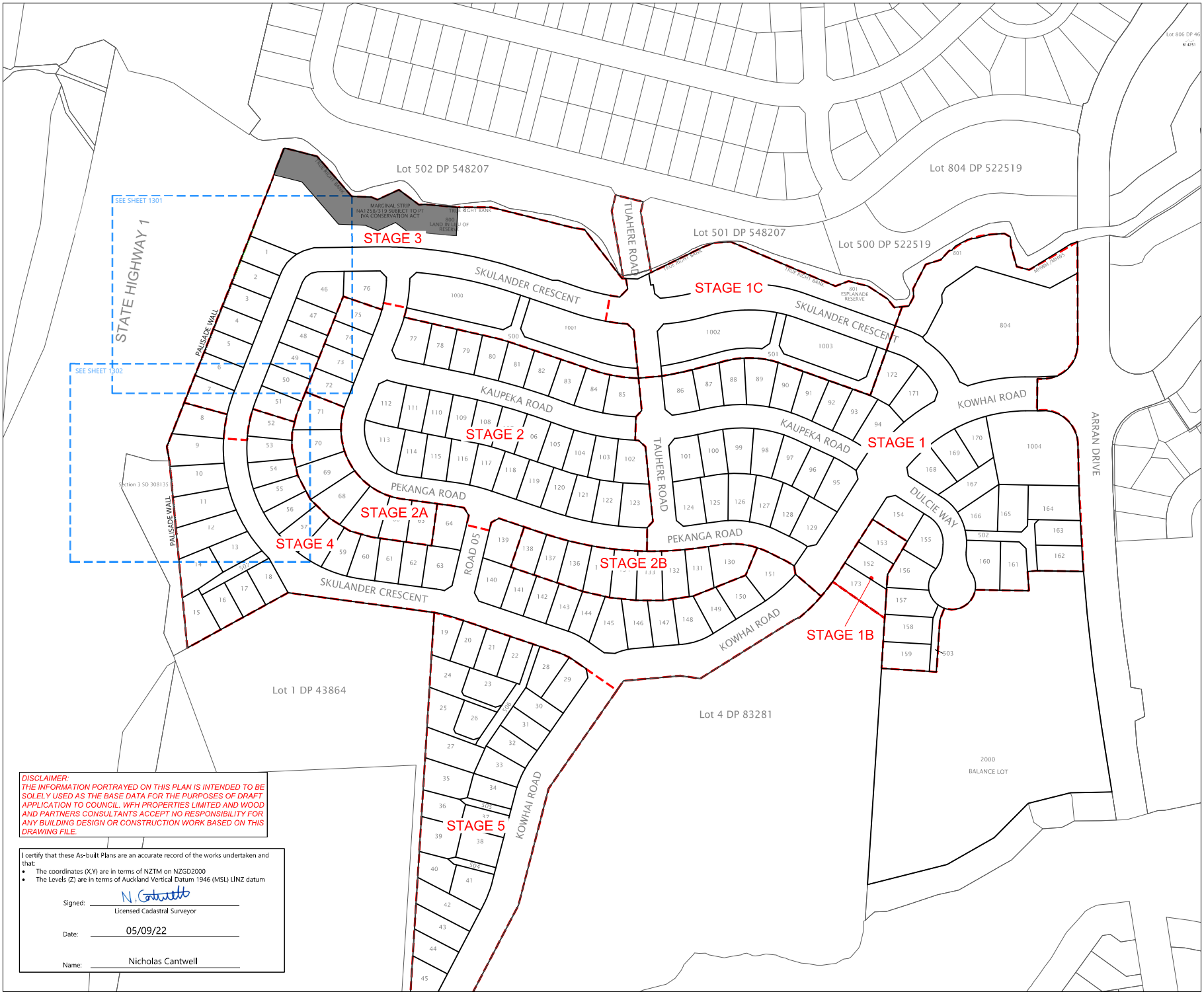

DISCLAIMER:
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I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: N. Cantwell
Licensed Cadastral Surveyor

Date: 05/09/22

Name: Nicholas Cantwell

WOODS Est.1970

LEGEND:

- 600MM STEEL REINFORCED CONCRETE PILE
- 650MM STEEL REINFORCED CONCRETE PILE
- LOT BOUNDARY
- STAGE BOUNDARY

NOTES:

-PILES ARE 600mm & 650mm IN DIAMETER
-PILES DATA SUPPLIED BY CONTRACTOR

REVISION DETAILS		BY	DATE
1	ISSUED FOR ASBUILT	MD	05/09/22

SURVEYED	HICKS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	TETRA TECH	
DRAWN	MD	
CHECKED	NC	
APPROVED	NC	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER - PRECINCT 6 OREWA WEST

PALISADE WALL ASBUILT LAYOUT PLAN SHEET 1 OF 3

STATUS	ISSUED FOR ASBUILT	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37600-00-1300-AB	

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DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF DRAFT APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

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- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: N. Cantwell
Licensed Cadastral Surveyor

Date: 05/09/22

Name: Nicholas Cantwell

WOODS Est.1970

LEGEND:

- 600MM STEEL REINFORCED CONCRETE PILE
- 650MM STEEL REINFORCED CONCRETE PILE
- LOT BOUNDARY
- STAGE BOUNDARY

NOTES:

-PILES ARE 600mm & 650mm IN DIAMETER
-PILES DATA SUPPLIED BY CONTRACTOR

REVISION	DETAILS	BY	DATE
1	ISSUED FOR ASBUILT	MD	05/09/22

SURVEYED	HICKS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	TETRA TECH	
DRAWN	MD	
CHECKED	NC	
APPROVED	NC	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER - PRECINCT 6
OREWA WEST

PALISADE WALL ASBUILT
SHEET 2 OF 3

STATUS	ISSUED FOR ASBUILT	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37600-00-1301-AB	

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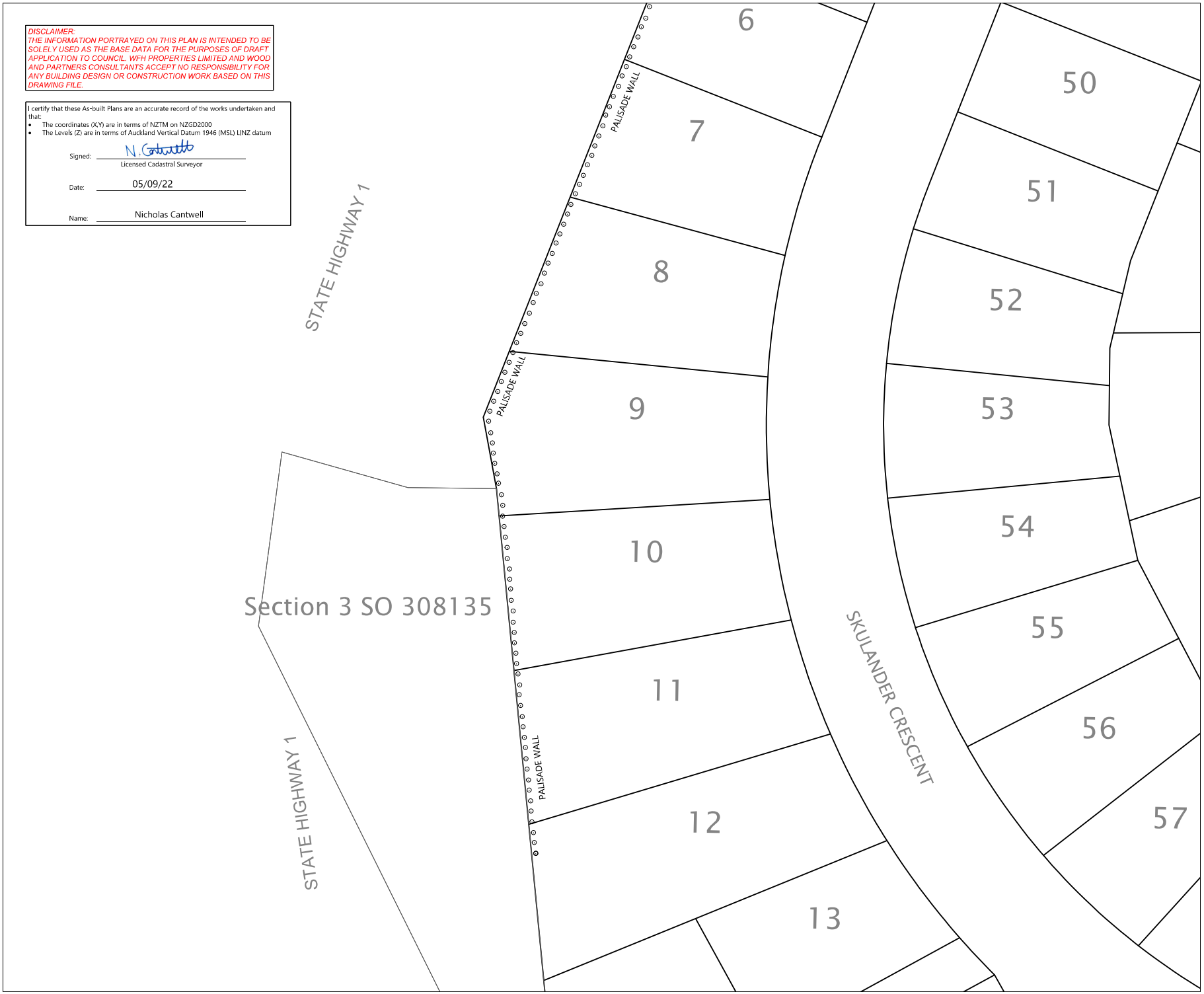

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Signed: N. Cantwell
Licensed Cadastral Surveyor

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Name: Nicholas Cantwell

WOODS Est.1970

LEGEND:

- 600MM STEEL REINFORCED CONCRETE PILE
- 650MM STEEL REINFORCED CONCRETE PILE
- LOT BOUNDARY
- STAGE BOUNDARY

NOTES:

-PILES ARE 600mm & 650mm IN DIAMETER
-PILES DATA SUPPLIED BY CONTRACTOR

REVISION DETAILS		BY	DATE
1	ISSUED FOR ASBUILT	MD	05/09/22

SURVEYED	HICKS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	TETRA TECH	
DRAWN	MD	
CHECKED	NC	
APPROVED	NC	WOODS.CO.NZ

N

WFH PROPERTIES

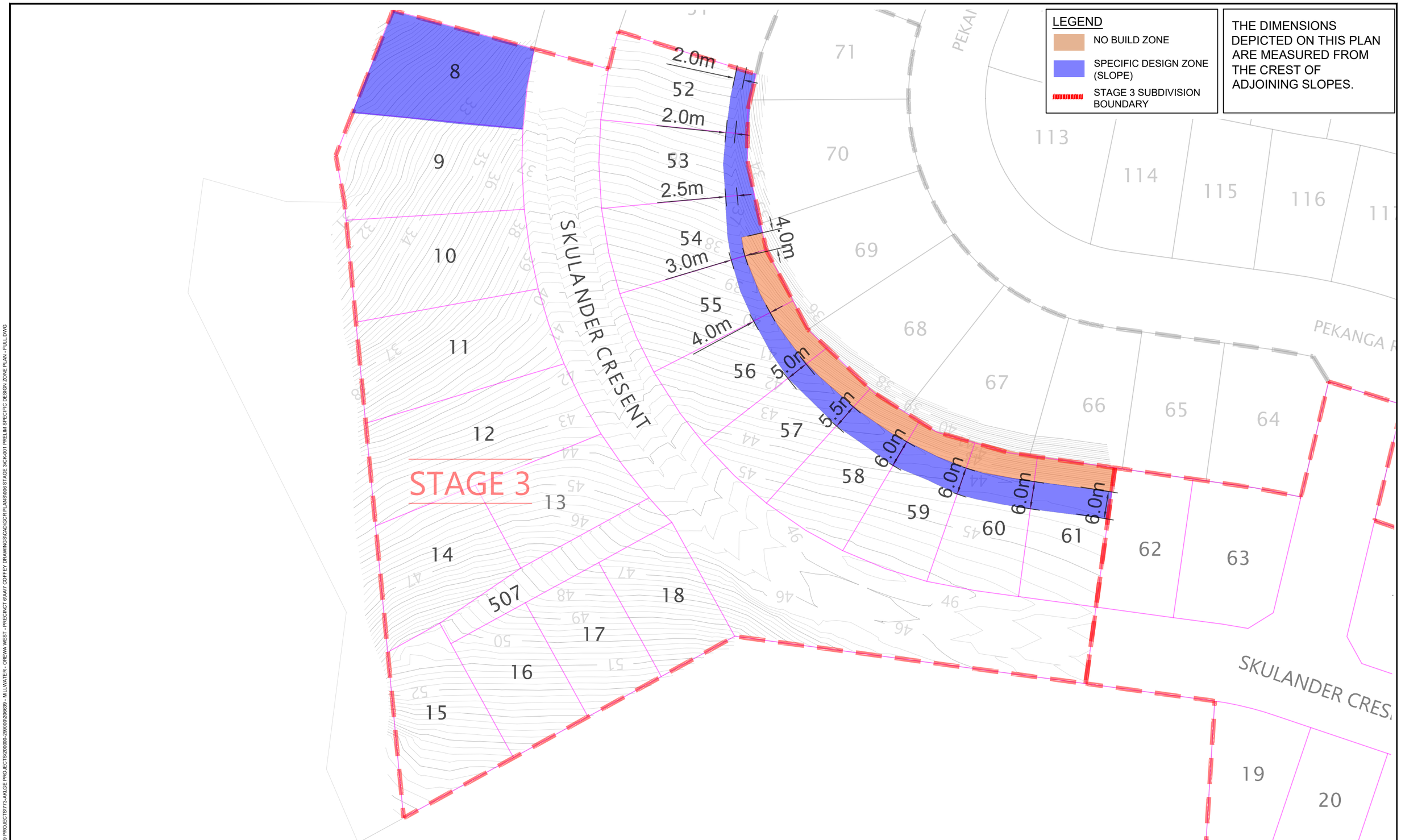
MILLWATER - PRECINCT 6
OREWA WEST

PALISADE WALL ASBUILT
SHEET 3 OF 3

STATUS	ISSUED FOR ASBUILT	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37600-00-1302-AB	

C:\12DSYNERGY\DATA\WP-PEN-APP-01\37600 - PRECINCT 6_328\CAD\SURV\AB\37600_00_1302_AB PALISADE WALLS.DWG, 2022-Sep-05 09:52, PRINT AS PDF FLAT.PC3, MattD

APPENDIX B: REFERENCE DRAWINGS



revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	FS	SP	04/08/2025

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SCALE 1:750 (A3) METRES

drawn	FS
approved	SP
date	04/08/2025
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

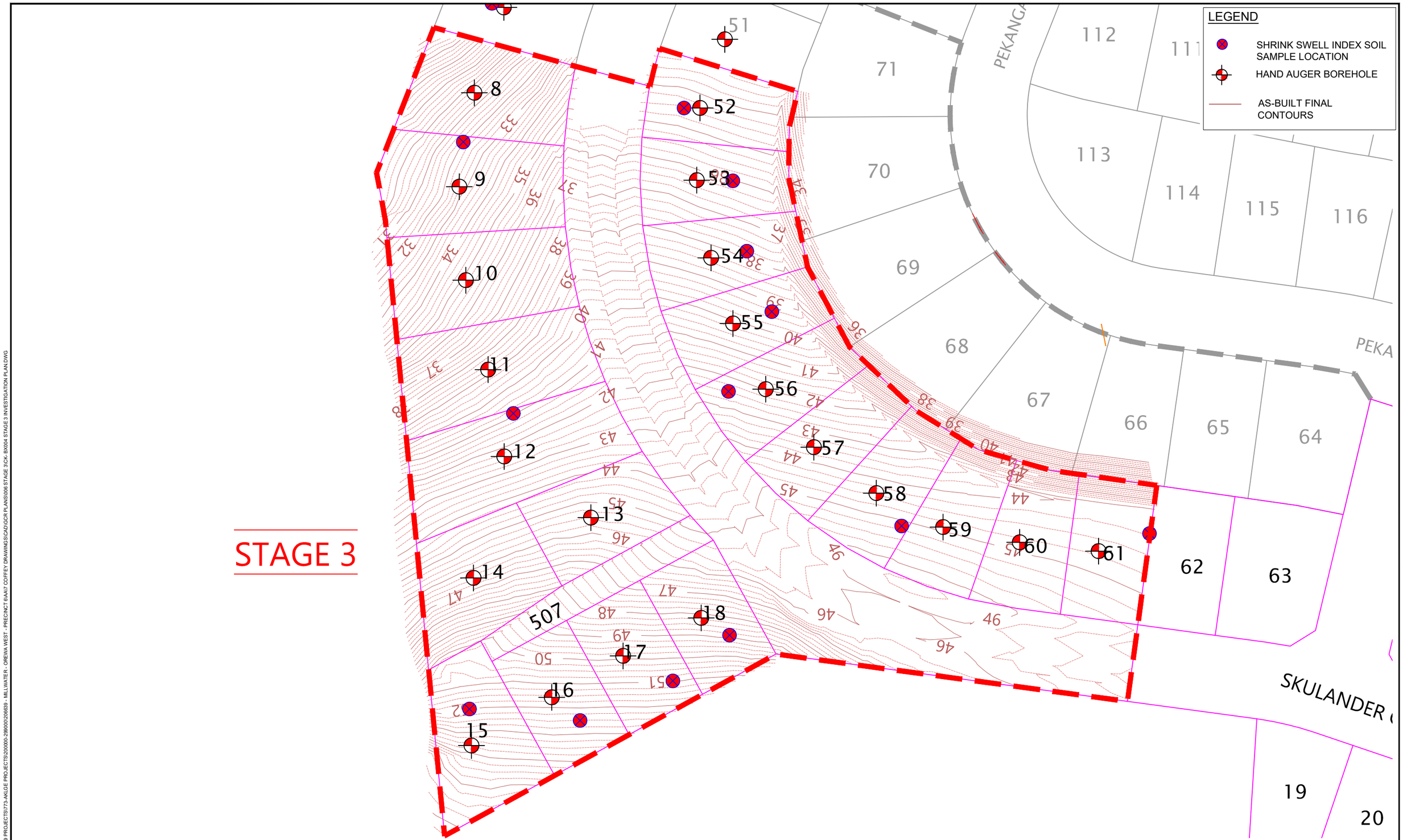
client: WFH PROPERTIES LIMITED

project: MILLWATER ARRAN HILLS PRECINCT 6 - STAGE 3

title: GEOTECHNICAL BUILDING LIMITATION ZONE PLAN

project no: 773-AKLGE206639 | figure no: CK/001 | rev: A

PLOT DATE: 4/08/2025 6:22:30 pm DWG FILE: F:\GENZ9 PROJECTS\773-AKLGE PROJECTS\200000-299000\206639 - MILLWATER - OREWA WEST - PRECINCT 6\AA7 COFFEY DRAWINGS\CAD\GCR PLANS\006 STAGE 3\CK\001 PRELIM SPECIFIC DESIGN ZONE PLAN - FULL.DWG



revision	no.	description	drawn	approved	date
	A	FOR STAGE 3 GEOTECHNCIAL COMPLETION REPORT	FS	SP	08/08/2025

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SCALE 1:750 (A3) METRES

drawn	EP
approved	SP
date	08/08/2024
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

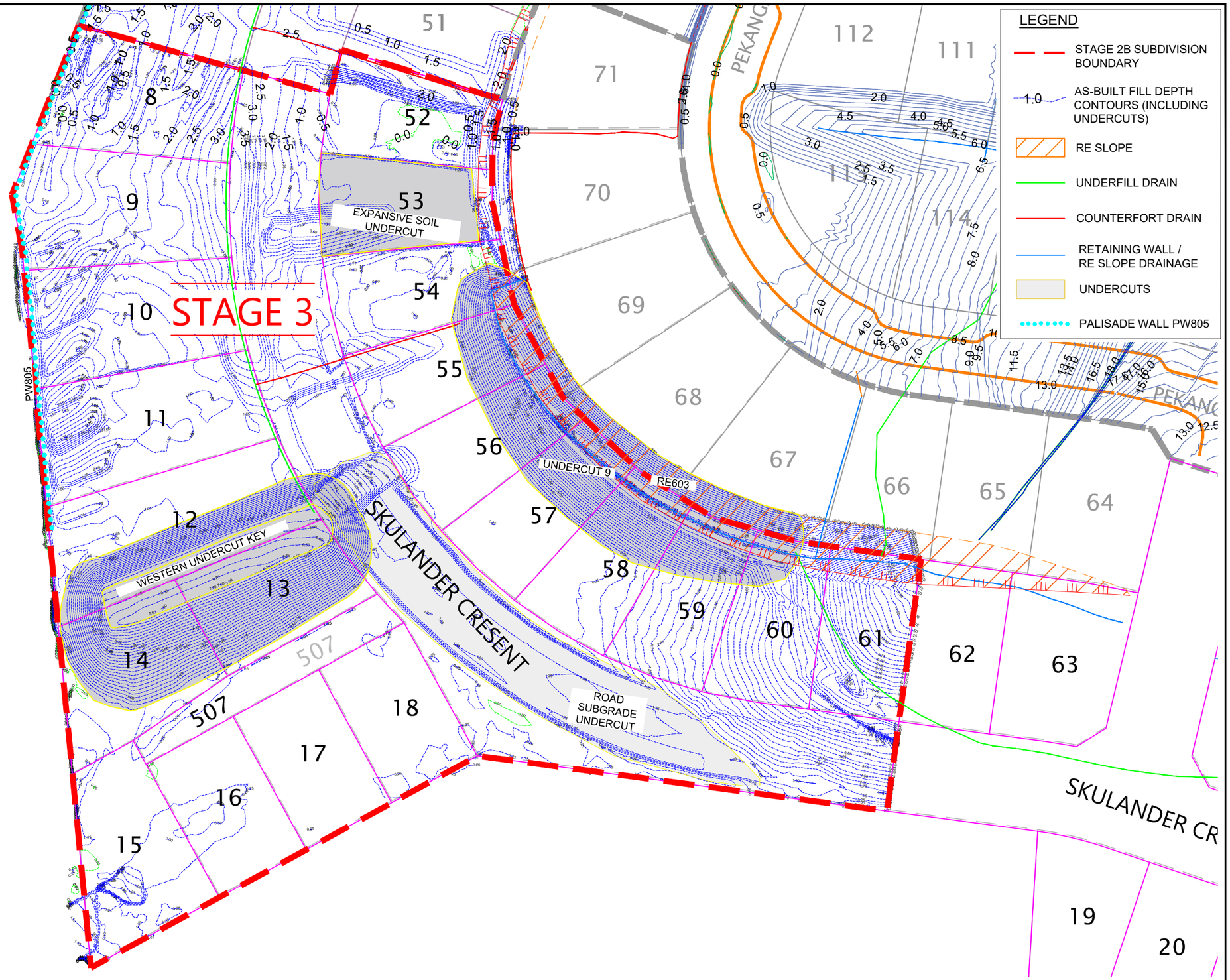
client: WFH PROPERTIES LTD

project: MILLWATER - OREWA WEST - PRECINCT 6
ARRAN HILLS SUBDIVISION STAGE 3

title: GEOTECHNICAL INVESTIGATION PLAN

project no: 773-AKLGE206639 | figure no: CK/002 | rev: A

PLOT DATE: 8/08/2025 1:54:16 pm DWG FILE: F:\GENZ9 PROJECTS\773-AKLGE PROJECTS\200000-299000\206639 - MILLWATER - OREWA WEST - PRECINCT 6\AA7 COFFEY DRAWINGS\CAD\GCR PLANS\006 STAGE 3\CK- BX004 STAGE 3 INVESTIGATION PLAN.DWG



revision	no.	description	drawn	approved	date
	A	FOR STAGE 3 GEOTECHNCIAL COMPLETION REPORT	EP	SP	07/08/2024

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SCALE 1:750 (A3) METRES

drawn	EP
approved	SP
date	07/08/2025
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

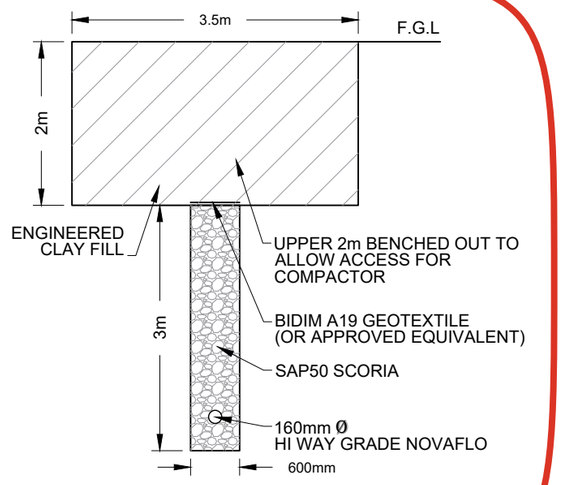
client: WFH PROPERTIES LTD

project: MILLWATER - OREWA WEST - PRECINCT 6
ARRAN HILLS SUBDIVISION STAGE 3

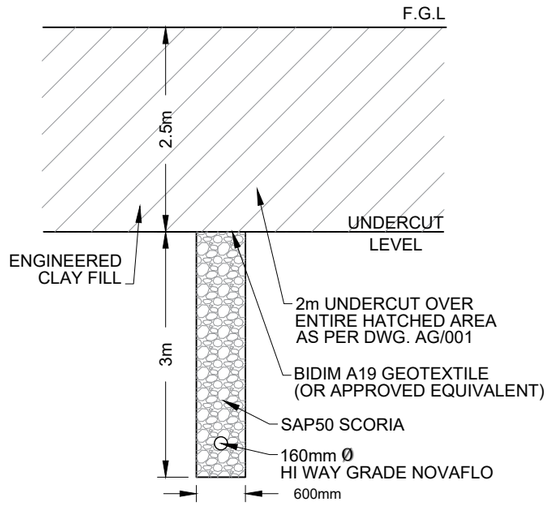
title: GEOTECHNICAL WORKS PLAN

project no: 773-AKLGE206639 | figure no: CK/003 | rev: A

PLOT DATE: 8/08/2025 10:24:56 am DWG FILE: F:\GEN\Z9 PROJECTS\773-AKLGE PROJECTS\200000-299000\206639 - MILLWATER - OREWA WEST - PRECINCT 6\AA\7 COFFEY DRAWINGS\CAD\GCR PLANS\000 STAGE 3\CK-003 STAGE 3 GEOTECHNICAL WORKS PLAN.DWG



CF DRAIN DETAIL 1
SCALE:1:75



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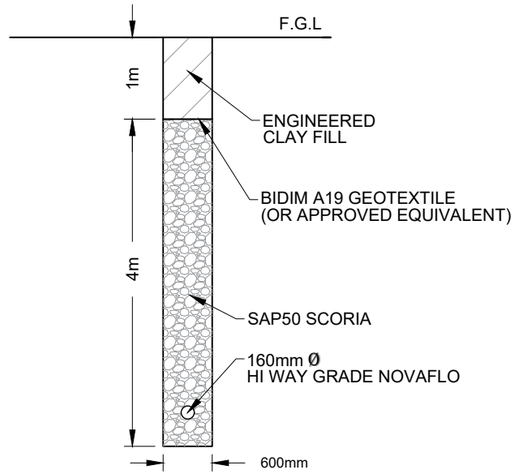
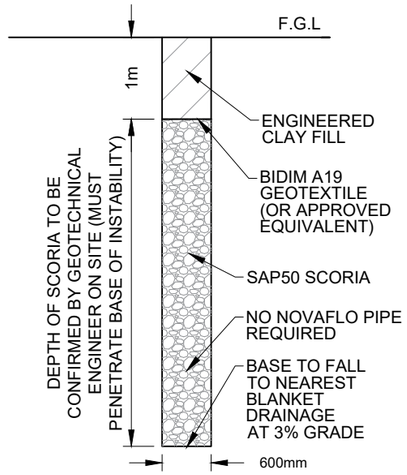
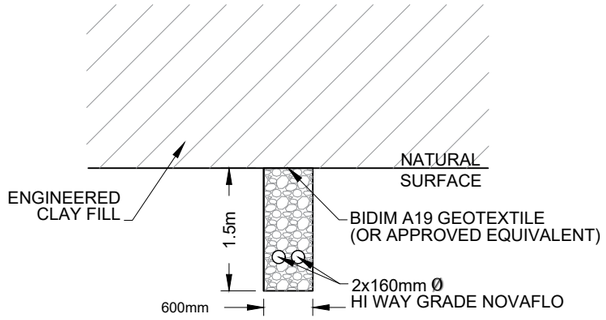


CF DRAIN DETAIL 3
SCALE:1:75



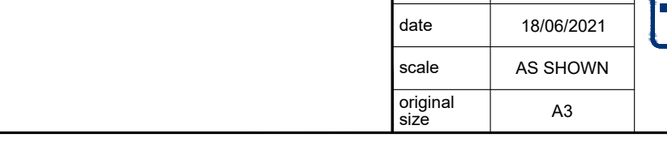
CF DRAIN DETAIL 4
SCALE:1:75

LOT 52 AND 55 SUBSOIL DRAINS



UNDERFILL DRAIN STANDARD DETAIL
SCALE:1:75

STAGE 3 UNDERFILL DRAINS DETAIL



COLLECTOR DRAIN DETAIL
SCALE:1:75

SHEARKEY OUTLET DETAIL
SCALE:1:150

UNDERFILL OUTLET DETAIL
SCALE:1:150

WINGWALL GRILL DETAIL
SCALE:1:150

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE (FOR EW GDR)	RZ	SP	04/12/2019
	B	UPDAT TO CF DRAIN LAYOUT	RZ	SP	20/07/2020
	C	UPDATED AS OF END OF 2020/2021 EARTHWORKS SEASON	RZ	SP	18/06/2021

drawn	RZ
approved	SP
date	18/06/2021
scale	AS SHOWN
original size	A3

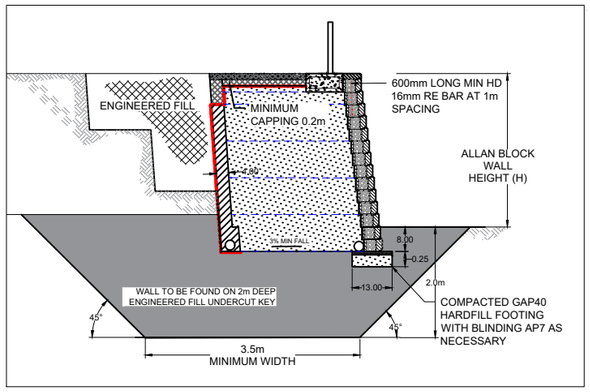
TETRA TECH COFFEY

client: WFH PROPERTIES LTD

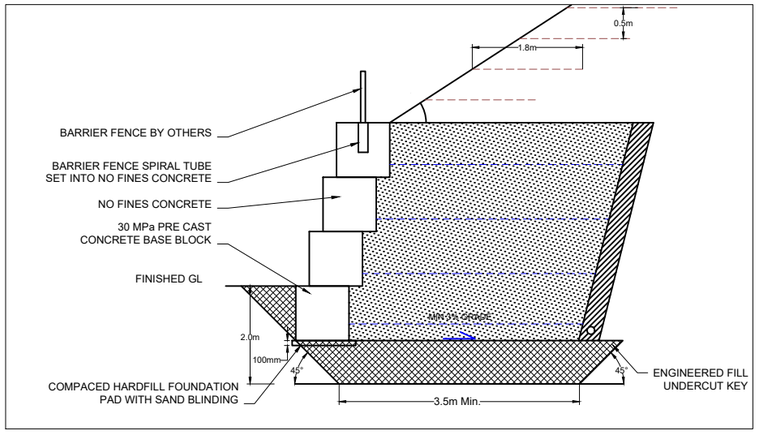
project: MILLWATER - OREWA WEST - PRECINCT 6

title: SUBSOIL DRAINAGE STANDARD DETAILS

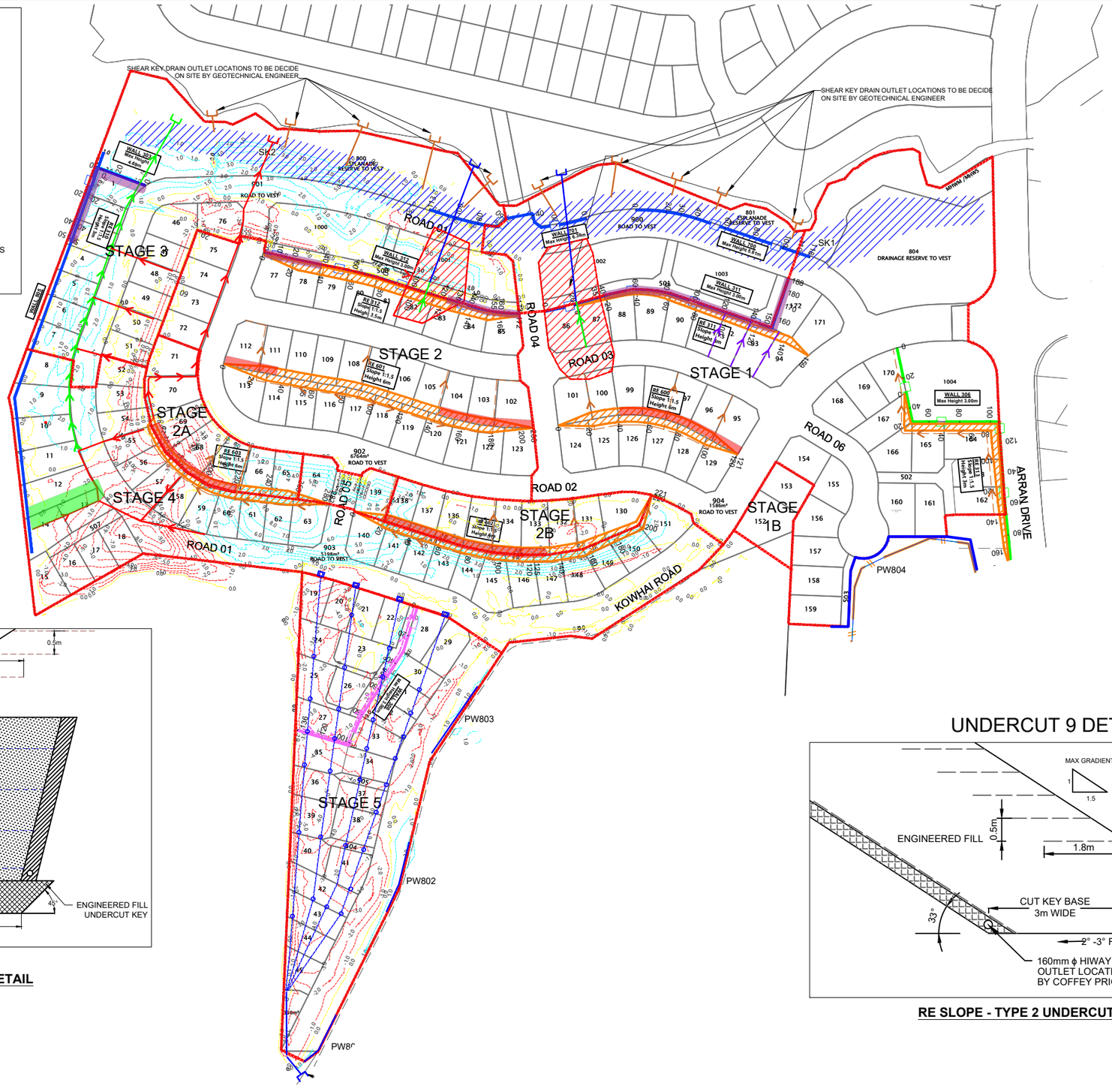
project no: 773-AKLGE206639 | figure no: AG/007 | rev: C



ALLAN BLOCK WALL UNDERCUT KEY DETAIL



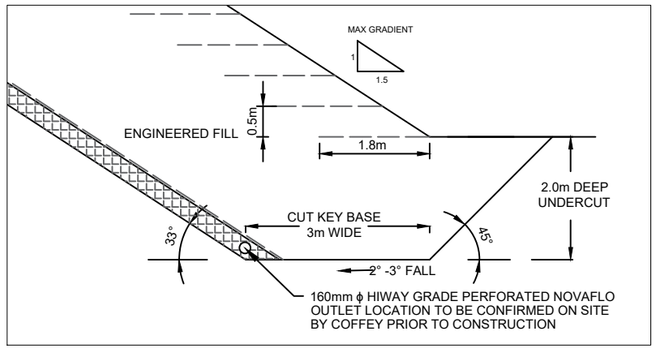
MASS BLOCK WALL UNDERCUT KEY DETAIL



LEGEND

- PROPOSED CUT CONTOURS (1m INTERVAL)
- PROPOSED FILL CONTOURS (1m INTERVAL)
- RETAINING WALL - KEYSTONE
- RETAINING WALL - MASS BLOCK
- RETAINING WALL - TIMBER
- PROPOSED PALISADE WALLS
- SITE BOUNDARY
- STAGE BOUNDARY
- SHEAR KEY EXCAVATION
- 2.5M NOMINAL UNDERCUTS
- UNSUITABLE UNDERCUTS
- ALLAN BLOCK WALL UNDERCUT KEY DETAIL
- MASS BLOCK WALL UNDERCUT KEY DETAIL
- RE SLOPE TYPE 2 UNDERCUT KEY DETAIL
- UNDERCUT KEY
- REINFORCED EARTH WALL

UNDERCUT 9 DETAIL



RE SLOPE - TYPE 2 UNDERCUT KEY DETAIL

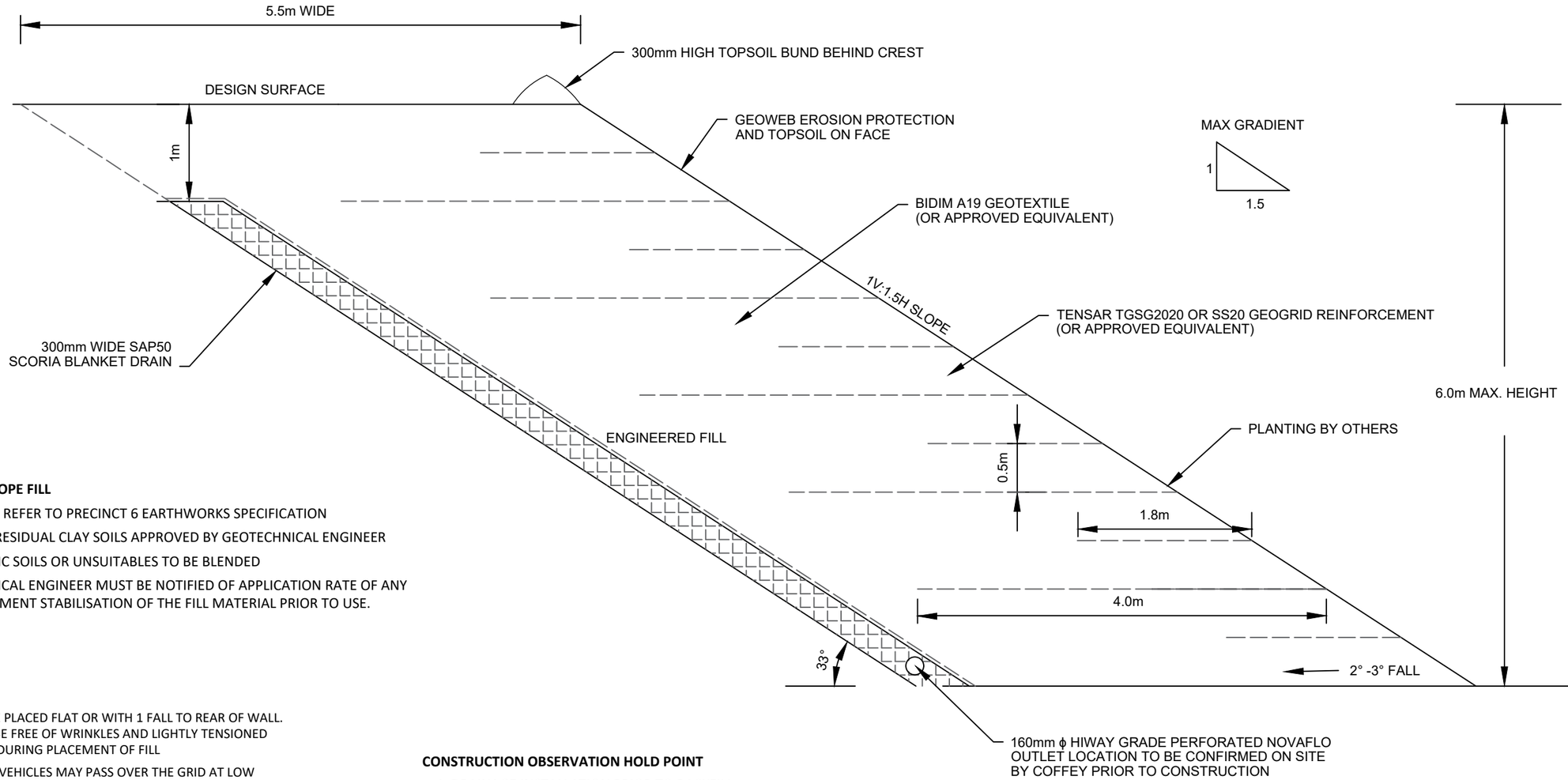
revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	RZ	SP	20/11/2019
	B	AMENDED FOR 2021/2022 EARTHWORKS SEASON	RZ	SP	19/11/2021
	C	AMENDED FOR 2022/20223 EARTHWORKS SEASON	SP	SP	14/06/2022
	D	AMENDED FOR START OF 2022 - 2023 EARTHWORKS SEASON	SP	SP	27/09/2022

0 30 60 90 120 150
SCALE 1:3000 (A3) METRES

drawn	SP
approved	SP
date	27/09/2022
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

client:	WFH PROPERTIES LTD		
project:	MILLWATER - OREWA WEST - PRECINCT 6		
title:	UNDERCUT DETAIL PLAN		
project no: 773-AKLGE206639	figure no: AG/008	rev: D	



ENGINEERED SLOPE FILL

- MATERIAL - REFER TO PRECINCT 6 EARTHWORKS SPECIFICATION
- SITE WON RESIDUAL CLAY SOILS APPROVED BY GEOTECHNICAL ENGINEER
- NO ORGANIC SOILS OR UNSUITABLES TO BE BLENDED
- GEOTECHNICAL ENGINEER MUST BE NOTIFIED OF APPLICATION RATE OF ANY LIME OR CEMENT STABILISATION OF THE FILL MATERIAL PRIOR TO USE.

GENERAL NOTES:

1. GEOGRID TO BE PLACED FLAT OR WITH 1 FALL TO REAR OF WALL. GRID SHOULD BE FREE OF WRINKLES AND LIGHTLY TENSIONED PRIOR TO AND DURING PLACEMENT OF FILL
2. RUBBER TYPED VEHICLES MAY PASS OVER THE GRID AT LOW SPEEDS. A MINIMUM OF 150MM OF FILL SHALL BE PLACED ON THE GRID PRIOR TO TRAFFICKING BY TRACKED VEHICLES. EXTRA CARE MUST BE TAKEN WHEN USING SHEEPSFOOT TYPE COMPACTORS TO ENSURE THE GRID IS NOT DAMAGED DURING COMPACTION.
3. GRID LAYER MUST BE CONTINUOUS OVER THE DESIGN EMBEDMENT LENGTH. NO JOINS ARE PERMITTED PARALLEL TO THE FACE. LAPS PERPENDICULAR TO THE FACE ARE TO OVERLAP BY 100MM.
4. SUBSOIL DRAINS TO MAINTAIN CONTINUOUS FALL OF A MINIMUM OF 8% TO THE OUTLET. CONNECTION TO STORMWATER MANHOLE TO COMPRISE OF A SOLID 100MM PVC CONNECTION.

CONSTRUCTION OBSERVATION HOLD POINT

1. DRAINAGE INSTALLATION PRIOR TO BACKFILL;
2. GRID LAYER PLACEMENT;
3. COMPACTION TEST FREQUENCY OF 1 TEST PER METRE;
4. CONNECTION OF DRAINAGE TO PUBLIC STORMWATER NETWORK;
5. PLACEMENT OF TOP SOIL AND GEOWEB.

FILL BATTER DETAIL FOR RE 600, 601, 602 AND 603
MAX BATTER HEIGHT 6m MAX BATTER GRADIENT 1V:1.5H

FOR CONSTRUCTION

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	RZ	SP	18/07/2019
	B	UPDATED AFTER AMENDMENTS TO DESIGN	RZ	AC	26/02/2020
	C	FOR CONSTRUCTION	RZ	SP	18/06/2020
	D	DESIGN CHANGE	SP	SP	14/06/2022

SCALE 0 0.5 1 1.5 2 2.5 METRES — 1:50 (A3)

drawn	SP
approved	SP
date	14/06/2022
scale	AS SHOWN
original size	A3

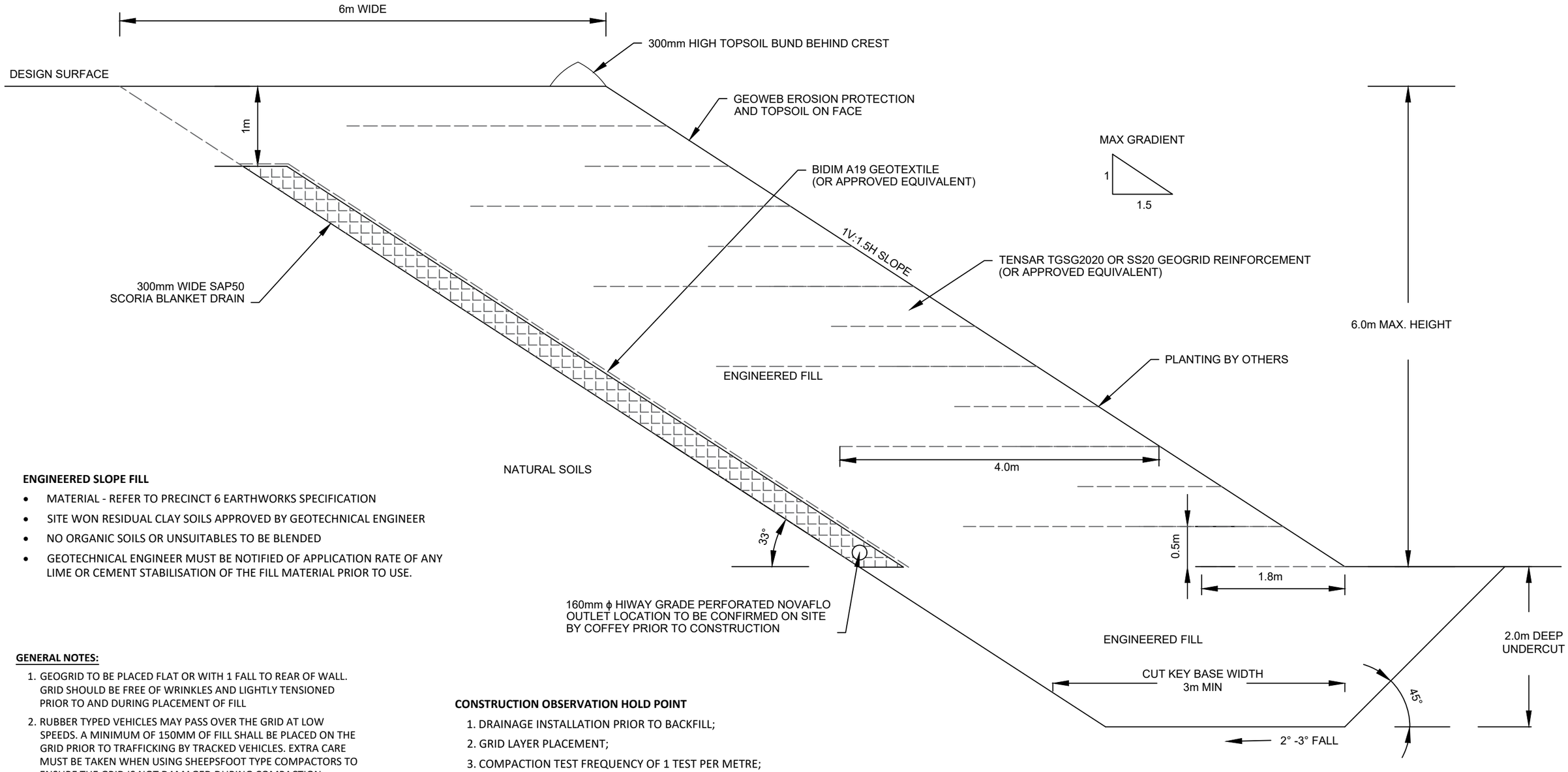
coffey
A TETRA TECH COMPANY

client: WFH PROPERTY LTD.

project: MILLWATER PRECINCT 6

title: REINFORCED EARTH SLOPE - FILL BATTER DETAIL

project no: 773-AKLGE206639 | figure no: AF/001 | rev: D



ENGINEERED SLOPE FILL

- MATERIAL - REFER TO PRECINCT 6 EARTHWORKS SPECIFICATION
- SITE WON RESIDUAL CLAY SOILS APPROVED BY GEOTECHNICAL ENGINEER
- NO ORGANIC SOILS OR UNSUITABLES TO BE BLENDED
- GEOTECHNICAL ENGINEER MUST BE NOTIFIED OF APPLICATION RATE OF ANY LIME OR CEMENT STABILISATION OF THE FILL MATERIAL PRIOR TO USE.

GENERAL NOTES:

1. GEOGRID TO BE PLACED FLAT OR WITH 1 FALL TO REAR OF WALL. GRID SHOULD BE FREE OF WRINKLES AND LIGHTLY TENSIONED PRIOR TO AND DURING PLACEMENT OF FILL
2. RUBBER TYPED VEHICLES MAY PASS OVER THE GRID AT LOW SPEEDS. A MINIMUM OF 150MM OF FILL SHALL BE PLACED ON THE GRID PRIOR TO TRAFFICKING BY TRACKED VEHICLES. EXTRA CARE MUST BE TAKEN WHEN USING SHEEPSFOOT TYPE COMPACTORS TO ENSURE THE GRID IS NOT DAMAGED DURING COMPACTION.
3. GRID LAYER MUST BE CONTINUOUS OVER THE DESIGN EMBEDMENT LENGTH. NO JOINS ARE PERMITTED PARALLEL TO THE FACE. LAPS PERPENDICULAR TO THE FACE ARE TO OVERLAP BY 100MM.
4. SUBSOIL DRAINS TO MAINTAIN CONTINUOUS FALL OF A MINIMUM OF 8% TO THE OUTLET. CONNECTION TO STORMWATER MANHOLE TO COMPRISE OF A SOLID 100MM PVC CONNECTION.

CONSTRUCTION OBSERVATION HOLD POINT

1. DRAINAGE INSTALLATION PRIOR TO BACKFILL;
2. GRID LAYER PLACEMENT;
3. COMPACTION TEST FREQUENCY OF 1 TEST PER METRE;
4. CONNECTION OF DRAINAGE TO PUBLIC STORMWATER NETWORK;
5. PLACEMENT OF TOP SOIL AND GEOWEB.

CUT BATTER DETAIL FOR RE 600,601, 602 AND 603
MAX BATTER HEIGHT 6m MAX BATTER GRADIENT 1V:1.5H

FOR CONSTRUCTION

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	RZ	SP	18/07/2019
	B	UPDATED AFTER AMENDMENTS TO DESIGN	RZ	AC	26/02/2020
	C	FOR CONSTRUCTION	RZ	SP	18/06/2020
	D	DESIGN CHANGE	SP	SP	14/06/2022

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SCALE 1:50 (A3) METRES

drawn	SP
approved	SP
date	14/06/2022
scale	AS SHOWN
original size	A3

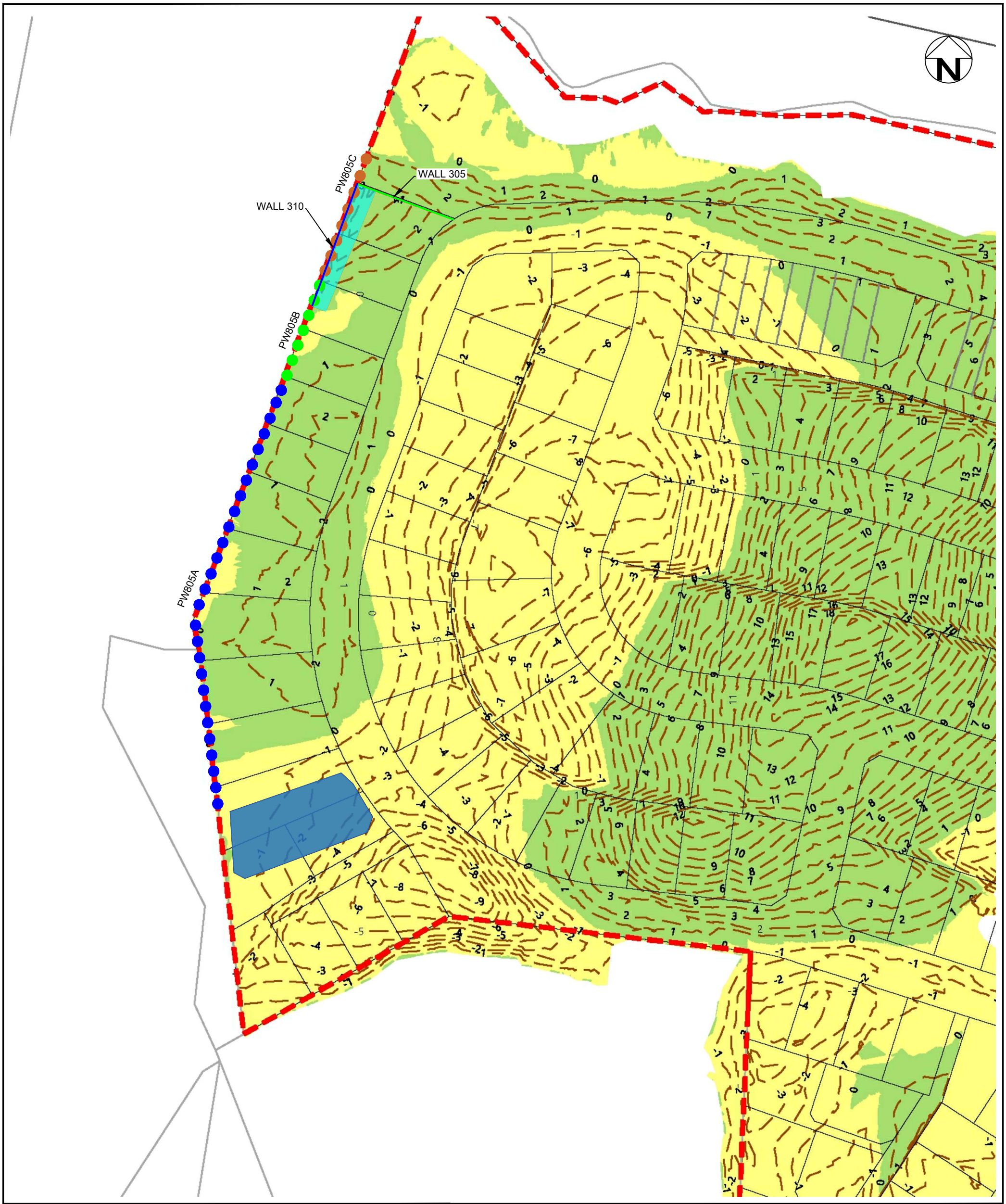
coffey
A TETRA TECH COMPANY

client: WFH PROPERTY LTD.

project: MILLWATER PRECINCT 6

title: REINFORCED EARTH SLOPE - CUT BATTER DETAIL

project no: 773-AKLGE206639 | figure no: AF/002 | rev: D



revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	RZ	AC	05/10/2021
	B	FOR CONSENT	SP	SP	30/09/2021

LEGEND

- 3 — CUT CONTOUR
- 0 — ZERO CUT / FILL CONTOUR
- 3 — FILL CONTOUR
- BOUNDARY
- CUT AREAS
- FILL AREAS
- UNDERCUT
- WALL 305
- WALL 310
- PW805A
- PW805B
- PW805C
- UNDERCUT KEY

0 12.5 25 37.5 50 62.5

SCALE 1:1250 (A3) METRES

drawn	SP
approved	SP
date	30/09/2021
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

client: WFH PROPERTIES LTD.

project: MILLWATER -OREWA WEST - PRECINCT 6

title: GEOTECHNICAL REMEDIATION PLAN - WESTERN SECTION

project no: 773-AKLGE206639 | figure no: AY-003 | rev: B

PLOT DATE: 5/10/2021 12:37:46 PM DWG FILE: C:\USERS\ROY.ZHOU\DESKTOP\AY\773-AKLGE206639-AY.DWG

IN-GROUND PILE WALL CONSTRUCTION OBSERVATIONS AND MONITORING

OBSERVATIONS OF ALL ASPECTS OF THE RETAINING WALL CONSTRUCTION ARE REQUIRED BY TETRA TECH COFFEY TO CONFIRM THAT THE DESIGN REQUIREMENTS ARE SATISFIED AND TO ENABLE CERTIFICATION OF THE COMPLETED WORKS. THIS LEVEL OF CONSTRUCTION MONITORING IS CONSISTENT WITH ENGNZ MONITORING LEVEL CM4. THESE INCLUDE, BUT MAY NOT BE LIMITED TO OBSERVATIONS AT THE FOLLOWING **HOLD POINTS:**

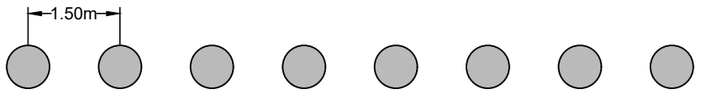
- REVIEW OF SET OUT OF PILE POSITIONS/ WALL ALIGNMENT.
- OBSERVATIONS ARE REQUIRED BY TETRA TECH COFFEY DURING CONSTRUCTION TO CONFIRM EXPECTED GROUND CONDITIONS. COFFEY NEEDS TO OBSERVE THE DRILLING OF ALL PILE HOLES FROM EXISTING GROUND LEVELS TO LOG AND TEST UNDERLYING SOILS SO AS TO CONFIRM ASSUMED SOIL CONDITIONS.
- TETRA TECH COFFEY SHALL OBSERVE AND APPROVE THE FOUNDING DEPTH AND CONDITION OF ALL PILE HOLES PRIOR TO INSTALLATION OF THE STEEL SECTIONS AND POURING OF CONCRETE.
- REVIEW OF ALL CONCRETE BATCHING PLANT RECEIPTS
- FINAL WALK OVER/SITE VISIT UPON COMPLETION.

UPON SATISFACTORY COMPLETION OF THE ABOVE WORKS, TETRA TECH COFFEY WOULD THEN BE IN A POSITION TO ISSUE THE APPROPRIATE PRODUCER STATEMENT - CONSTRUCTION REVIEW (PS4) AS REQUIRED BY COUNCIL.

CONSTRUCTION NOTES:

THIS DRAWING AND ASSOCIATED NOTES ARE TO BE READ IN CONJUNCTION WITH THE TETRA TECH COFFEY DESIGN REPORT, REFERENCED 773-AKLGE206639-AY.

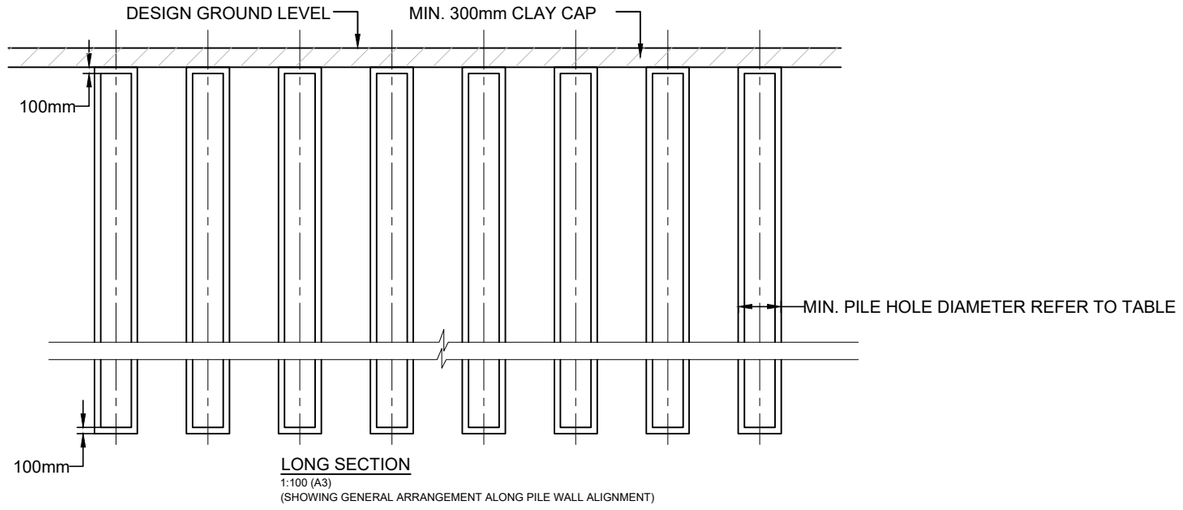
1. ALL EXISTING AND PROPOSED SERVICES SHOULD BE LOCATED AND PROTECTED DURING CONSTRUCTION WORKS BY THE CONTRACTOR.
2. CONSTRUCTION OF IN-GROUND PILE WALLS SHALL BE IN ACCORDANCE WITH THESE DRAWINGS AND RELEVANT RETAINING WALL DESIGN REPORT UNLESS OTHERWISE APPROVED BY TETRA TECH COFFEY.
3. REFER TO SITE PLAN FOR THE GENERAL LOCATION AND EXTENT OF IN-GROUND PILE WALL. SET OUT LOCATIONS TO BE PROVIDED BY OTHERS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. LOCATIONS SHALL BE CONFIRMED BY TETRA TECH COFFEY PRIOR TO DRILLING.
4. ALL STEEL SECTIONS SHALL BE CONCRETE ENCASED WITH A MINIMUM OF 75mm SIDE COVER AND MINIMUM 100MM BASE AND TOP COVER.
5. THE CHARACTERISTIC COMPRESSIVE STRENGTH OF CONCRETE SHALL BE F'C = 32 MPA UNLESS OTHERWISE NOTED.
6. THE CONCRETE ENCASEMENT SHALL BE ADEQUATELY VIBRATED WITH A PENCIL VIBRATOR TO AVOID "HONEY COMBING".
7. FOUNDATION SPOIL SHALL BE REMOVE BY AUGERING TO THE DIMENSIONS DETAILED IN THE DESIGN DRAWINGS, WITH ALL SURPLUS MATERIAL BEING DISPOSED OF AWAY FROM THE PILE LOCATIONS. ALLOWANCE SHALL BE MADE FOR THE CONSTRUCTION OF ACCESS TO AUGERED HOLES FOR CONCRETE TRUCKS. DRIVING OF PILES IS NOT ACCEPTABLE AS AN ALTERNATIVE TO AUGERING. THE CONTRACTOR SHALL VERIFY THE POSITION OF ALL UNDERGROUND SERVICES AND CONFIRM THAT THERE ARE NO CLASHES PRIOR TO CONSTRUCTION.
8. IF SIGNIFICANT OVERLAND FLOW IS PRESENT ABOVE WALL ALIGNMENT SURFACE CUT-OFF DRAINAGE MUST BE INSTALLED TO PREVENT WATER INGRESS INTO PILE HOLES.
9. THE CONTRACTOR SHALL NOTIFY TO THE TETRA TECH COFFEY DESIGN ENGINEER IMMEDIATELY FOR FURTHER INSTRUCTION SHOULD ANY UNFORESEEN CIRCUMSTANCE OR ABNORMAL SITE CONDITIONS BE ENCOUNTERED DURING CONSTRUCTION.
10. THE CONTRACTOR SHALL BE RESPONSIBLE AT ALL TIMES FOR ENSURING THE TEMPORARY STABILITY OF THE WORKS.
11. IF THERE IS POTENTIAL FOR HOLE COLLAPSE E.G. DUE TO WEAK GROUND CONDITIONS OR GROUND WATER INGRESS IT IS RECOMMENDED THAT NON-CONSECUTIVE HOLES BE DRILLED AND POURED WITH CONCRETE PRIOR TO DRILLING OF ADJOINING HOLES. TEMPORARY CASING MAY ALSO BE REQUIRED.
12. IN-GROUND PILE WALL IS TO CAPPED TO THE FINISHED DESIGN LEVEL WITH A MINIMUM THICKNESS 300MM CLAY CAP OF MINIMUM UNDRAINED SHEAR STRENGTH 100 KPa UNLESS OTHERWISE SPECIFIED.
13. PILE WALL TO EXTEND AS SHOWN ON CIVIL DRAWING. THE LOCATION AND EXTENT ARE TO BE CONFIRMED ON SITE BY TETRA TECH COFFEY DESIGN ENGINEER.



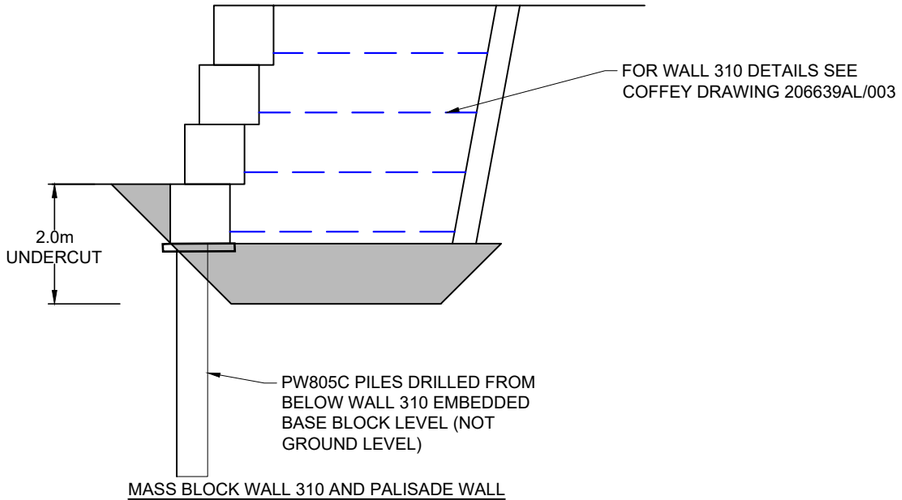
PLAN
1:100 (A3)
(SHOWING GENERAL PILE ARRANGEMENT)

WALL SUB I.D.	WALL LENGTH (m)	PILE DIAMETER (mm)	PILE C-C SPACING (m)	PILE LENGTH (m)	MIN EMBEDMENT INTO N>50 ROCK (m)	STEEL SECTION	MIN CONCRETE STRENGTH (MPa)
PW805-A	150	600	1.5	12	-	310 UC 158	32
PW805-B	39	600	1.5	12	-	310 UC 137	32
PW805-C	39	650	1.5	10*	2.5	460 UB 82.1	32

*Top of pile to be measured from Wall 310 foundation subgrade level, not ground level.



LONG SECTION
1:100 (A3)
(SHOWING GENERAL ARRANGEMENT ALONG PILE WALL ALIGNMENT)



MASS BLOCK WALL 310 AND PALISADE WALL
NTS

FOR INFORMATION

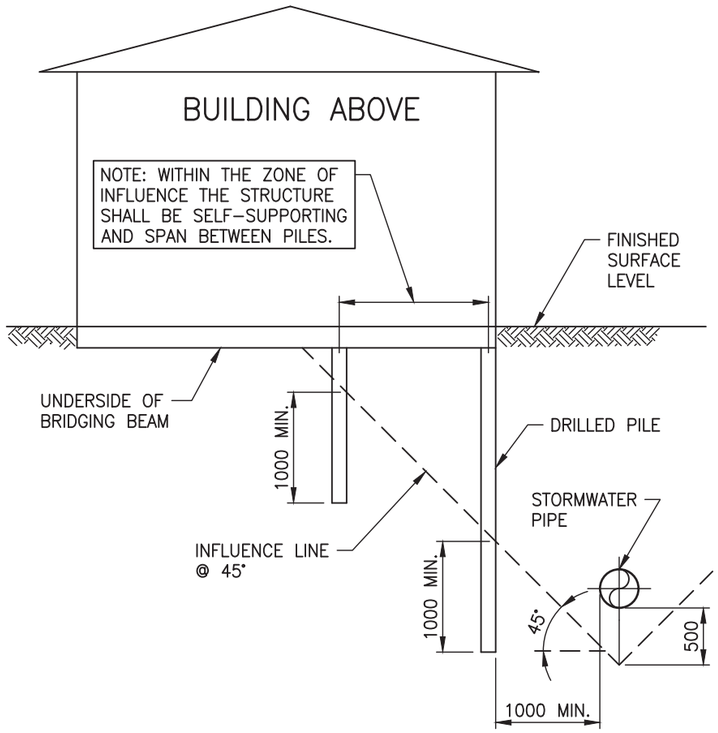
revision	no.	description	drawn	approved	date
	A	FOR ORIGINAL REPORT	RZ	AC	11/02/2021
	B	FOR CONSENT	SP	SP	30/09/2021
	C	AMENDMENTS FOLLOWING PEER REVIEW	SP	SP	12/11/2021

1 0 1 3 5
Scale: 1:100 (A3)

drawn	SP
approved	SP
date	12/11/2021
scale	1:100
original size	A3

TETRA TECH COFFEY

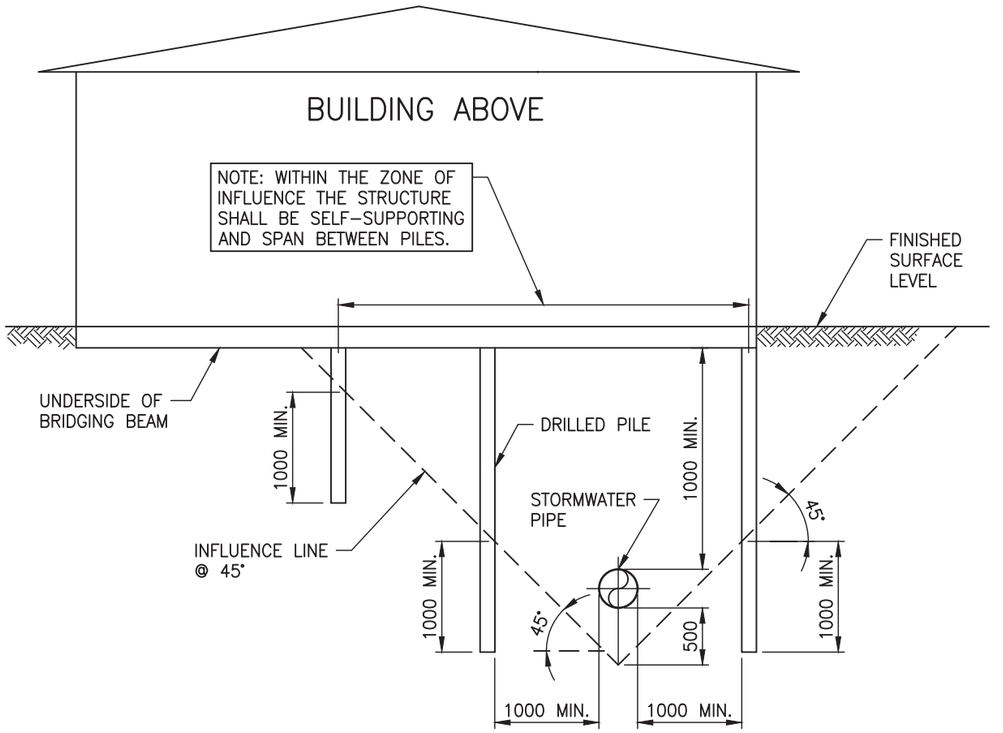
client: WFH PROPERTIES LTD.
project: MILLWATER PRECINCT 6
title: PW805 GEOTECHNICAL DESIGN DRAWING
project no: 773-AKLGE206639 | drawing no: AY-004 | rev: C



BUILD CLOSE

'WORKS CLOSE' NOTES:

1. OUTSIDE ZONE OF INFLUENCE, NORMAL FOUNDATION REQUIREMENTS APPLY.
2. SPECIFIC APPROVAL IS REQUIRED FROM AUCKLAND COUNCIL IF WORKS ARE ADJACENT TO PIPES LARGER THAN 375mm INTERNAL DIAMETER, OR GREATER THAN 2.0m DEEP.
3. BUILDING SHALL BE OUTSIDE ALL OVERLAND FLOW PATHS AND FLOODPLAINS. SEE SECTION 4.3.5.6 AND 4.3.5.7 OF THE SWCoP FOR FURTHER DETAILS.
4. PILES SHALL BE CONSTRUCTED TO A DEPTH OF 1.0m BELOW INFLUENCE LINE.



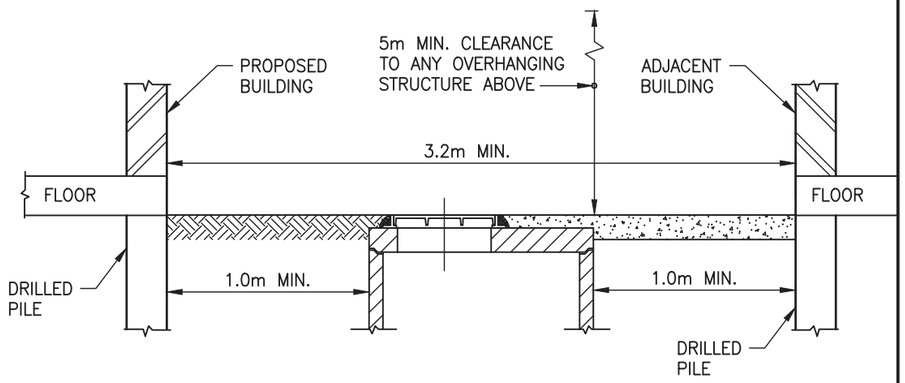
BUILD OVER

'WORKS OVER' NOTES:

1. OUTSIDE ZONE OF INFLUENCE, NORMAL FOUNDATION REQUIREMENTS APPLY.
2. THE DETAIL APPLIES TO STORMWATER PIPES ≤ 375mm NOMINAL DIAMETER AND ≤ 2.0m DEPTH TO INVERT.
3. WORKS OVER PIPES LARGER THAN 375mm NOMINAL DIAMETER IS NOT ALLOWED.
4. PILES SHALL BE CONSTRUCTED TO A DEPTH OF 1.0m BELOW INFLUENCE LINE.
5. BRIDGING IS NOT ALLOWED OVER PIPES WHERE CLEAR VERTICAL SEPARATION DISTANCE FROM TOP OF PIPE TO UNDERSIDE OF BRIDGING BEAM IS LESS THAN 1.0m.

GENERAL NOTES:

1. THE INFORMATION ON THIS PAGE IS INTENDED TO SHOW EXAMPLES OF TYPICAL SCENARIOS AND SHALL BE USED FOR GENERAL GUIDANCE PURPOSES ONLY. SIGNIFICANT VARIATIONS ON A SITE-BY-SITE BASIS ARE TO BE EXPECTED AND IT IS IN NO WAY IMPLIED THAT MEETING ANY OF THESE REQUIREMENTS WILL GUARANTEE APPROVAL.
2. WHERE CONSTRUCTION WORKS ARE PROPOSED IN THE VICINITY OF EXISTING PUBLIC STORMWATER ASSETS, ANY NECESSARY MEASURES TO PROTECT SUCH ASSETS SHALL BE IMPLEMENTED, IN ACCORDANCE WITH SECTION 4.3.23 OF THE SWCoP.
3. REQUIREMENTS FOR FOUNDATION DESIGN, ETC. APPLY TO BOTH SIDES OF THE PIPE.
4. NO DRIVEN PILES ARE PERMITTED WITHIN 10m OF BRICK STORMWATER STRUCTURES, OR WITHIN 5m OF ALL OTHER STORMWATER STRUCTURES.
5. SPECIFIC APPROVAL IS REQUIRED FROM AUCKLAND COUNCIL FOR DRIVEN PILES IN PARTIALLY DRILLED HOLES, WITHIN THE 5m-10m ZONE.
6. PILES THAT MAY BE REQUIRED TO RESIST HORIZONTAL FORCES WILL REQUIRE SPECIFIC DESIGN.
7. PILE/FOOTING LOCATION POINT MUST BE BELOW 45° "ZONE OF INFLUENCE".
8. ALL MANHOLES SHALL HAVE 24 HOURS UNOBSTRUCTED ACCESS.
9. MANHOLES IN BASEMENTS, OR IN LOCATIONS WHERE SUFFICIENT CLEARANCE IS UNAVAILABLE, ARE NOT PERMITTED.
10. ALL PIPE 'WORK OVER' WILL REQUIRE SPECIFIC APPROVAL BY AUCKLAND COUNCIL.
11. REFER TO SECTION 4.3.23 OF THE SWCOP FOR PIPE 'WORK OVER' REQUIREMENTS.
12. FOR MANHOLES GREATER THAN 4m DEEP OR LARGER THAN 1200mm DIA. SPECIFIC DESIGN (INCLUDING CLEARANCE REQUIREMENTS) IS REQUIRED.
13. SPECIFIC APPROVAL FROM COUNCIL IS REQUIRED FOR WORKS WITHIN 10 METERS OF A RISING MAIN.
14. WORKS OVER RISING MAIN IS NOT ALLOWED.



MANHOLE CONSTRUCTION CLEARANCE

STORMWATER CODE OF PRACTICE
STANDARD DETAILS

REVISION: 3
REV DATE: 17 JANUARY 2022
CAD FILENAME: AC-STD-SW22.DWG

AUCKLAND COUNCIL

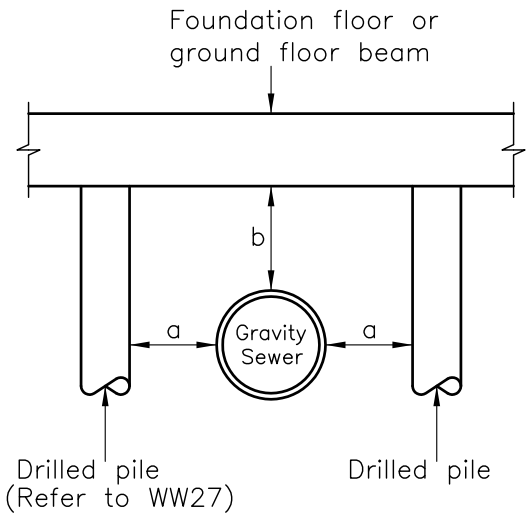
ENVIRONMENTAL-SW

STORMWATER PIPE AND MANHOLE CONSTRUCTION CLEARANCE REQUIREMENTS

MANHOLES NEAR WORKS AND WORKS CLOSE TO, OR OVER, PIPES

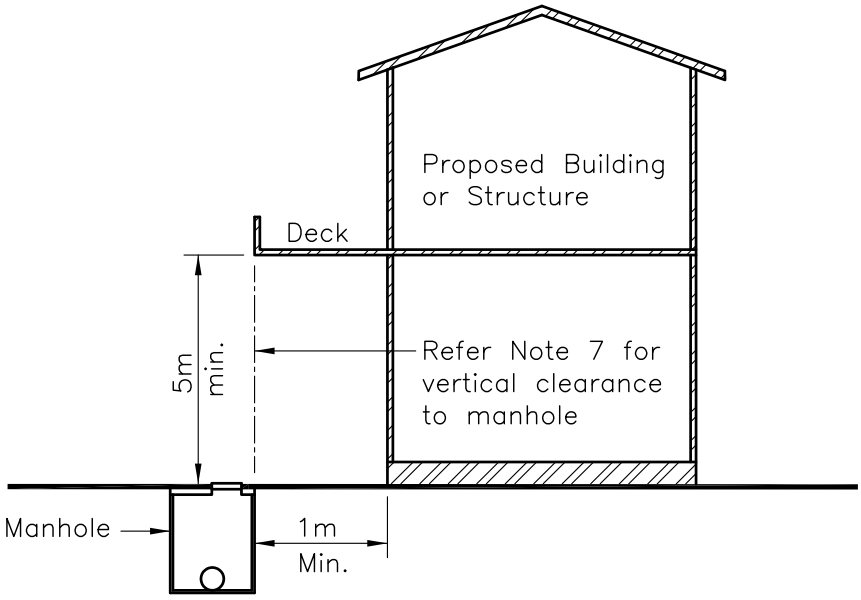
ORIGINAL SCALE A3
SCALE: N.T.S.
DRAWING SET: SWCoP
SHEET: 1 OF 1
DRAWING No.: SW22
REV: 3

Auckland Council
Te Kaunihera o Tāmaki Makaurau



Minimum Pile Clearances						
Type of Sewer	Sewer Depth < 3m		Sewer Depth 3m–5m		Sewer Depth >5m	
	a	b	a	b	a	b
Local Wastewater Network	1m	0.6m	1m	0.6m	1.5m	0.6m
Transmission (Trunk) Sewer	1m	1m	2m	1m	3m	1.5m

PIPE CONSTRUCTION CLEARANCE FOR BRIDGING OPTIONS



MANHOLE CONSTRUCTION CLEARANCE

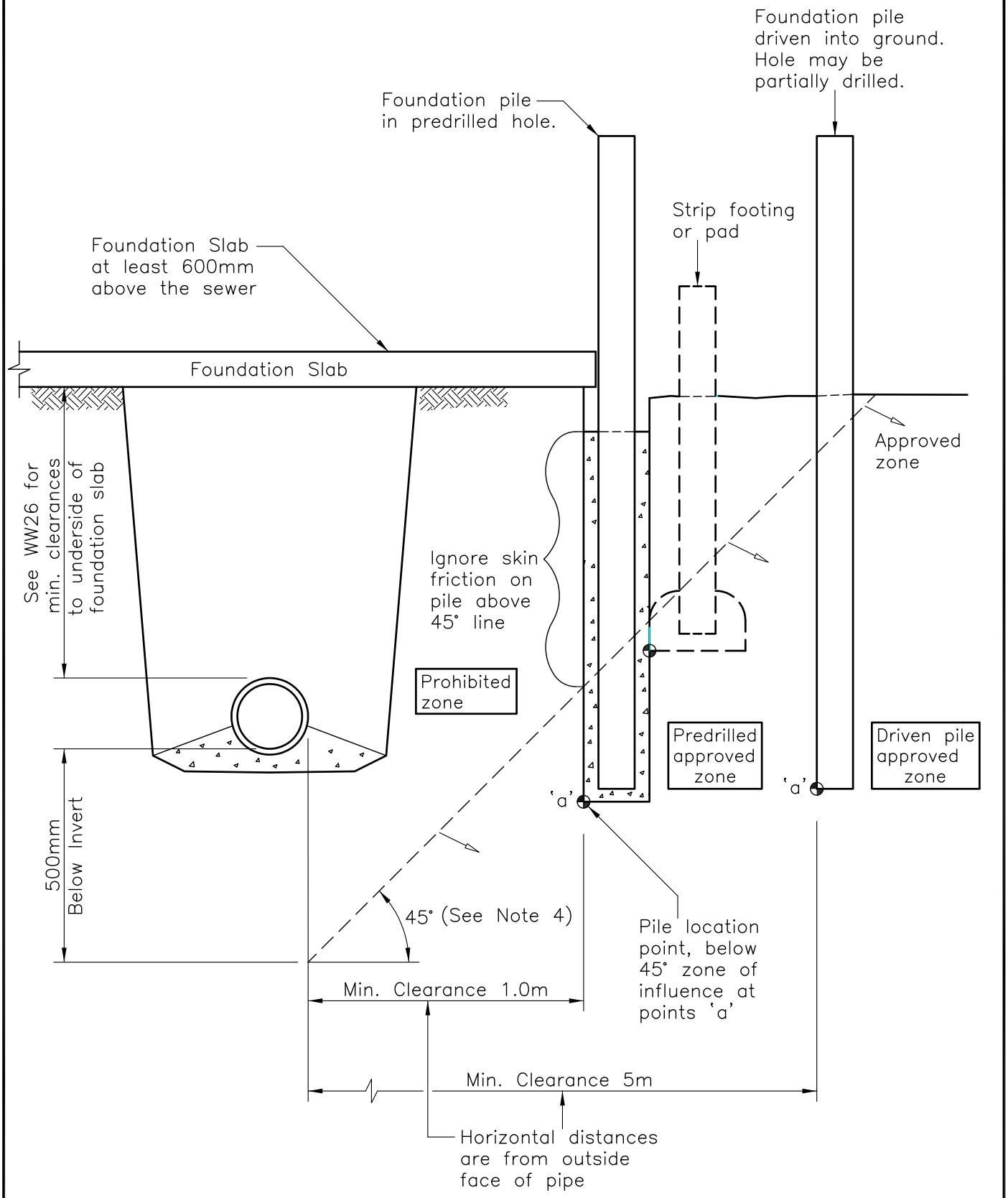
NOTES:

1. Locate sewer to survey accuracy or by hand piloting.
2. No driven piles within 5m of a sewer or 10m of brick sewer.
3. All manholes shall have 24 hrs unobstructed access.
4. No construction shall occur above a manhole or within tolerances 'a' or 'b' in table above.
5. Pressure mains shall not be built over.
6. Brick or poor condition wastewater pipe shall not be built over. Bridging options must be approved.
7. Vertical clearance from the top of the chamber shall be 5m Min. over the full width of the chamber.

O:\---\ EGCADFI \ 2017 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.044D .DWG

PIPE AND MANHOLE CONSTRUCTION CLEARANCE

SCALE:	N.T.S.
ISSUE DATE:	04–12–2017
DWG No.	2010070.044D
REFERENCE No.	WW 26



NOTES:

1. No driven piles are permitted within 10m of brick Sewers, or within 5m of all other sewers.
2. Piles that are required to resist horizontal forces will require specific design.
3. Pile/Footing location point must be below 45° zone of influence.
4. Zone of influence typically 45° or angle determined by a structural engineer.

O:\---\ EGCADFI \ 2017 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.045B .DWG

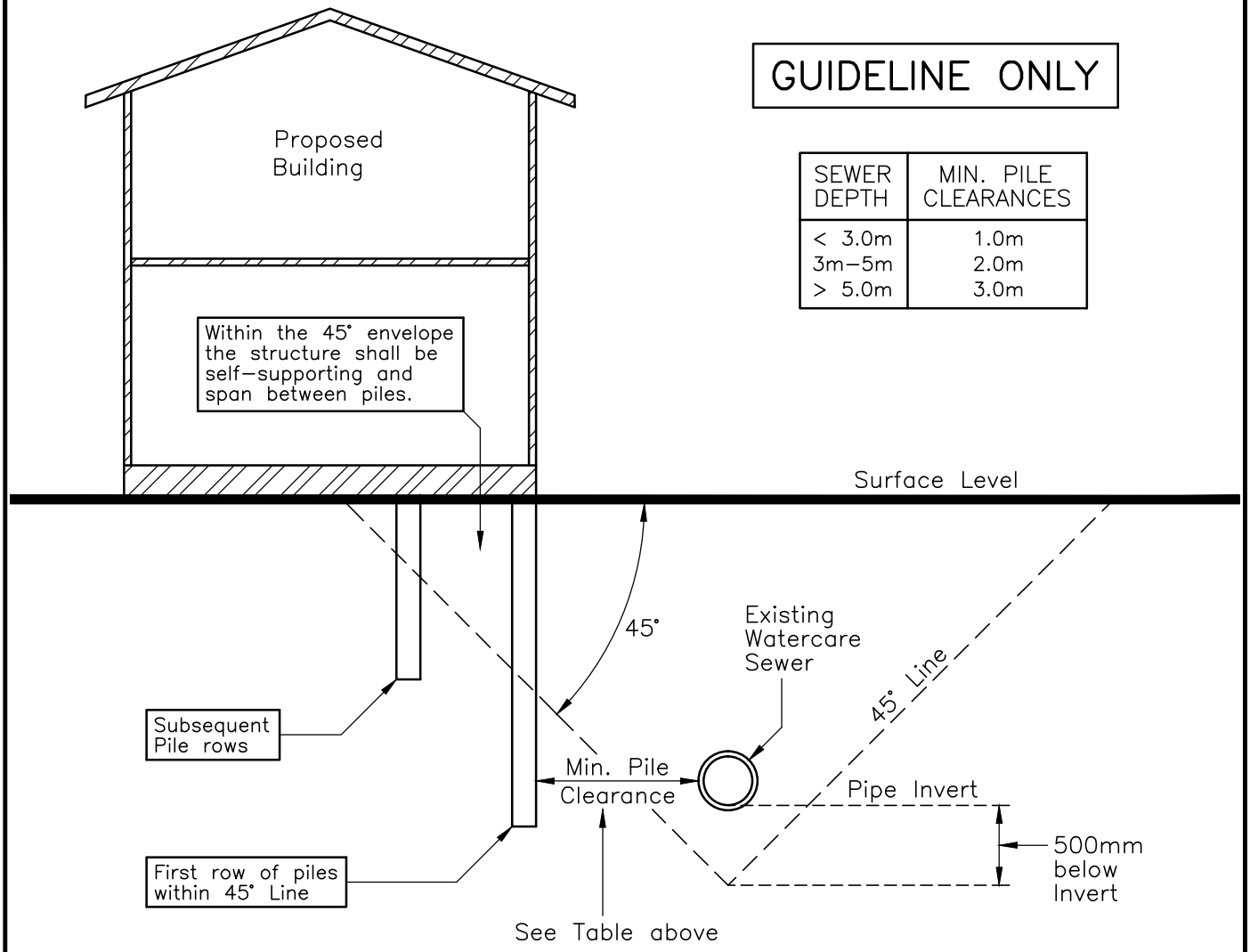
Watercare

BUILDING CLOSE TO OR OVER LOCAL NETWORK WASTEWATER

SCALE:	N.T.S.
ISSUE DATE:	04–12–2017
DWG No.	2010070.045B
REFERENCE No.	WW 27

GUIDELINE ONLY

SEWER DEPTH	MIN. PILE CLEARANCES
< 3.0m	1.0m
3m–5m	2.0m
> 5.0m	3.0m



SECTION THROUGH BUILDING AND TRANSMISSION SEWER

NOTES:

1. This detail shall be used as a guideline only. All applications will be assessed on individual basis and conditions imposed could be more specific than these shown.
2. No structural loads are to be placed on public sewer lines.
3. All structural loads on piles shall be absorbed outside the 45° envelope and below the pipe invert level for the first row of piles.
4. Where raft foundations or strip footings are proposed within the 45° envolope, statement from a structural engineer is required to confirm that the foundation design complies with Clause 2.
5. Driven piles are not permitted within 10 metres of a brick sewer or 5 metres of any other sewers.
6. Closed Circuit Television (CCTV) inspections of Transmission sewer only on approval from Watercare Services Ltd.
7. Manholes shall be minimum 1m clear from buildings as per drawing WW20 and building eaves shall be completely clear.
8. Drawings of the proposed works must accurately identify the location of the sewer/s affected and the distances with cross–section details for all structures. Watercare approved registered surveyor must be engaged to carry out the mark out.

O:\---\ EGCADFI \ 2017 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.051C .DWG

Watercare

GUIDELINE FOR BUILDING CLOSE TO OR OVER TRANSMISSION WASTEWATER

SCALE:	N.T.S.
ISSUE DATE:	13–07–2018
DWG No.	2010070.051C
REFERENCE No.	WW 28

APPENDIX C: CLASSIFICATION TESTS

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM23S-02483
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 24/04/2023

Sample Details

Sample ID:	ETAM23S-02483	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	6/04/2023	**Material:**	Undisturbed Soil
Date Submitted:	11/04/2023	**Source:**	Unknown (Sampled by Client)
Date Tested:	13/04/2023		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT01		
Borehole Number:	PT01		
Borehole Depth (m):	-		

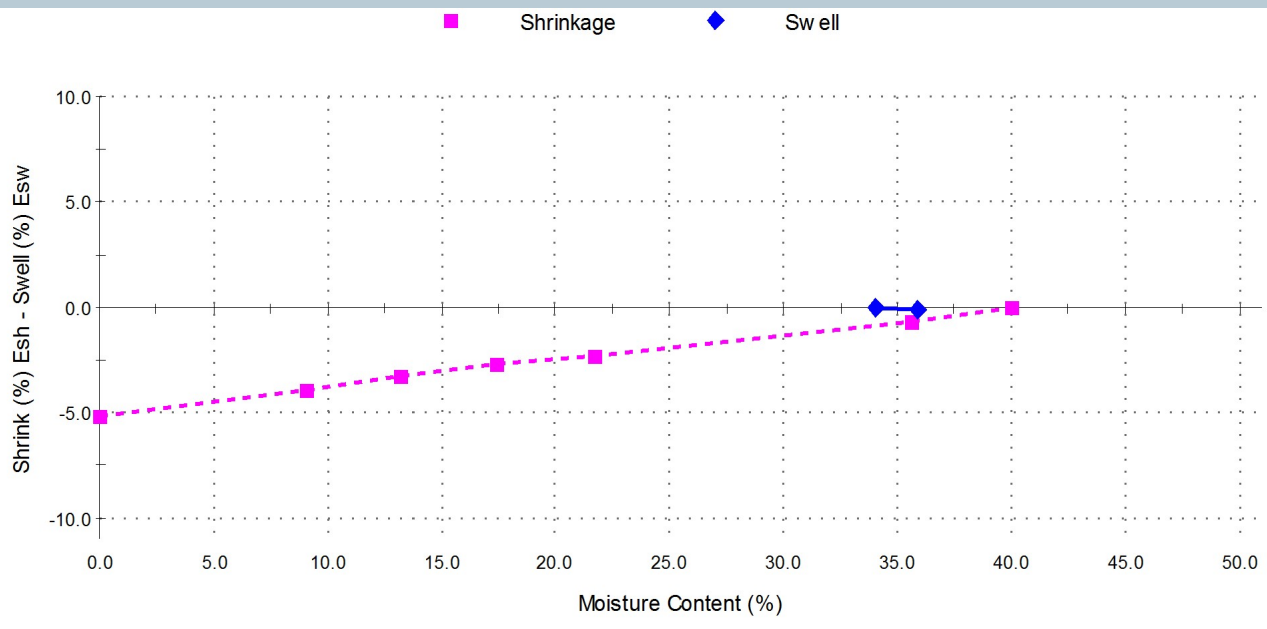
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.1
Moisture Content before (%):	34.0
Moisture Content after (%):	35.9
Est. Unc. Comp. Strength before (kPa):	200
Est. Unc. Comp. Strength after (kPa):	275

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	5.2
Shrinkage Moisture Content (%):	40.0
Est. inert material (%):	1.5%
Crumbling during shrinkage:	0.5%
Cracking during shrinkage:	0.5%

Shrink Swell



Shrink Swell Index - Iss (%): 2.9

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM23W00652
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM23S-02484
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 24/04/2023

Sample Details

Sample ID:	ETAM23S-02484	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	6/04/2023	**Material:**	Undisturbed Soil
Date Submitted:	11/04/2023	**Source:**	Unknown (Sampled by Client)
Date Tested:	13/04/2023		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT02		
Borehole Number:	PT02		
Borehole Depth (m):	-		

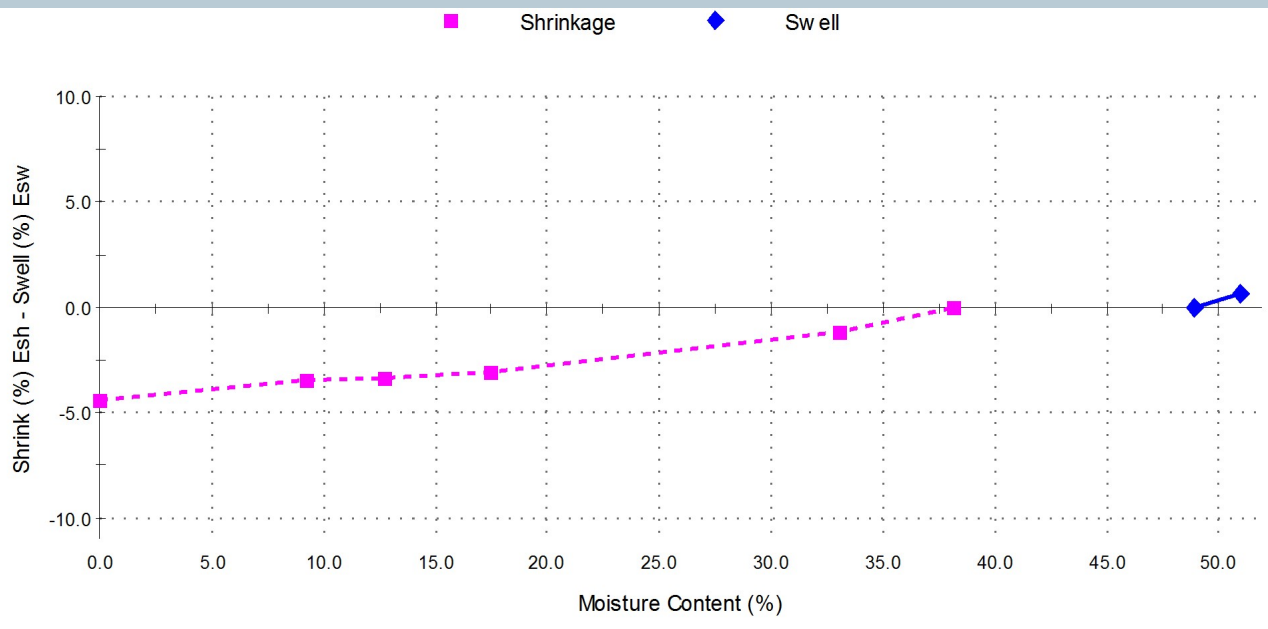
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	0.6
Moisture Content before (%):	48.9
Moisture Content after (%):	50.9
Est. Unc. Comp. Strength before (kPa):	250
Est. Unc. Comp. Strength after (kPa):	150

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	4.4
Shrinkage Moisture Content (%):	38.1
Est. inert material (%):	1.5%
Crumbling during shrinkage:	0.5%
Cracking during shrinkage:	1%

Shrink Swell



Shrink Swell Index - Iss (%): 2.6

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM23W00652
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM23S-02485
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 24/04/2023

Sample Details

Sample ID:	ETAM23S-02485	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	6/04/2023	**Material:**	Undisturbed Soil
Date Submitted:	11/04/2023	**Source:**	Unknown (Sampled by Client)
Date Tested:	14/04/2023		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT03		
Borehole Number:	PT03		
Borehole Depth (m):	-		

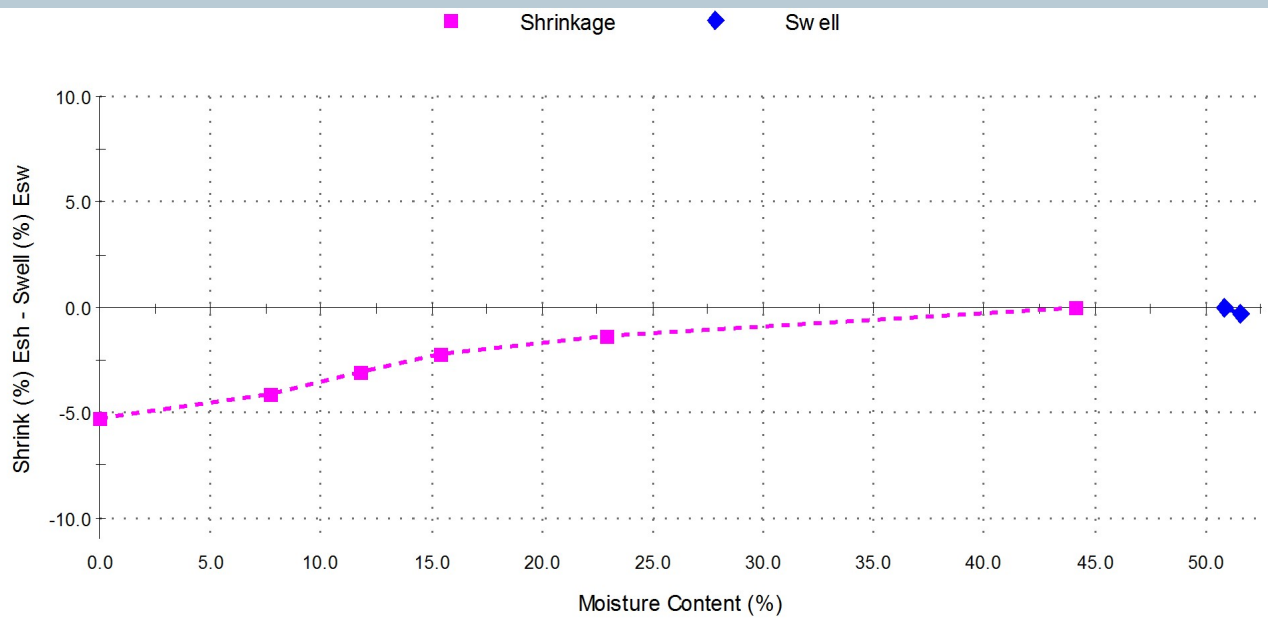
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.3
Moisture Content before (%):	50.9
Moisture Content after (%):	51.6
Est. Unc. Comp. Strength before (kPa):	200
Est. Unc. Comp. Strength after (kPa):	200

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	5.3
Shrinkage Moisture Content (%):	44.2
Est. inert material (%):	1%
Crumbling during shrinkage:	0.5%
Cracking during shrinkage:	0.5%

Shrink Swell



Shrink Swell Index - Iss (%): 2.9

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM23W00652
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM23S-02487
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 24/04/2023

Sample Details

Sample ID:	ETAM23S-02487	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	6/04/2023	**Material:**	Undisturbed Soil
Date Submitted:	11/04/2023	**Source:**	Unknown (Sampled by Client)
Date Tested:	14/04/2023		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT06		
Borehole Number:	PT06		
Borehole Depth (m):	-		

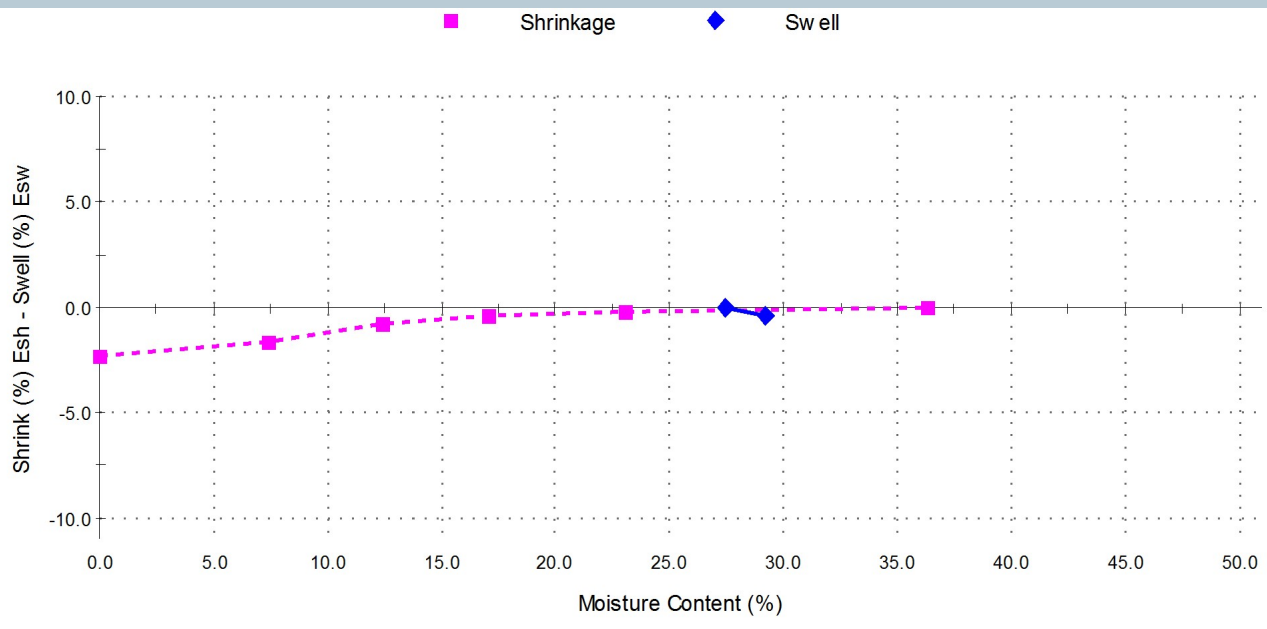
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.4
Moisture Content before (%):	27.4
Moisture Content after (%):	29.2
Est. Unc. Comp. Strength before (kPa):	350
Est. Unc. Comp. Strength after (kPa):	425

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	2.3
Shrinkage Moisture Content (%):	36.3
Est. inert material (%):	1%
Crumbling during shrinkage:	2%
Cracking during shrinkage:	1%

Shrink Swell



Shrink Swell Index - Iss (%): 1.3

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM23W00652
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM23S-02488
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 24/04/2023

Sample Details

Sample ID:	ETAM23S-02488	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	6/04/2023	**Material:**	Undisturbed Soil
Date Submitted:	11/04/2023	**Source:**	Unknown (Sampled by Client)
Date Tested:	17/04/2023		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT07		
Borehole Number:	PT07		
Borehole Depth (m):	-		

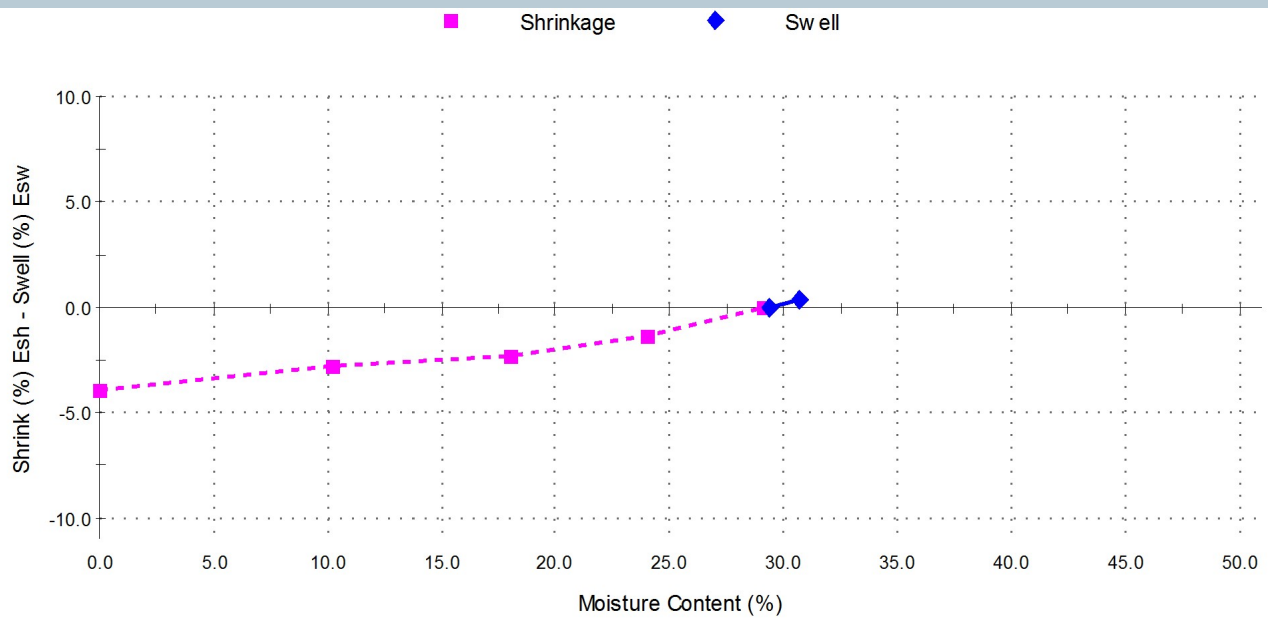
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	0.4
Moisture Content before (%):	29.4
Moisture Content after (%):	30.7
Est. Unc. Comp. Strength before (kPa):	375
Est. Unc. Comp. Strength after (kPa):	375

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	3.9
Shrinkage Moisture Content (%):	29.1
Est. inert material (%):	5%
Crumbling during shrinkage:	0.5%
Cracking during shrinkage:	2%

Shrink Swell



Shrink Swell Index - Iss (%): 2.3

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM23W00652
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM23S-02489
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 24/04/2023

Sample Details

Sample ID:	ETAM23S-02489	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	6/04/2023	**Material:**	Undisturbed Soil
Date Submitted:	11/04/2023	**Source:**	Unknown (Sampled by Client)
Date Tested:	17/04/2023		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT08		
Borehole Number:	PT08		
Borehole Depth (m):	-		

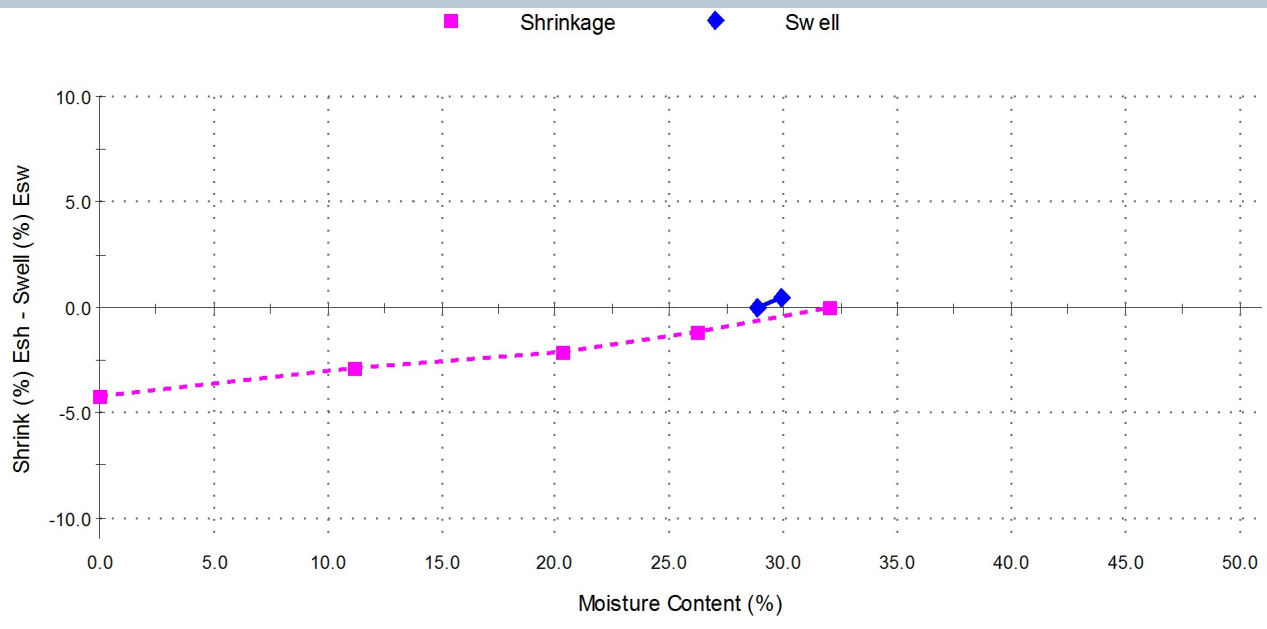
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	0.5
Moisture Content before (%):	28.8
Moisture Content after (%):	29.9
Est. Unc. Comp. Strength before (kPa):	450
Est. Unc. Comp. Strength after (kPa):	425

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	4.2
Shrinkage Moisture Content (%):	32.0
Est. inert material (%):	2%
Crumbling during shrinkage:	0%
Cracking during shrinkage:	1.5%

Shrink Swell



Shrink Swell Index - Iss (%): 2.4

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM23W00652
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM23S-05113
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 6/07/2023

Sample Details

Sample ID:	ETAM23S-05113	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	21/06/2023	**Material:**	Undisturbed Soil
Date Submitted:	23/06/2023	**Source:**	Unknown (Sampled by Client)
Date Tested:	27/06/2023		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT21		
Borehole Number:	PT21		
Borehole Depth (m):	-		

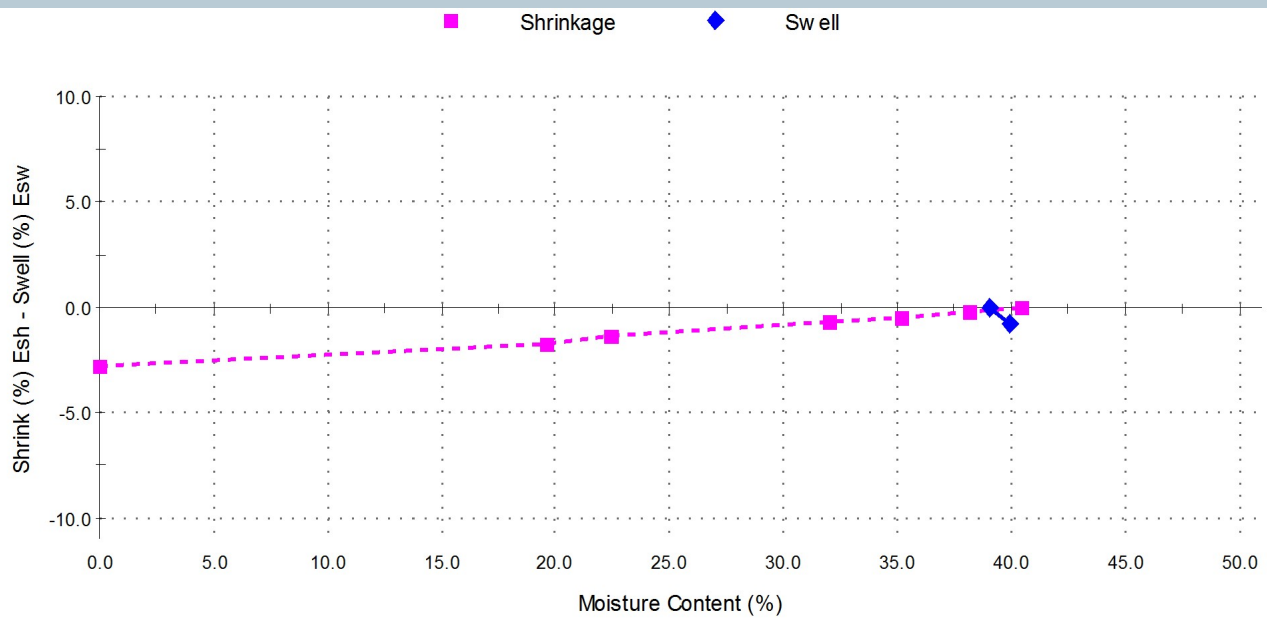
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.8
Moisture Content before (%):	39.0
Moisture Content after (%):	39.9
Est. Unc. Comp. Strength before (kPa):	200
Est. Unc. Comp. Strength after (kPa):	175

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	2.8
Shrinkage Moisture Content (%):	40.5
Est. inert material (%):	1%
Crumbling during shrinkage:	1.5%
Cracking during shrinkage:	2%

Shrink Swell



Shrink Swell Index - Iss (%): 1.5

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM23W01213
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM25S-02919
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Level 2, 88 Broadway New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- **TRN:** -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
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Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 28/05/2025

Sample Details

Sample ID:	ETAM25S-02919	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	14/05/2025	**Material:**	Undisturbed Soil
Date Submitted:	14/05/2025	**Source:**	In-Situ
Date Tested:	16/05/2025		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	Lot 8 / 9, 0.1 - 0.3 m		
Borehole Number:	Lot 8/9		
Borehole Depth (m):	0.1 - 0.3		

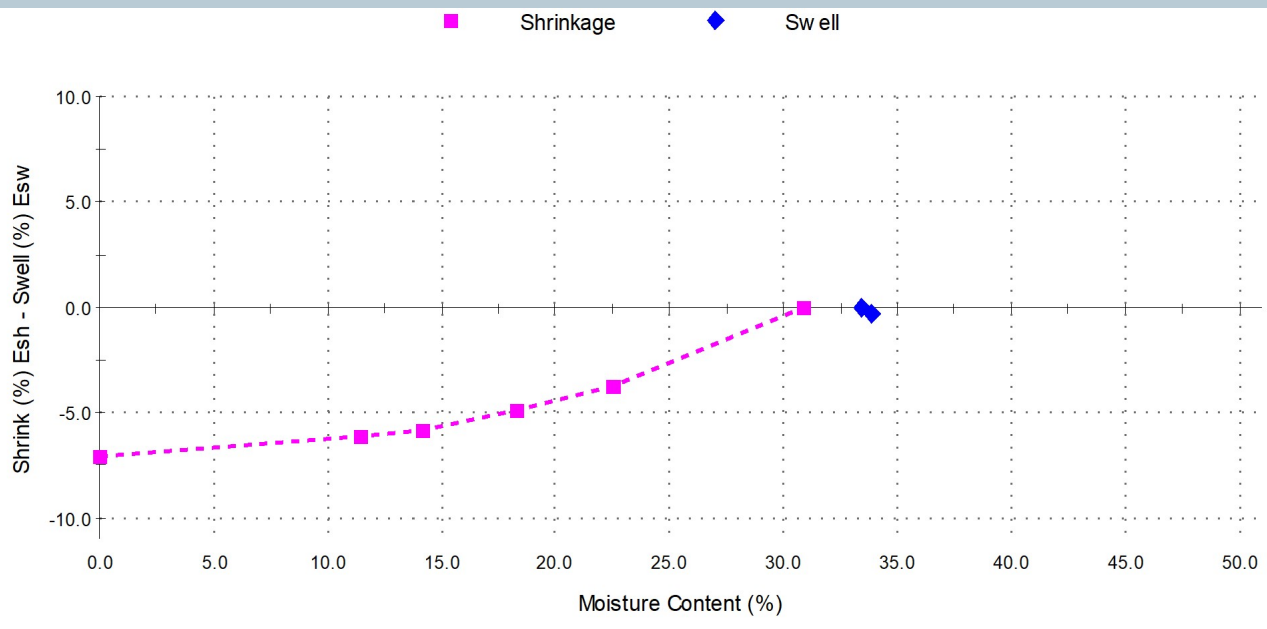
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.3
Moisture Content before (%):	33.4
Moisture Content after (%):	33.8
Est. Unc. Comp. Strength before (kPa):	150
Est. Unc. Comp. Strength after (kPa):	150

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	7.1
Shrinkage Moisture Content (%):	30.8
Est. inert material (%):	2%
Crumbling during shrinkage:	0%
Cracking during shrinkage:	0.5%

Shrink Swell



Shrink Swell Index - Iss (%): 3.9

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM25W00892
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM25S-02920
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Level 2, 88 Broadway
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 28/05/2025

Sample Details

Sample ID:	ETAM25S-02920	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	14/05/2025	**Material:**	Undisturbed Soil
Date Submitted:	14/05/2025	**Source:**	In-Situ
Date Tested:	16/05/2025		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	Lot 11 / 12, 0.2 - 0.4 m		
Borehole Number:	Lot 11/12		
Borehole Depth (m):	0.2 - 0.4		

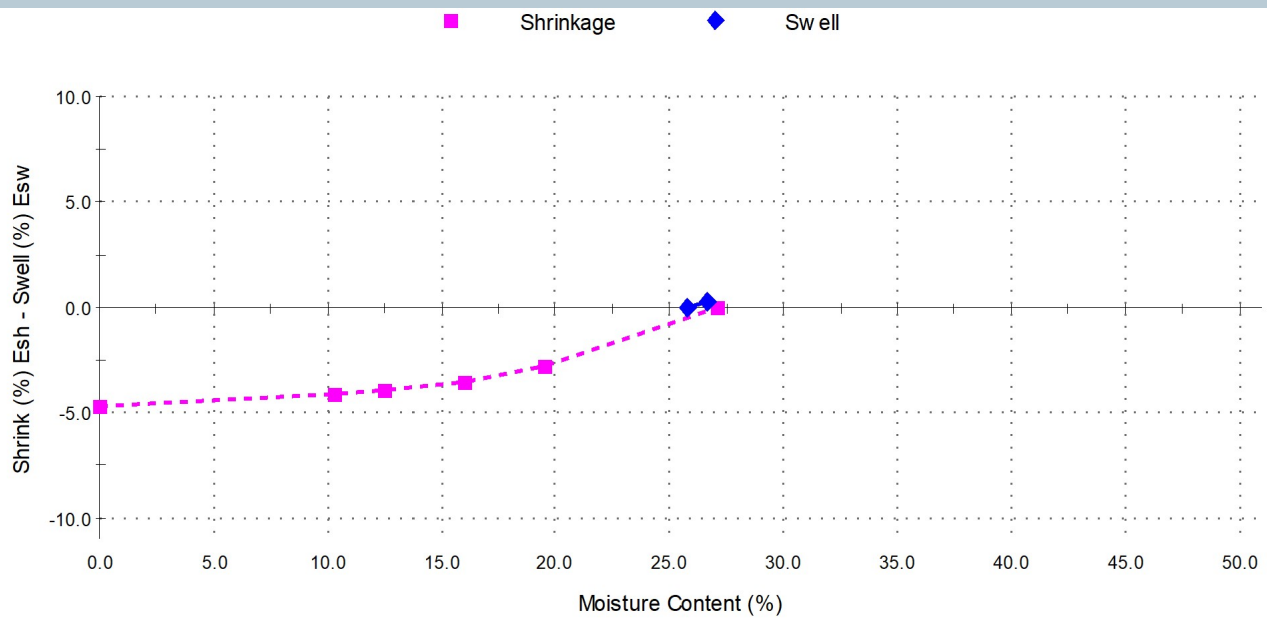
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	0.2
Moisture Content before (%):	25.8
Moisture Content after (%):	26.6
Est. Unc. Comp. Strength before (kPa):	300
Est. Unc. Comp. Strength after (kPa):	300

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	4.7
Shrinkage Moisture Content (%):	27.1
Est. inert material (%):	2%
Crumbling during shrinkage:	0%
Cracking during shrinkage:	0.5%

Shrink Swell



Shrink Swell Index - Iss (%): 2.7

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM25W00892
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM25S-02921
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Level 2, 88 Broadway
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 28/05/2025

Sample Details

Sample ID:	ETAM25S-02921	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	7/05/2025	**Material:**	Undisturbed Soil
Date Submitted:	14/05/2025	**Source:**	In-Situ
Date Tested:	16/05/2025		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	Lot 52		
Borehole Number:	Lot 52		
Borehole Depth (m):	-		

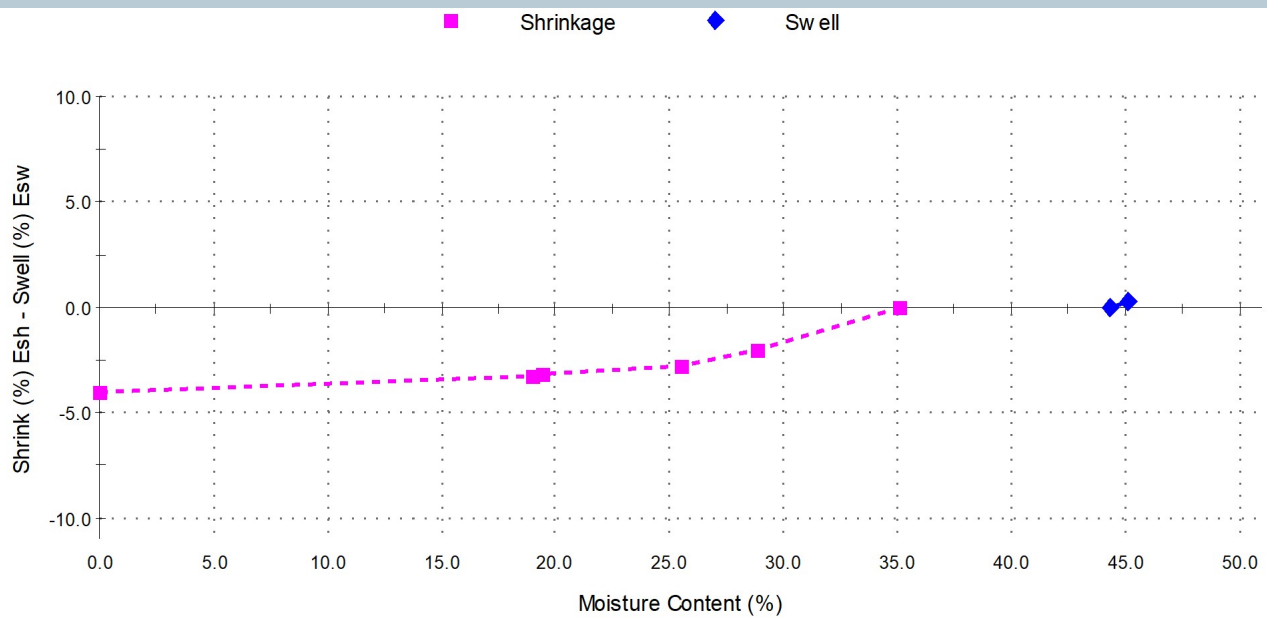
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	0.3
Moisture Content before (%):	44.3
Moisture Content after (%):	45.1
Est. Unc. Comp. Strength before (kPa):	175
Est. Unc. Comp. Strength after (kPa):	175

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	4.0
Shrinkage Moisture Content (%):	35.1
Est. inert material (%):	2%
Crumbling during shrinkage:	0.5%
Cracking during shrinkage:	4%

Shrink Swell



Shrink Swell Index - Iss (%): 2.3

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM25W00892
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM25S-02922
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Level 2, 88 Broadway
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 28/05/2025

Sample Details

Sample ID:	ETAM25S-02922	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	14/05/2025	**Material:**	Undisturbed Soil
Date Submitted:	14/05/2025	**Source:**	In-Situ
Date Tested:	19/05/2025		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	Lot 53, 0.1 - 0.3 m		
Borehole Number:	Lot 53		
Borehole Depth (m):	0.1 - 0.3		

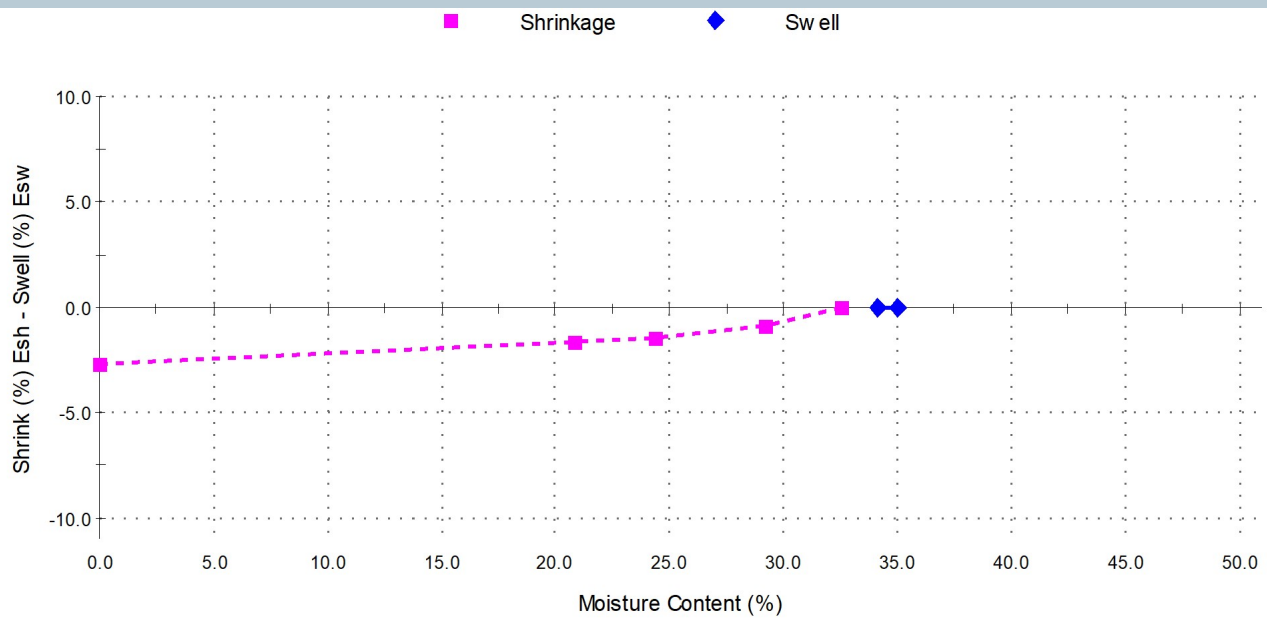
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	0.0
Moisture Content before (%):	34.1
Moisture Content after (%):	35.0
Est. Unc. Comp. Strength before (kPa):	450
Est. Unc. Comp. Strength after (kPa):	450

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	2.7
Shrinkage Moisture Content (%):	32.5
Est. inert material (%):	2%
Crumbling during shrinkage:	0%
Cracking during shrinkage:	1%

Shrink Swell



Shrink Swell Index - Iss (%): 1.5

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM25W00892
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM25S-02923
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Level 2, 88 Broadway
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 28/05/2025

Sample Details

Sample ID:	ETAM25S-02923	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	14/05/2025	**Material:**	Undisturbed Soil
Date Submitted:	14/05/2025	**Source:**	In-Situ
Date Tested:	19/05/2025		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	Lot 54 , 0.2 - 0.4 m		
Borehole Number:	Lot 54		
Borehole Depth (m):	0.2 - 0.4		

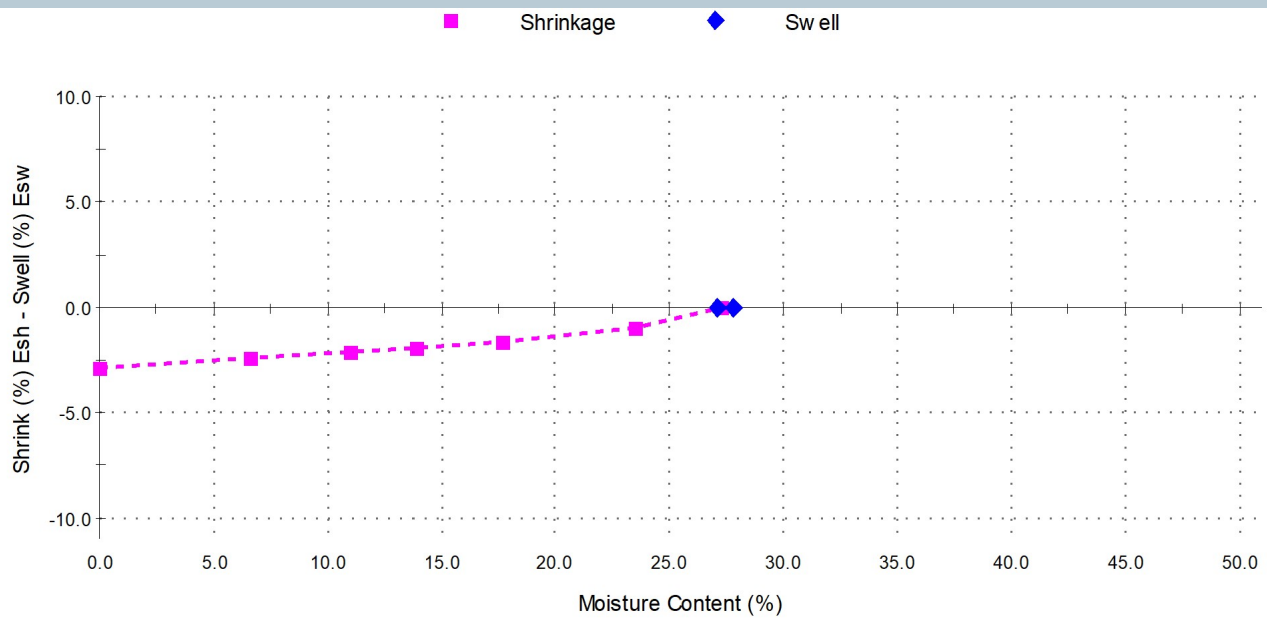
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	0.0
Moisture Content before (%):	27.1
Moisture Content after (%):	27.8
Est. Unc. Comp. Strength before (kPa):	450+
Est. Unc. Comp. Strength after (kPa):	450+

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	2.9
Shrinkage Moisture Content (%):	27.2
Est. inert material (%):	1%
Crumbling during shrinkage:	0%
Cracking during shrinkage:	1%

Shrink Swell



Shrink Swell Index - Iss (%): 1.6

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM25W00892
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM25S-02924
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Level 2, 88 Broadway New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- **TRN:** -

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 28/05/2025

Sample Details

Sample ID:	ETAM25S-02924	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	14/05/2025	**Material:**	Undisturbed Soil
Date Submitted:	14/05/2025	**Source:**	In-Situ
Date Tested:	20/05/2025		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	Lot 55, 0.3 - 0.5 m		
Borehole Number:	Lot 55		
Borehole Depth (m):	0.3 - 0.5		

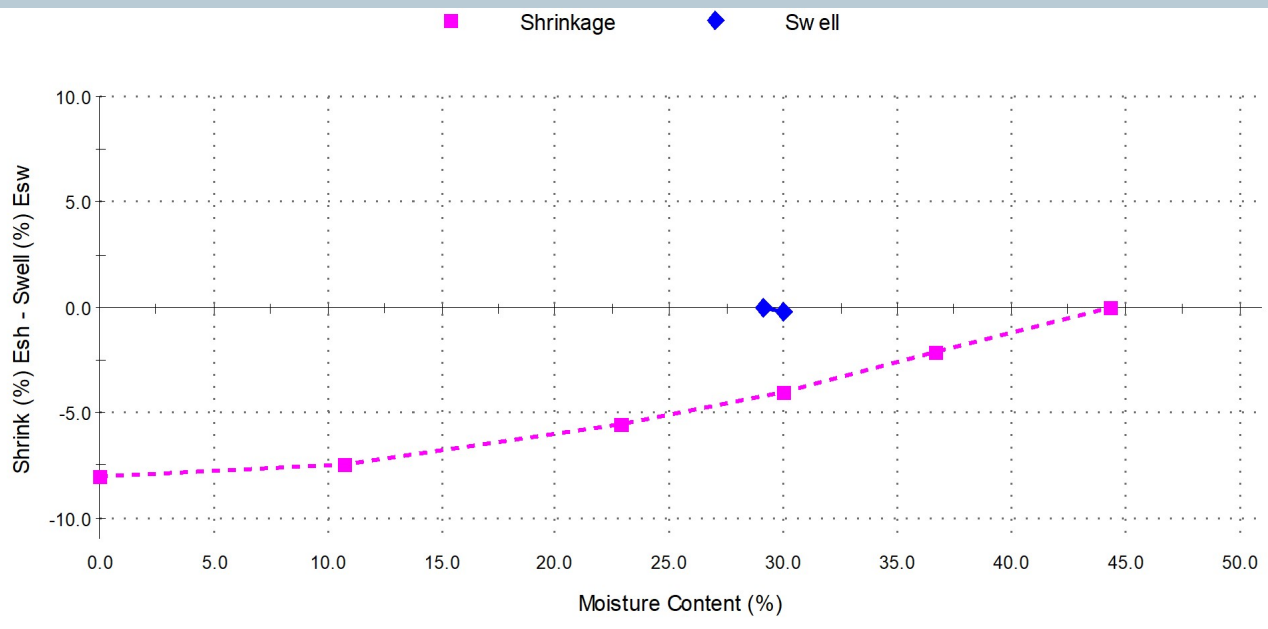
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.2
Moisture Content before (%):	29.1
Moisture Content after (%):	30.0
Est. Unc. Comp. Strength before (kPa):	450
Est. Unc. Comp. Strength after (kPa):	350

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	8.0
Shrinkage Moisture Content (%):	44.3
Est. inert material (%):	1%
Crumbling during shrinkage:	0.5%
Cracking during shrinkage:	1%

Shrink Swell



Shrink Swell Index - Iss (%): 4.4

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM25W00892
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM25S-02925
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Level 2, 88 Broadway
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 28/05/2025

Sample Details

Sample ID:	ETAM25S-02925	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	14/05/2025	**Material:**	Undisturbed Soil
Date Submitted:	14/05/2025	**Source:**	In-Situ
Date Tested:	20/05/2025		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	Lot 61 / 62, 0.2 - 0.4 m		
Borehole Number:	Lot 61/62		
Borehole Depth (m):	0.2 - 0.4		

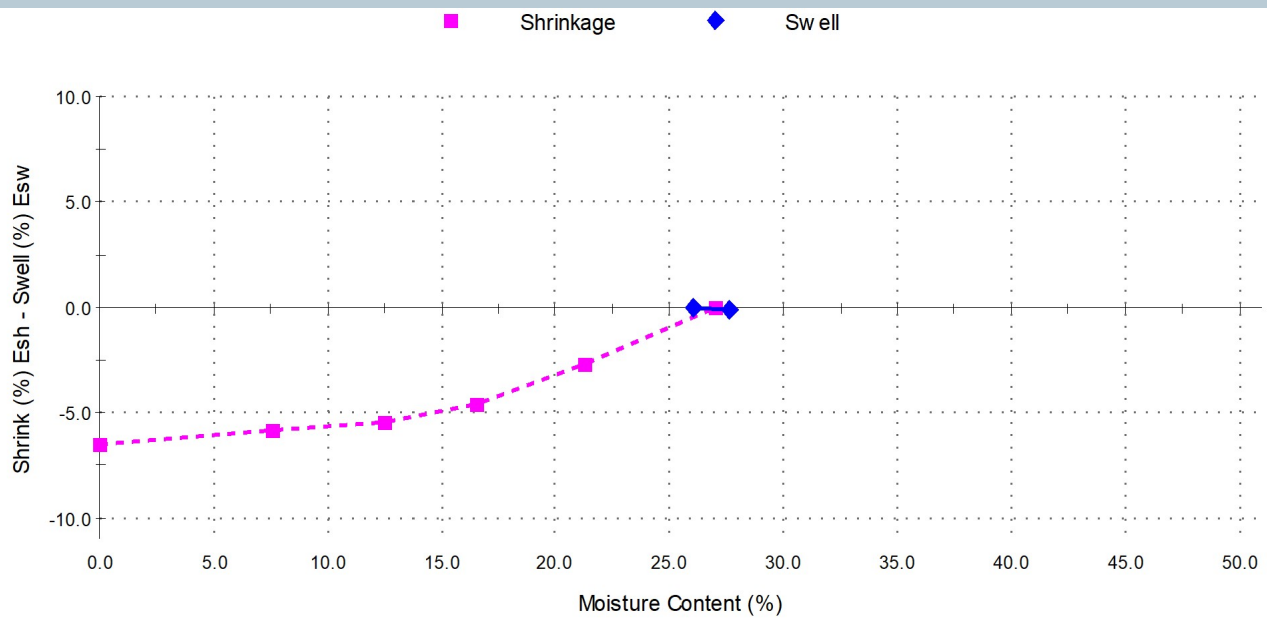
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.1
Moisture Content before (%):	26.0
Moisture Content after (%):	27.6
Est. Unc. Comp. Strength before (kPa):	225
Est. Unc. Comp. Strength after (kPa):	200

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	6.5
Shrinkage Moisture Content (%):	27.0
Est. inert material (%):	3%
Crumbling during shrinkage:	0%
Cracking during shrinkage:	0.5%

Shrink Swell



Shrink Swell Index - Iss (%): 3.6

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM25W00892
Tested By: JM

APPENDIX D: EARTHWORKS FIELD DENSITY SUMMARY SHEETS

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00290
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00290

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 8/03/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
3/03/2023	ETAM23W00290	LW	1059	1.90	32.0	1.44	2.65	0.0	167	184	167	191	Shear Key	1748901	5949106	7.6	Silty Clay	-
3/03/2023	ETAM23W00290	LW	1060	1.90	32.5	1.44	2.65	0.0	137	184	167	167	Shear Key	1748899	5949099	8.1	Silty Clay	-
3/03/2023	ETAM23W00290	LW	1061	1.87	30.9	1.43	2.65	1.9	207	207	207	207	RE Wall 604B	1749055	5949072	13.8	Silty Clay	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00290
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00290

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 8/03/2023

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00321
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00321

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 10/03/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/03/2023	ETAM23W00321	SC	1068	1.82	29.5	1.41	2.65	5.4	155	155	158	158	Gully 2	1749012	5948870	-	Silty CLAY	-
7/03/2023	ETAM23W00321	SC	1069	1.88	29.2	1.45	2.65	2.8	192+	192+	192+	192+	Gully 2	1748963	5948858	-	Silty CLAY	-
7/03/2023	ETAM23W00321	SC	1070	1.85	30.3	1.42	2.65	3.4	186	186	186	186	Gully 2	1748987	5948836	-	Silty CLAY	-
7/03/2023	ETAM23W00321	SC	1071	1.91	37.2	1.39	2.65	0.0	170	170	155	158	Shear Key	1748893	5948093	-	Clayey SILT	-
7/03/2023	ETAM23W00321	SC	1072	1.85	33.2	1.39	2.65	1.4	185	185	170	170	Shear Key	1448893	5949103	-	Clayey SILT	-
7/03/2023	ETAM23W00321	SC	1073	1.85	37.8	1.35	2.65	0.0	155	155	158	158	Shear Key	1748914	5949098	-	Clayey SILT	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

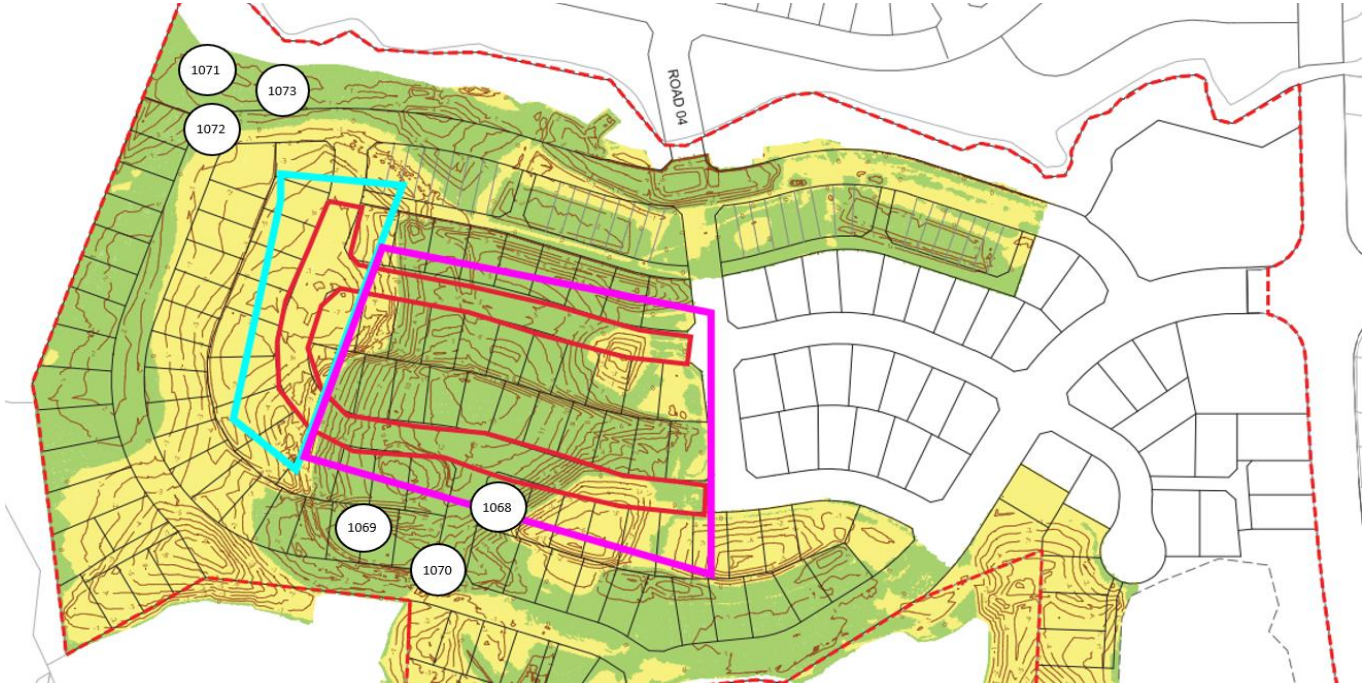
Earthworks Fill Report

Report No: EFIL:ETAM23W00321
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00321

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 10/03/2023



Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00333
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00333

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 10/03/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
8/03/2023	ETAM23W00333	SC	1074	1.85	29.5	1.43	2.65	3.8	174	152	150	143	Gully 2	1749002	5948823	41.1	Silty Clay	-
8/03/2023	ETAM23W00333	SC	1075	1.77	35.3	1.31	2.65	4.2	155	155	152	152	Gully 2	1748945	5948853	41.4	Silty Clay	-
8/03/2023	ETAM23W00333	SC	1076	1.85	32.0	1.40	2.65	2.3	155	155	170	170	Shear Key	1748896	5949094	-	Silty Clay	-
8/03/2023	ETAM23W00333	SC	1077	1.82	31.4	1.38	2.65	4.3	147	152	152	152	Shear Key	1478919	5949097	-	Silty Clay	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00333
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00333

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 10/03/2023

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00372
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00372

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 15/03/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
9/03/2023	ETAM23W00372	SC	1078	1.85	33.8	1.38	2.65	0.9	186	186	170	170	Gully	1749012	5948843	-	Silty Clay	-
9/03/2023	ETAM23W00372	SC	1079	1.81	33.8	1.35	2.65	3.5	155	155	167	167	Gully	1748973	5948848	-	Silty Clay	-
9/03/2023	ETAM23W00372	SC	1080	1.86	29.3	1.44	2.65	3.4	192	192	192	192	Shear Key	1748903	5949097	-	Silty Clay	-
9/03/2023	ETAM23W00372	SC	1081	1.81	30.5	1.39	2.65	5.3	186	186	186	186	Shear Key	1748904	5949111	-	Silty Clay	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00372
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00372

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 15/03/2023

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00378
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00378

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 16/03/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
10/03/2023	ETAM23W00378	SC	1082	1.85	32.0	1.40	2.65	2.0	152	143	158	155	Shear Key	1748915	5949088	-	Silty Clay	-
10/03/2023	ETAM23W00378	SC	1083	1.86	35.9	1.36	2.65	-0.5	152	155	158	158	Shear Key	1748685	5949099	-	Silty Clay	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00378
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00378

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 16/03/2023

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00386
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00386

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 16/03/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
13/03/2023	ETAM23W00386	SC	1084	1.88	29.7	1.45	2.65	2.3	186	186	186	186	Shear Key	1748891	5949112	-	Silty Clay	-
13/03/2023	ETAM23W00386	SC	1085	1.83	32.8	1.38	2.65	2.7	186	186	192	192	Shear Key	1748899	5949101	-	Silty Clay	-
13/03/2023	ETAM23W00386	SC	1086	1.83	31.8	1.39	2.65	3.3	170	186	186	170	Gully	1748968	5948834	-	Silty Clay	-
13/03/2023	ETAM23W00386	SC	1087	1.88	34.4	1.40	2.65	-0.7	173	170	167	182	Gully	1748982	5948843	-	Silty Clay	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00386
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00386

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 16/03/2023

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00403
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00403

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 16/03/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
14/03/2023	ETAM23W00403	SC	1088	1.88	31.2	1.44	2.65	1.0	155	192	186	156	Shear Key	1748904	5949089	-	Silty Clay	-
14/03/2023	ETAM23W00403	SC	1089	1.87	28.4	1.45	2.65	3.8	UTP	UTP	192	192	Shear Key	1748889	5949103	-	Silty Clay	-
14/03/2023	ETAM23W00403	SC	1090	1.86	27.6	1.46	2.65	4.9	186	170	UTP	UTP	Shear Key	1748922	5949102	-	Silty Clay	-
14/03/2023	ETAM23W00403	SC	1091	1.78	33.1	1.34	2.65	5.1	170	170	186	192	Shear Key	1748968	5949102	-	Silty Clay	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00403
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00403

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 16/03/2023

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00404
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00404

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 16/03/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
15/03/2023	ETAM23W00404	SC	1092	1.82	31.4	1.38	2.65	4.4	155	158	152	155	Gully 2	1749040	5948826	-	Silty Clay	-
15/03/2023	ETAM23W00404	SC	1093	1.84	30.6	1.41	2.65	3.5	192	192	192	192	Gully 2	1748968	5948835	-	Silty Clay	-
15/03/2023	ETAM23W00404	SC	1094	1.86	31.4	1.41	2.65	2.2	186	186	192	192	Shear Key	1748891	5949103	-	Silty Clay	-
15/03/2023	ETAM23W00404	SC	1095	1.88	31.9	1.42	2.65	1.0	192	192	192	192	Shear Key	1748931	5949093	-	Silty Clay	-
15/03/2023	ETAM23W00404	SC	1096	1.79	40.6	1.27	2.65	0.4	155	170	167	158	Gully 2	1748991	5948873	-	Silty Clay	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00404
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00404

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 16/03/2023

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00417
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00417

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 17/03/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
16/03/2023	ETAM23W00417	SC	1097	1.89	30.9	1.45	2.65	0.7	192	192	192	192	Gully Main Fill	1749005	5948863	-	Silty Clay	-
16/03/2023	ETAM23W00417	SC	1098	1.86	32.1	1.41	2.65	1.6	186	170	170	155	Gully Main Fill	1749019	5948878	-	Silty Clay	-
16/03/2023	ETAM23W00417	SC	1099	1.83	37.0	1.33	2.65	0.3	170	170	182	182	Shear Key	1748893	5949105	-	Silty Clay	-
16/03/2023	ETAM23W00417	SC	1100	1.84	36.6	1.34	2.65	0.1	155	158	161	158	Shear Key	1748897	5949057	-	Silty Clay	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00417
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00417

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 17/03/2023

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00465
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00465

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 22/03/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
17/03/2023	ETAM23W00465	SC	1101	1.86	31.4	1.41	2.65	2.3	186	186	192	192	Gully 2	1749023	5948858	-	Silty CLAY	-
17/03/2023	ETAM23W00465	SC	1102	1.84	32.3	1.39	2.65	2.8	186	186	186	186	Gully 2	1748991	5948880	-	Silty CLAY	-
17/03/2023	ETAM23W00465	SC	1103	1.80	32.6	1.36	2.65	4.5	170	173	167	170	Shear Key	1748890	5949100	11.56	Silty CLAY	-
17/03/2023	ETAM23W00465	SC	1104	1.86	29.9	1.43	2.65	3.4	170	170	173	173	Shear Key	1748934	5949088	11.42	Silty CLAY	-
17/03/2023	ETAM23W00465	SC	1105	1.90	32.1	1.44	2.65	0.0	170	170	170	170	Shear Key	1748966	5949095	12.51	Clayey SILT	-
17/03/2023	ETAM23W00465	SC	1106	1.85	30.8	1.41	2.65	3.1	167	186	170	170	Shear Key	1748995	5949064	13.40	Clayey SILT	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

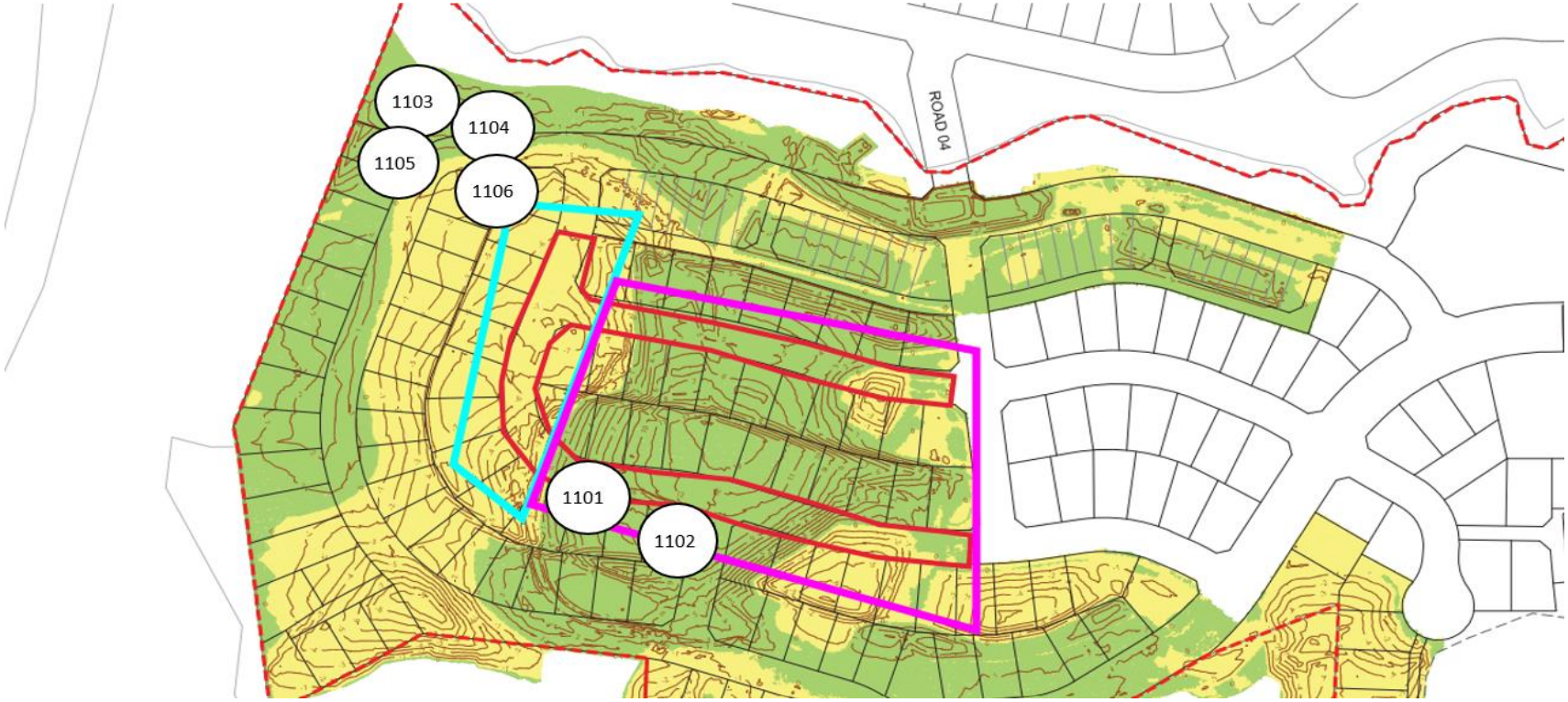
Earthworks Fill Report

Report No: EFIL:ETAM23W00465
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00465

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 22/03/2023



Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00479
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00479

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 23/03/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
21/03/2023	ETAM23W00479	SC	1107	1.87	29.9	1.44	2.65	2.6	192+	192+	192+	192+	Shear Key	1748890	5949099	11.73	Silty CLAY	-
21/03/2023	ETAM23W00479	SC	1108	1.84	31.3	1.40	2.65	3.4	186	186	192+	192+	Shear Key	1748918	5949092	11.68	Silty CLAY	-
21/03/2023	ETAM23W00479	SC	1109	1.86	33.6	1.39	2.65	1.0	192+	192+	186	186	Shear Key	1748935	5949085	12.75	Silty CLAY	-
21/03/2023	ETAM23W00479	SC	1110	1.87	32.2	1.41	2.65	1.1	186	186	186	186	Shear Key	1748953	5949082	13.65	Silty CLAY	-

Comments:

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

Auckland Laboratory

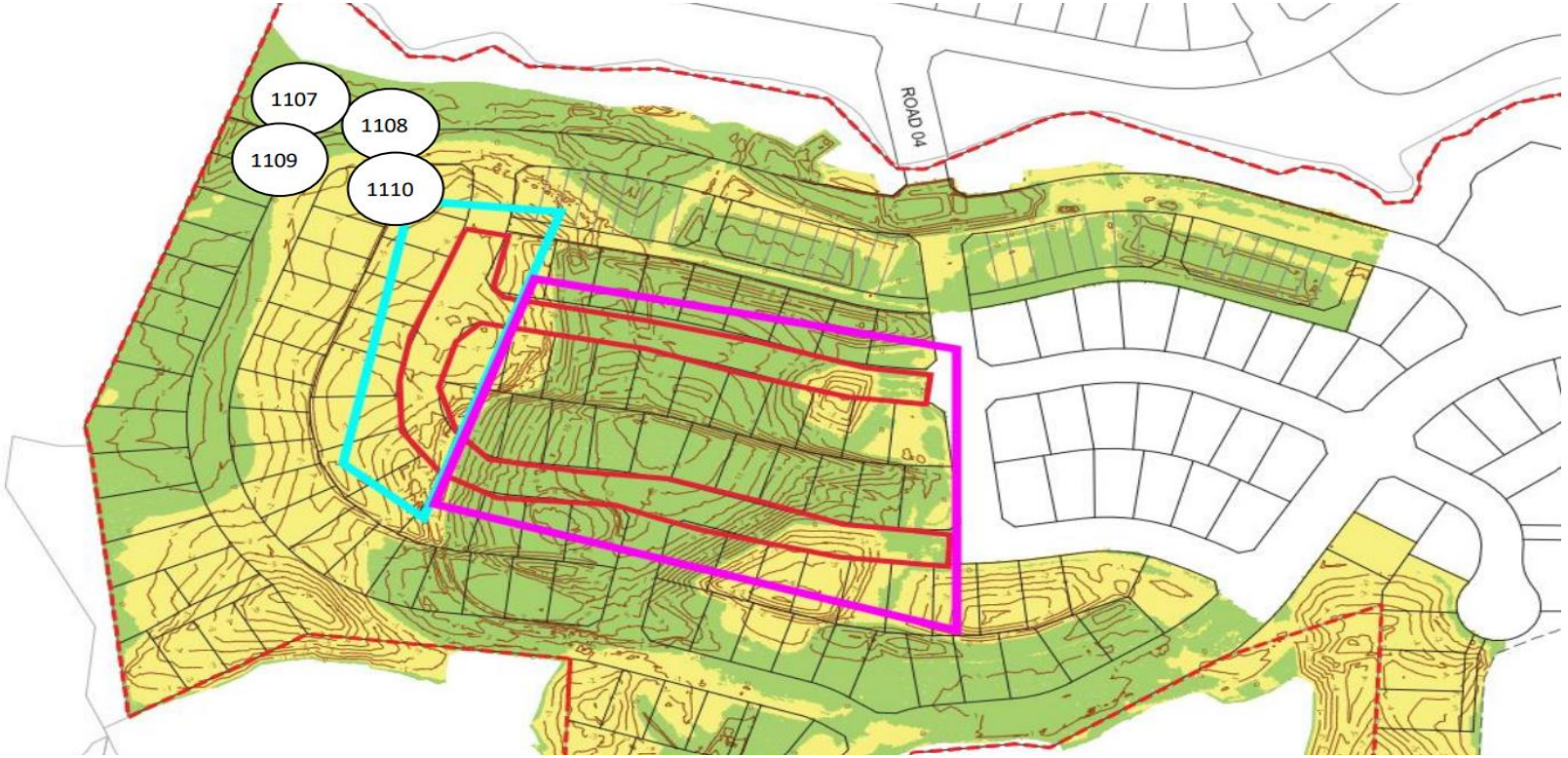
GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00479
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00479

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 23/03/2023



Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00624
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00624

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 5/04/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
4/04/2023	ETAM23W00624	LW	1131	1.90	31.2	1.45	2.65	0.0	207	207	207	207	Kowhai Road	1749063	5948787	42.8	Silty Clay	-
4/04/2023	ETAM23W00624	LW	1132	1.90	31.9	1.44	2.65	0.0	207	207	207	207	Kowhai Road	1749052	5948775	42.4	Silty Clay	-
4/04/2023	ETAM23W00624	LW	1133	1.89	30.7	1.44	2.65	1.2	191	180	195	207	Lot Fill	1749010	5949061	16.4	Silty Clay	-
4/04/2023	ETAM23W00624	LW	1134	1.88	30.5	1.44	2.65	1.8	207	207	207	191	Lot Fill	1749007	5949071	16.5	Silty Clay	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

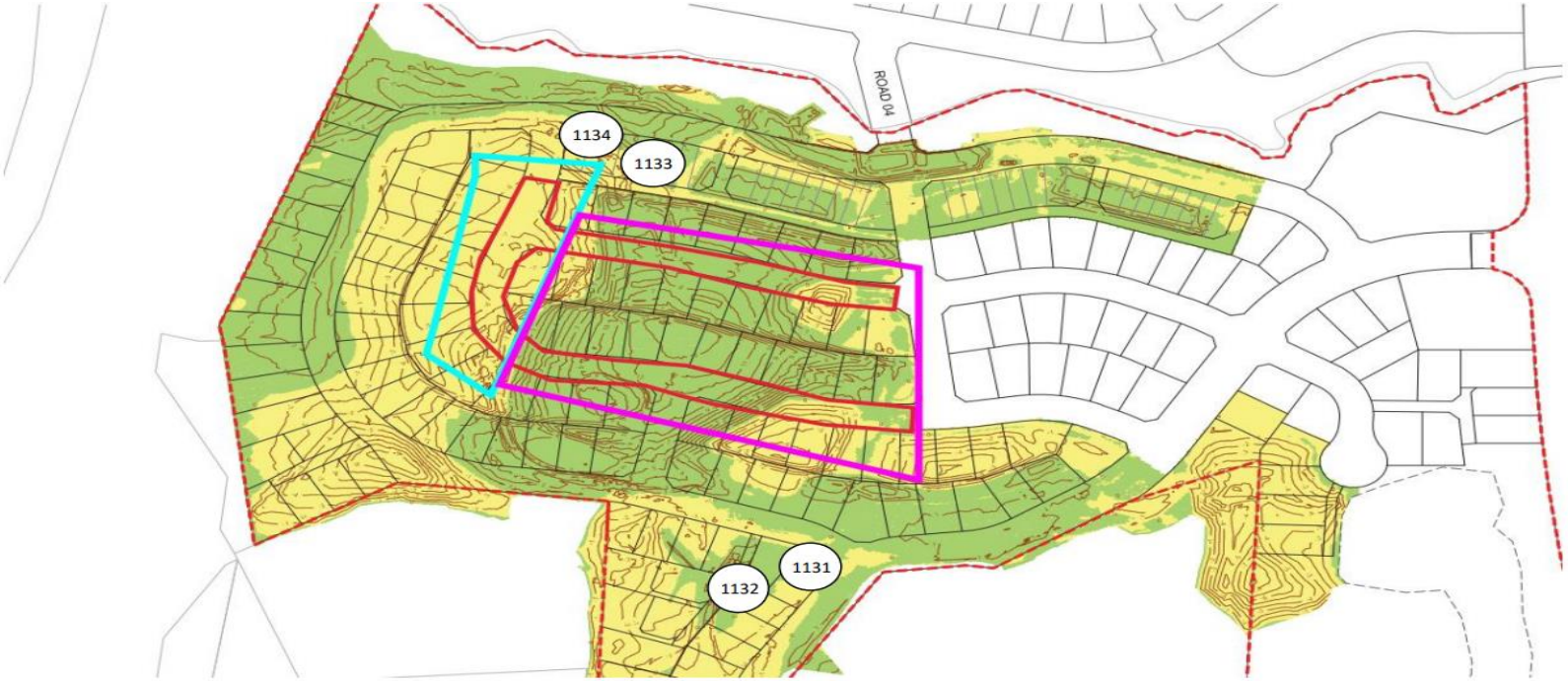
Earthworks Fill Report

Report No: EFIL:ETAM23W00624
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00624

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 5/04/2023



SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00655
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00655

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
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Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 12/04/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
6/04/2023	ETAM23W00655	LW	1135	1.96	26.6	1.55	2.65	0.5	207+	207+	207+	207+	Undercut 310	1748969	5949086	-	Silty CLAY	RLs unavailable
6/04/2023	ETAM23W00655	LW	1136	1.95	26.8	1.54	2.65	0.8	207+	207+	207+	207+	Undercut 310	1748863	5949081	-	Silty CLAY	RLs unavailable

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00655
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00655

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
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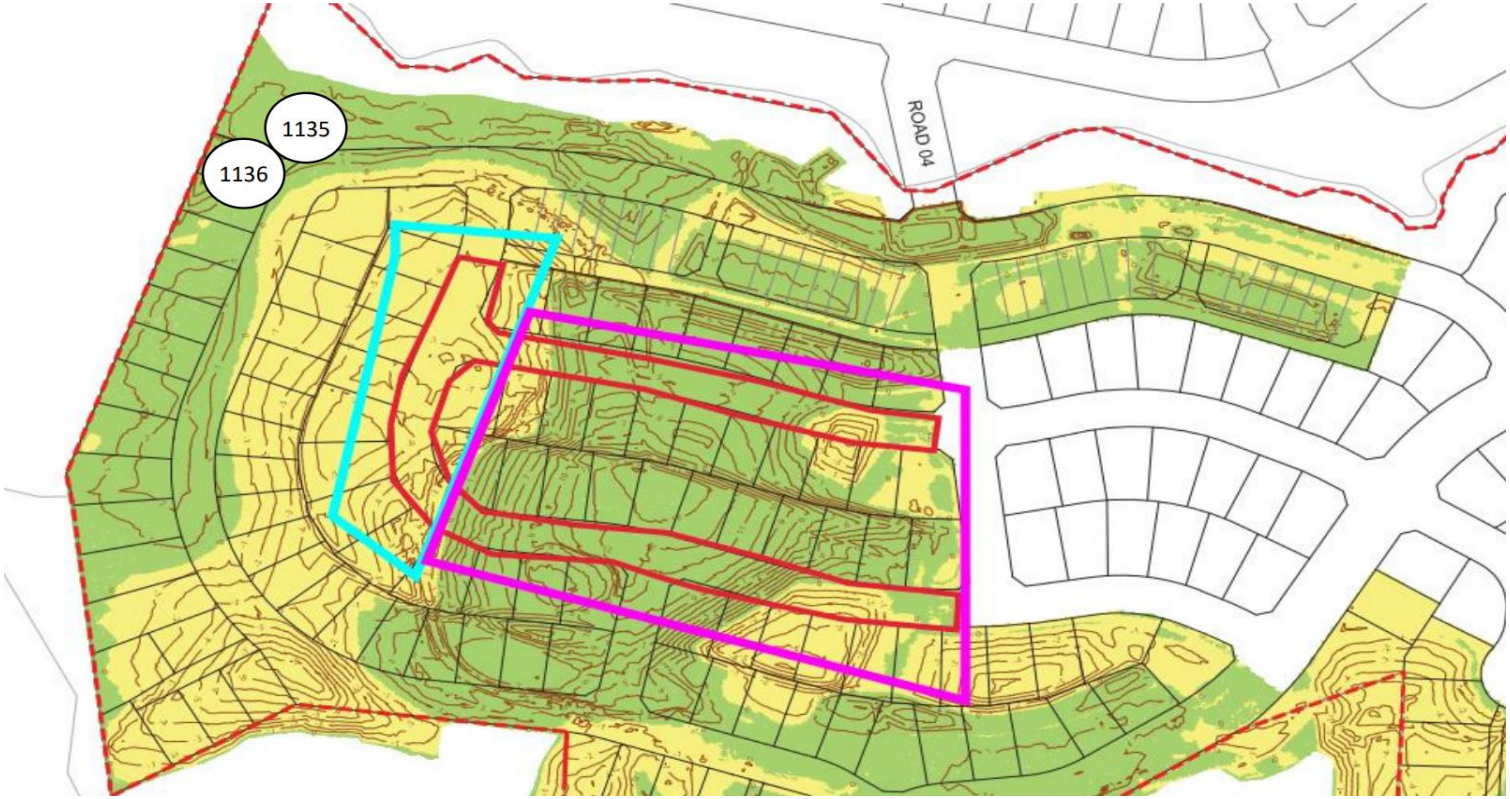
Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 12/04/2023



Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00777
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00777

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 28/04/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
21/04/2023	ETAM23W00777	SC	1145	1.86	32.3	1.40	2.65	1.7	170	170	186	186	Shear Key	1748909	5949096	17.56	Clayey SILT	-
21/04/2023	ETAM23W00777	SC	1146	1.80	30.4	1.38	2.65	5.8	170	170	155	155	Shear Key	1748898	5949082	17.00	Clayey SILT	-
21/04/2023	ETAM23W00777	SC	1147	1.79	34.5	1.33	2.65	3.9	152	152	158	158	Shear Key	1748872	5949086	14.18	Clayey SILT	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

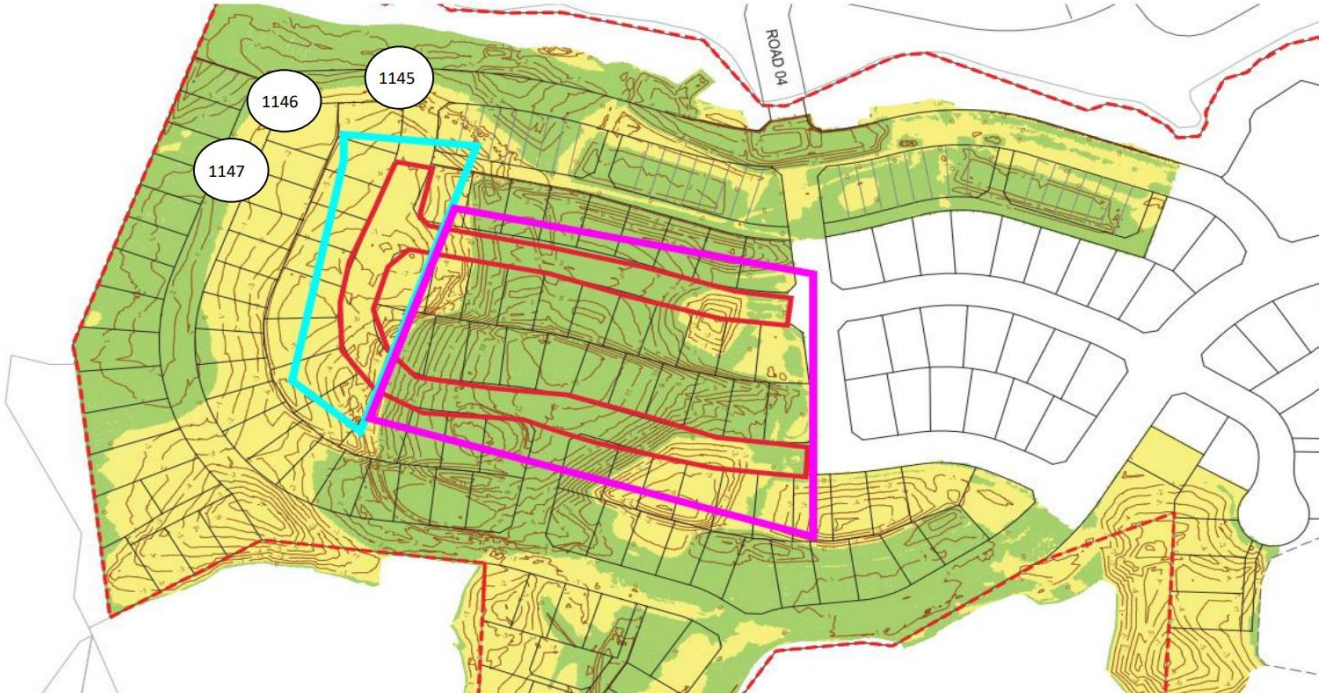
Earthworks Fill Report

Report No: EFIL:ETAM23W00777
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00777

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 28/04/2023



Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00798
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00798

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 3/05/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
27/04/2023	ETAM23W00798	SC	1150	1.86	30.9	1.42	2.65	2.7	155	155	140	140	Shear Key	1748865	5949077	14.20	Clayey SILT	-
27/04/2023	ETAM23W00798	SC	1151	1.79	33.1	1.35	2.65	4.5	170	170	170	170	Shear Key	1748890	5949080	16.24	Clayey SILT	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

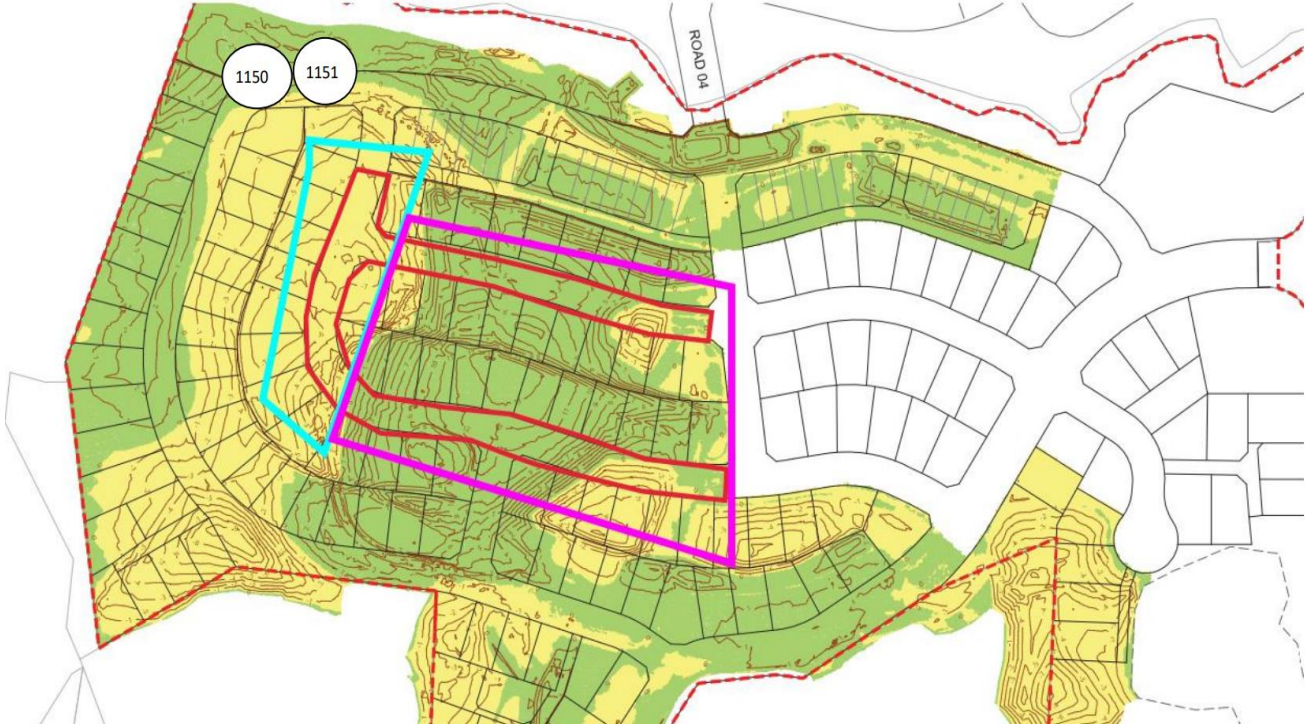
Earthworks Fill Report

Report No: EFIL:ETAM23W00798
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00798

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 3/05/2023



Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00939
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00939

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 22/05/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
18/05/2023	ETAM23W00939	SC	1154	1.81	34.7	1.35	2.65	2.4	150	150	152	152	Shear Key	1748869	5949076	16.02	Lime Silty Clay	-
18/05/2023	ETAM23W00939	SC	1153	1.83	34.6	1.36	2.65	1.6	170	170	155	155	Shear Key	1748866	5949068	16.20	Lime Silty Clay	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00939
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00939

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 22/05/2023

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01948
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01948

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 24/11/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
17/11/2023	ETAM23W01948	SC	1194	1.85	33.6	1.39	2.65	1	183	189	207	178	Western Fill Area	1748855	5948874	-	Clayey SILT	Not Available
17/11/2023	ETAM23W01948	SC	1195	1.88	33.6	1.40	2.65	0	163	173	178	157	Western Fill Area	1748856	5948948	-	Clayey SILT	Not Available
17/11/2023	ETAM23W01948	SC	1196	1.85	33.5	1.39	2.65	1	183	178	173	163	Western Fill Area	1748835	5948993	25.00	Clayey SILT	-
17/11/2023	ETAM23W01948	SC	1197	1.77	33.6	1.32	2.65	6	142	157	147	157	Western Fill Area	1748830	5948975	25.45	Clayey SILT	-

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01948
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01948

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

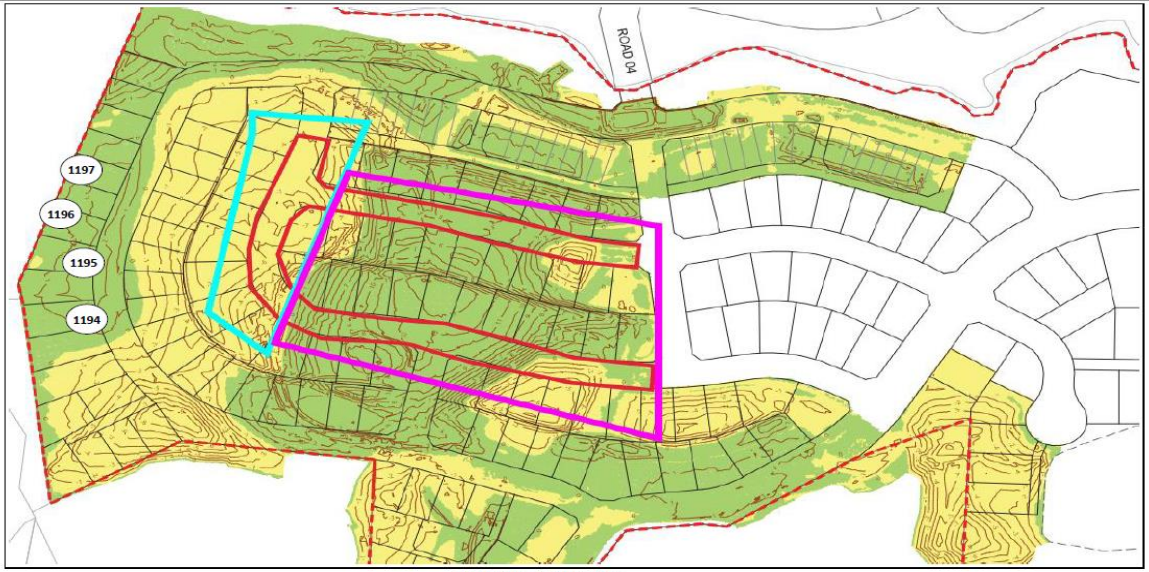
Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 24/11/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW01948
Page No: 2 of 2

Location: Western Fill Area

Tested by: SC
Date Tested: 17/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01991
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01991

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 30/11/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
27/11/2023	ETAM23W01991	LW	1198	1.84	36.1	1.36	2.65	0	192	176	205	210	RE Wall 604	1749000	5949082	13.70	Silty CLAY	-
27/11/2023	ETAM23W01991	LW	1199	1.81	38.7	1.30	2.65	0	220+	220+	180	192	RE Wall 604	1749024	5949074	13.80	Silty CLAY	-
27/11/2023	ETAM23W01991	LW	1200	1.84	34.5	1.36	2.65	1	220+	220+	220+	220+	Western Fill Area	1748855	5948874	40.70	Silty CLAY	-
27/11/2023	ETAM23W01991	LW	1201	1.85	34.6	1.37	2.65	1	220+	220+	220+	220+	Western Fill Area	1748856	5948910	39.50	Silty CLAY	-

Comments:

Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)
Reduced level (RL) was supplied by contractor and not IANZ endorsed.

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W01991
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

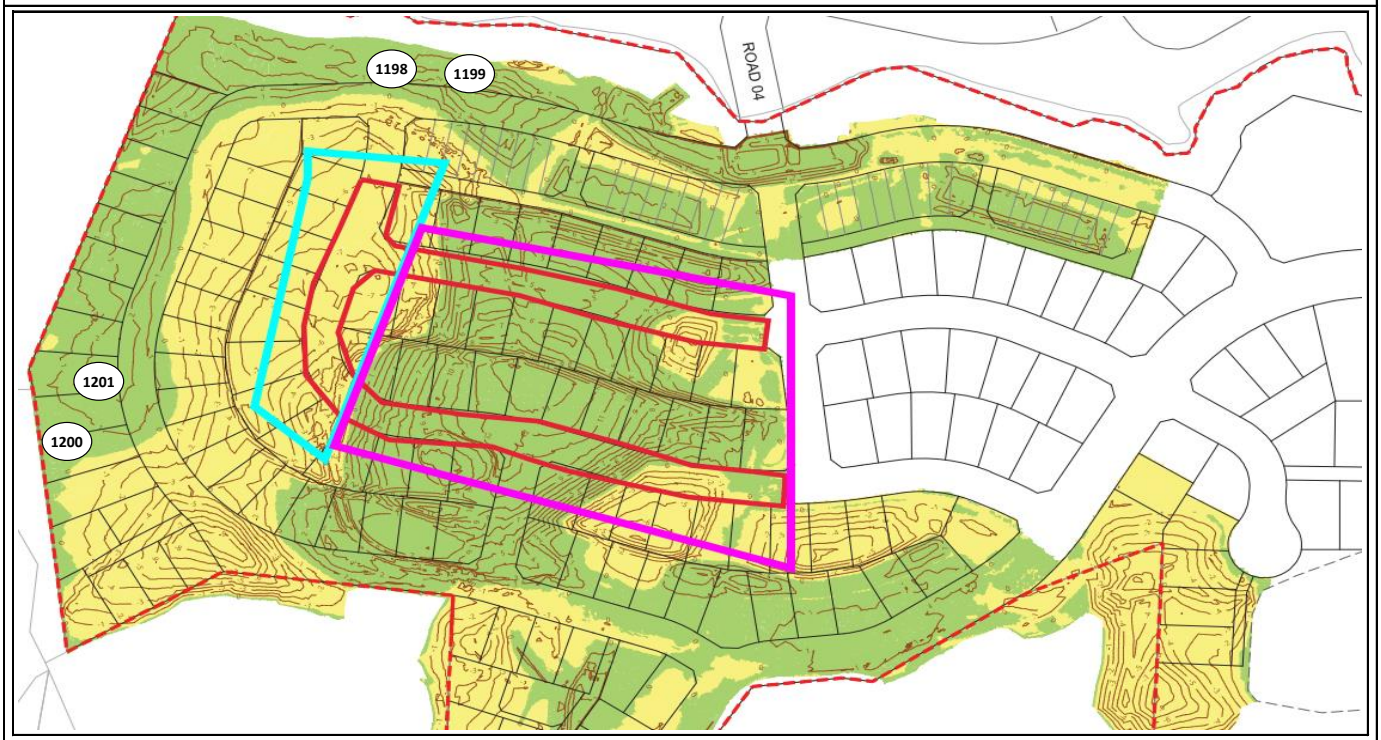
Approved Signatory: Cesar Pura
(Laboratory Supervisor)
IANZ Accredited Laboratory Number:105
Date of Issue: 30/11/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW01991
Page No: 2 of 2

Location: Western Fill Area + RE Wall 604

Tested by: SC
Date Tested: 27/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02017
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02017

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 5/12/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
30/11/2023	ETAM23W02017	SC	1204	1.88	31.4	1.43	2.65	1	194	175	159	175	RE Wall	1748971	5949079	15.99	Silty CLAY	-
30/11/2023	ETAM23W02017	SC	1205	1.87	30.7	1.43	2.65	2	188	198+	198+	198+	RE Wall	1748981	5949060	16.00	Silty CLAY	-
30/11/2023	ETAM23W02017	SC	1206	1.89	28.6	1.47	2.65	3	198+	175	198+	175	Western Fill Area	1748841	5948993	-	Silty CLAY	RL not available
30/11/2023	ETAM23W02017	SC	1207	1.91	27.0	1.51	2.65	3	UTP	UTP	UTP	UTP	Western Fill Area	1748828	5948956	-	Silty CLAY	RL not available
30/11/2023	ETAM23W02017	SC	1208	1.86	32.9	1.40	2.65	1	152	149	159	175	Western Fill Area	1748848	5948913	-	Silty CLAY	RL not available
30/11/2023	ETAM23W02017	SC	1209	1.92	26.3	1.52	2.65	3	UTP	UTP	UTP	UTP	Gully Fill Area	1748975	5948886	-	Silty CLAY	RL not available
30/11/2023	ETAM23W02017	SC	1210	1.90	22.8	1.55	2.65	6	UTP	UTP	UTP	143	Gully Fill Area	1749004	5948871	-	Silty CLAY	RL not available

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

Comments:

Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)
Reduced level (RL) was supplied by contractor and not IANZ endorsed.

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02017
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

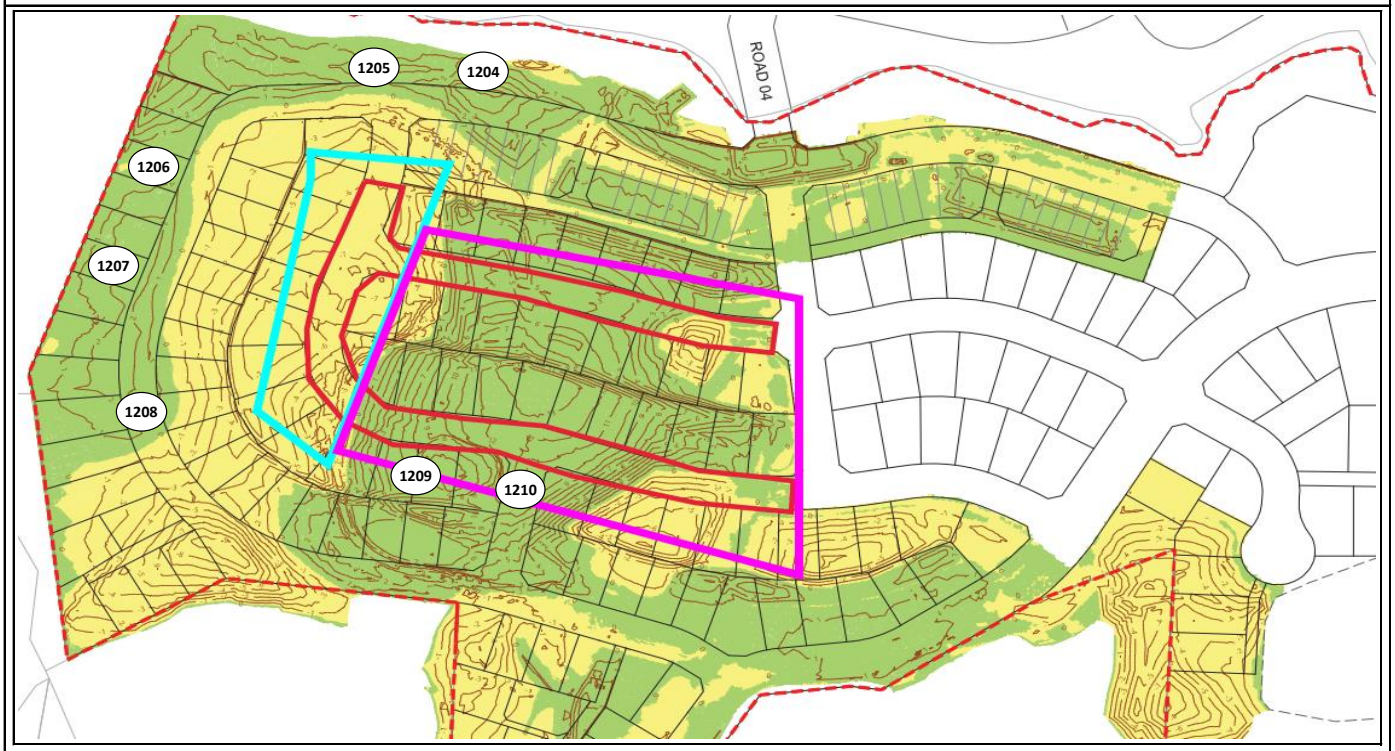
Approved Signatory: Cesar Pura
(Laboratory Supervisor)
IANZ Accredited Laboratory Number:105
Date of Issue: 5/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02017
Page No: 2 of 2

Location: RE Wall + Western Area + Gully Fill Area

Tested by: SC
Date Tested: 30/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02054
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02054

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 13/12/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
8/12/2023	ETAM23W02054	SC	1217	1.84	35.0	1.36	2.65	1	162	175	162	171	Western Fill Area	1748864	5948984	-	Clayey SILT	RL not available
8/12/2023	ETAM23W02054	SC	1218	1.80	34.6	1.33	2.65	3	159	159	175	175	Western Fill Area	1748837	5948964	-	Clayey SILT	RL not available

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02054
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.

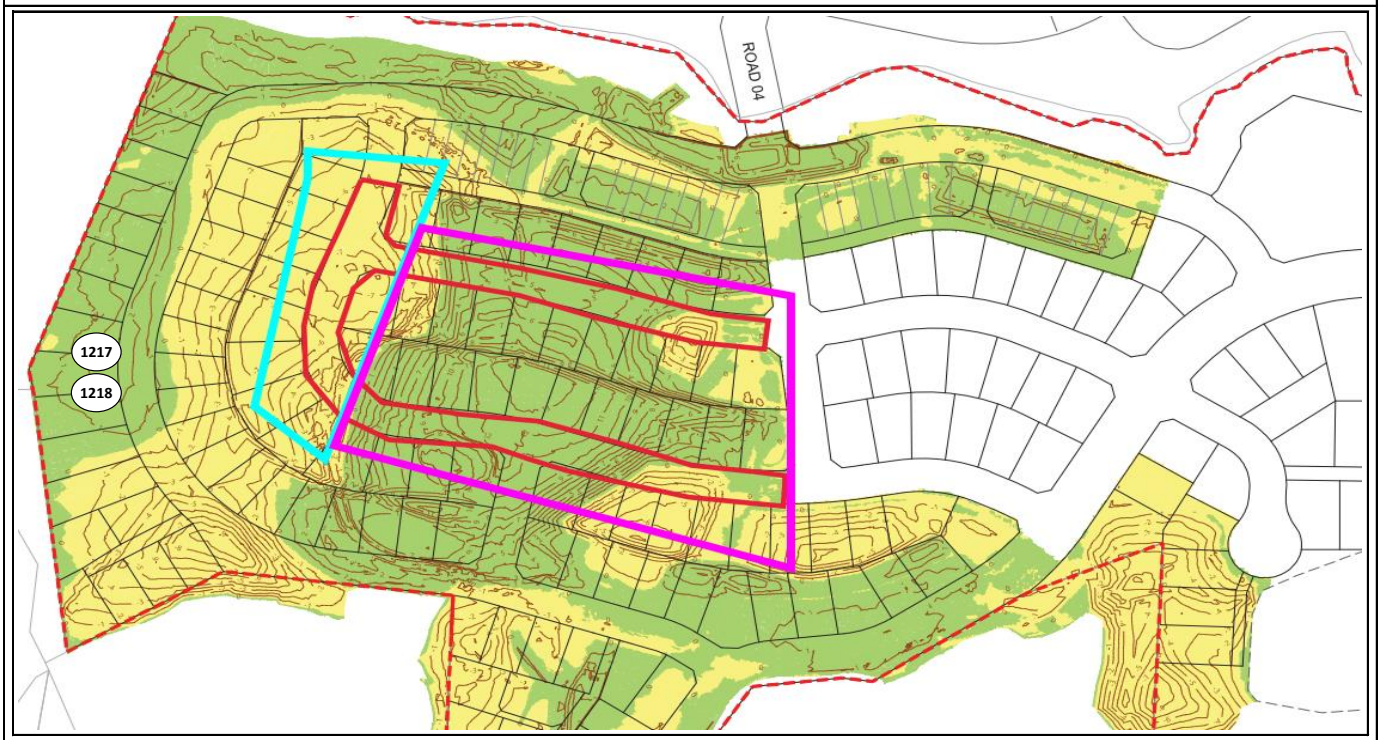
Approved Signatory: Cesar Pura
(Laboratory Supervisor)
IANZ Accredited Laboratory Number:105
Date of Issue: 13/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02054
Page No: 2 of 2

Location: Western Area (see below)

Tested by: SC
Date Tested: 8/12/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02071
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02071

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 15/12/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
12/12/2023	ETAM23W02071	RP	1219	1.93	27.1	1.52	2.65	2	UTP	UTP	UTP	UTP	Western Fill Area	1748845	5948963	30.5	Silty CLAY	-
12/12/2023	ETAM23W02071	RP	1220	1.88	28.1	1.47	2.65	3	197+	197+	197+	171	Western Fill Area	1748853	5948989	27.5	Silty CLAY	-
12/12/2023	ETAM23W02071	RP	1221	1.88	28.4	1.47	2.65	3	197+	197+	197+	175	Fill Area	1749019	5948879	36.7	Silty CLAY	-
12/12/2023	ETAM23W02071	RP	1222	1.85	26.4	1.47	2.65	6	UTP	UTP	UTP	UTP	Fill Area	1748996	5948877	35.6	Silty CLAY	-

Comments:

Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)
Reduced level (RL) was supplied by contractor and not IANZ endorsed.

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02071
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

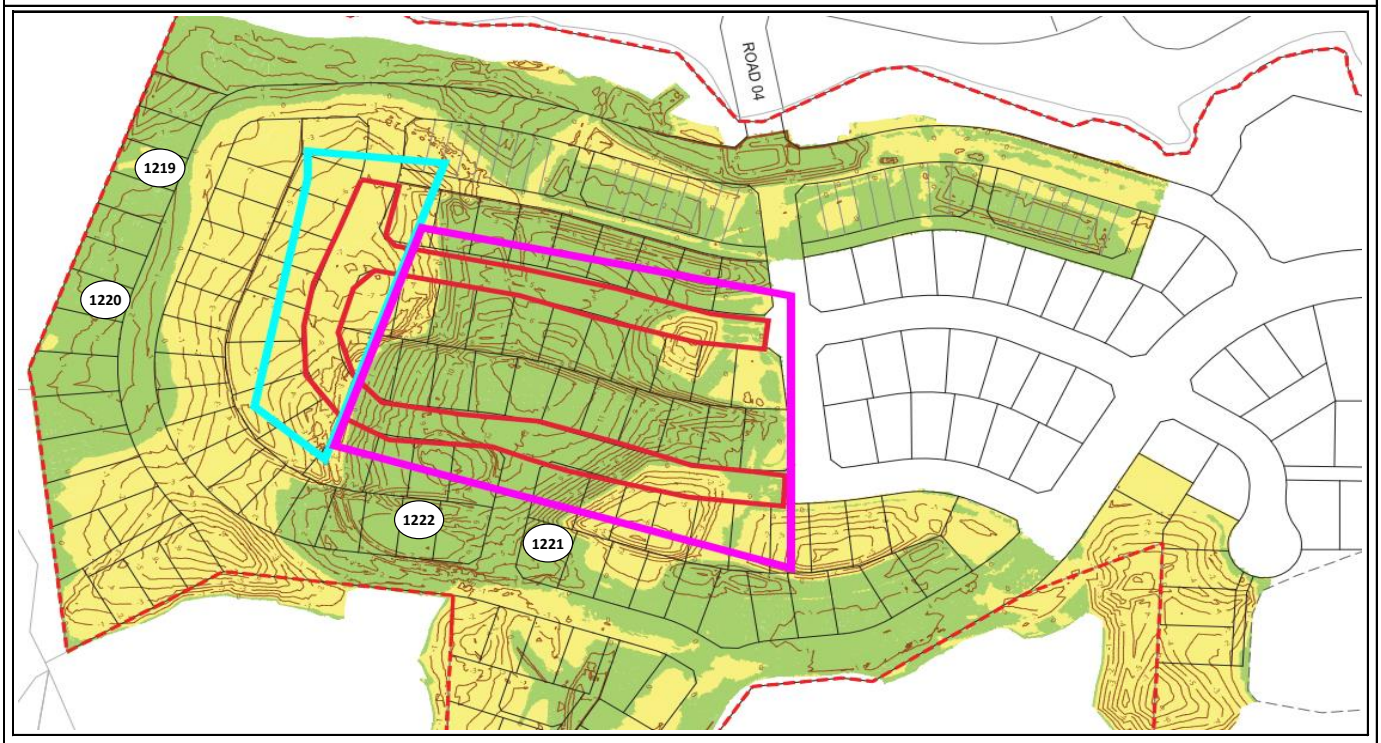
Approved Signatory: Cesar Pura
(Laboratory Supervisor)
IANZ Accredited Laboratory Number:105
Date of Issue: 15/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02071
Page No: 2 of 2

Location: Western Area + Gully (see below)

Tested by: RP
Date Tested: 12/12/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02091
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02091

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 20/12/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
14/12/2023	ETAM23W02091	RP	1223	1.87	29.6	1.44	2.65	2.8	UTP	UTP	UTP	162	Western Fill Area	1748870	5949017	-	Silty CLAY	RL not available
14/12/2023	ETAM23W02091	RP	1224	1.88	28.0	1.47	2.65	3.4	UTP	UTP	UTP	UTP	Western Fill Area	1748848	5948980	-	Silty CLAY	RL not available
14/12/2023	ETAM23W02091	RP	1225	1.85	32.7	1.39	2.65	1.9	175	188	UTP	UTP	Road Undercut	1748923	5948841	-	Silty CLAY	RL not available
14/12/2023	ETAM23W02091	RP	1226	1.86	30.7	1.42	2.65	2.7	UTP	UTP	UTP	UTP	Road Undercut	1748900	5948852	-	Silty CLAY	RL not available
14/12/2023	ETAM23W02091	RP	1227	1.85	32.6	1.40	2.65	1.9	UTP	UTP	UTP	UTP	Road Undercut	1748877	5948870	-	Silty CLAY	RL not available
14/12/2023	ETAM23W02091	RP	1228	1.91	33.4	1.43	2.65	0.0	UTP	UTP	UTP	196	Gully	1749004	5948881	-	Silty CLAY	RL not available
14/12/2023	ETAM23W02091	RP	1229	1.86	33.7	1.39	2.65	0.5	UTP	UTP	UTP	UTP	Gully	1749028	5948857	-	Silty CLAY	RL not available

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02091
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

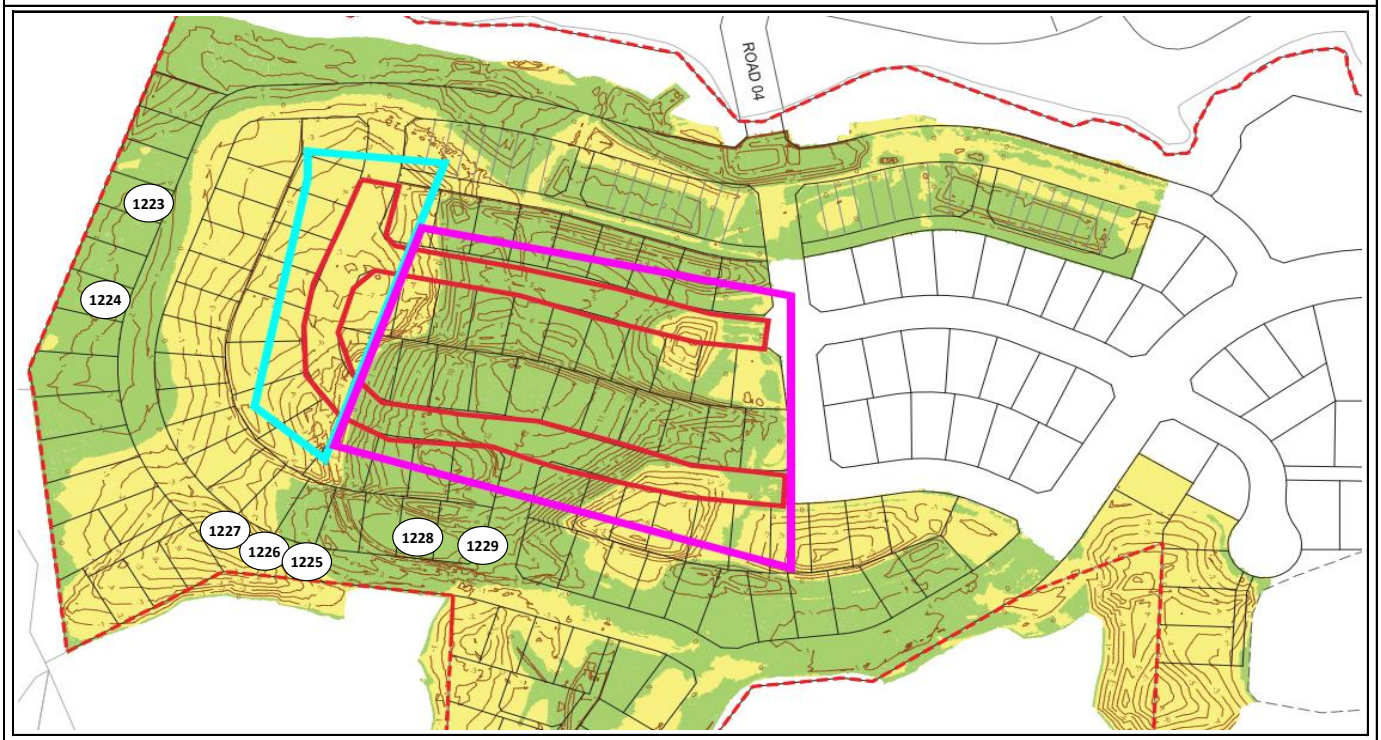
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 20/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02091
Page No: 2 of 2

Location: Western Area + Gully (see below)

Tested by: RP
Date Tested: 14/12/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02134
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02134

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 22/12/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
21/12/2023	ETAM23W02134	RP	1238	1.83	30.3	1.41	2.65	4.3	UTP	UTP	UTP	188	Undercut 9	1748907	5948905	-	Silty CLAY	RL not available
21/12/2023	ETAM23W02134	RP	1239	1.92	26.5	1.52	2.65	2.3	UTP	UTP	UTP	UTP	Undercut 9	1748940	5948882	-	Silty CLAY	RL not available
21/12/2023	ETAM23W02134	RP	1240	1.81	33.0	1.36	2.65	3.6	UTP	UTP	UTP	UTP	Road Undercut	1748921	5948849	-	Silty CLAY	RL not available
21/12/2023	ETAM23W02134	RP	1241	1.96	27.6	1.54	2.65	-0.6	UTP	UTP	UTP	UTP	Road Undercut	174892	5948866	-	Silty CLAY	RL not available

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02134
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

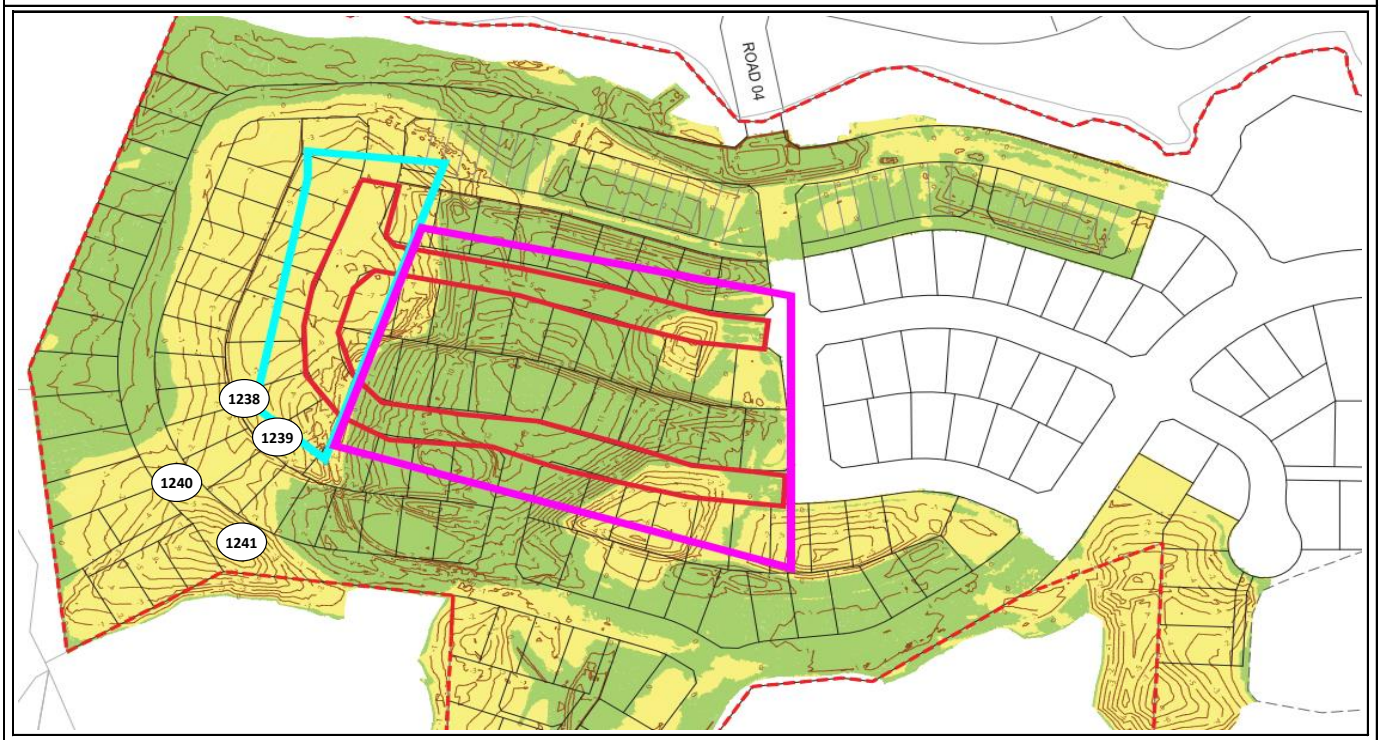
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 22/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02134
Page No: 2 of 2

Location: Undercut 9 + Road Undercut

Tested by: RP
Date Tested: 21/12/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00067
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00067

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

Project Location: 117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 25/01/2024

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
19/01/2024	ETAM24W00067	RP	1266	1.92	25.8	1.52	2.65	3.2	UTP	UTP	UTP	UTP	RE Wall 602	1749102	5948837	-	Silty CLAY	RL not available
19/01/2024	ETAM24W00067	RP	1267	1.94	25.7	1.55	2.65	2.0	UTP	UTP	UTP	UTP	RE Wall 602	1749154	5948830	-	Silty CLAY	RL not available
19/01/2024	ETAM24W00067	RP	1268	1.88	29.5	1.45	2.65	2.3	UTP	UTP	UTP	UTP	Silt Pond	1749102	5949016	16.2	Silty CLAY	-
19/01/2024	ETAM24W00067	RP	1269	1.88	25.7	1.49	2.65	5.4	UTP	UTP	UTP	UTP	Silt Pond	1749081	5949025	14.2	Silty CLAY	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00067
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

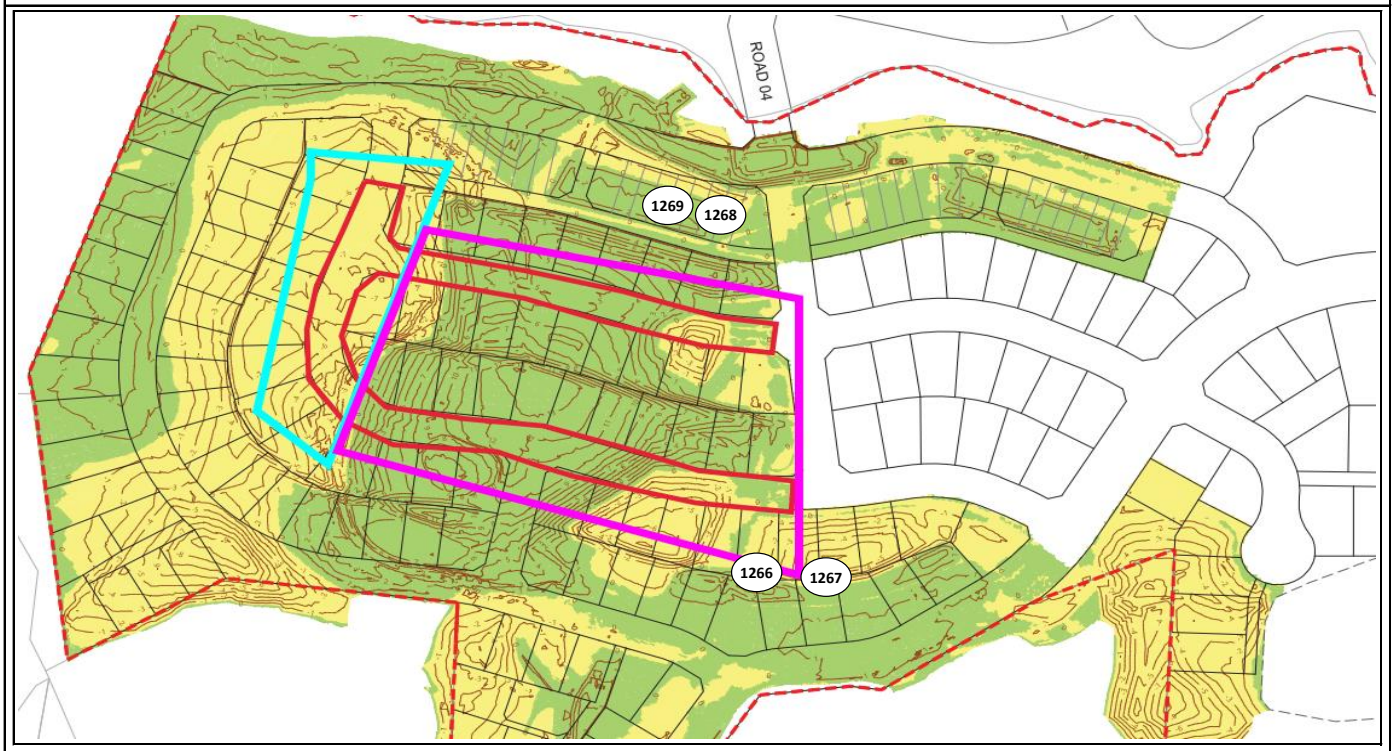
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 25/01/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00067
Page No: 2 of 2

Location: RE Wall 602 + Silt Pond

Tested by: RP
Date Tested: 19/01/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00074
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00074

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 26/01/2024

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
22/01/2024	ETAM24W00074	LW	1270	1.88	27.9	1.47	2.65	3.3	220+	220+	220+	220+	Undercut Area	1748832	5948869	-	Silty CLAY	RL not available
22/01/2024	ETAM24W00074	LW	1271	1.82	31.0	1.39	2.65	4.5	220+	220+	220+	149	Undercut Area	1748852	5948881	-	Silty CLAY	RL not available
22/01/2024	ETAM24W00074	LW	1272	1.94	27.1	1.53	2.65	0.9	220+	220+	220+	220+	RE Wall 602	1749200	5948845	-	Silty CLAY	RL not available
22/01/2024	ETAM24W00074	LW	1273	1.90	27.8	1.49	2.65	2.4	220+	220+	220+	220+	RE Wall 602	1749165	5948831	-	Silty CLAY	RL not available
22/01/2024	ETAM24W00074	LW	1274	1.90	29.7	1.47	2.65	1.1	220+	220+	220+	220+	Silt Pond	1749094	5949020	-	Silty CLAY	RL not available
22/01/2024	ETAM24W00074	LW	1275	1.90	27.5	1.49	2.65	3.0	220+	220+	220+	220+	Silt Pond	1749079	5949025	-	Silty CLAY	RL not available

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00074
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

ACCREDITED IANZ TESTING LABORATORY

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

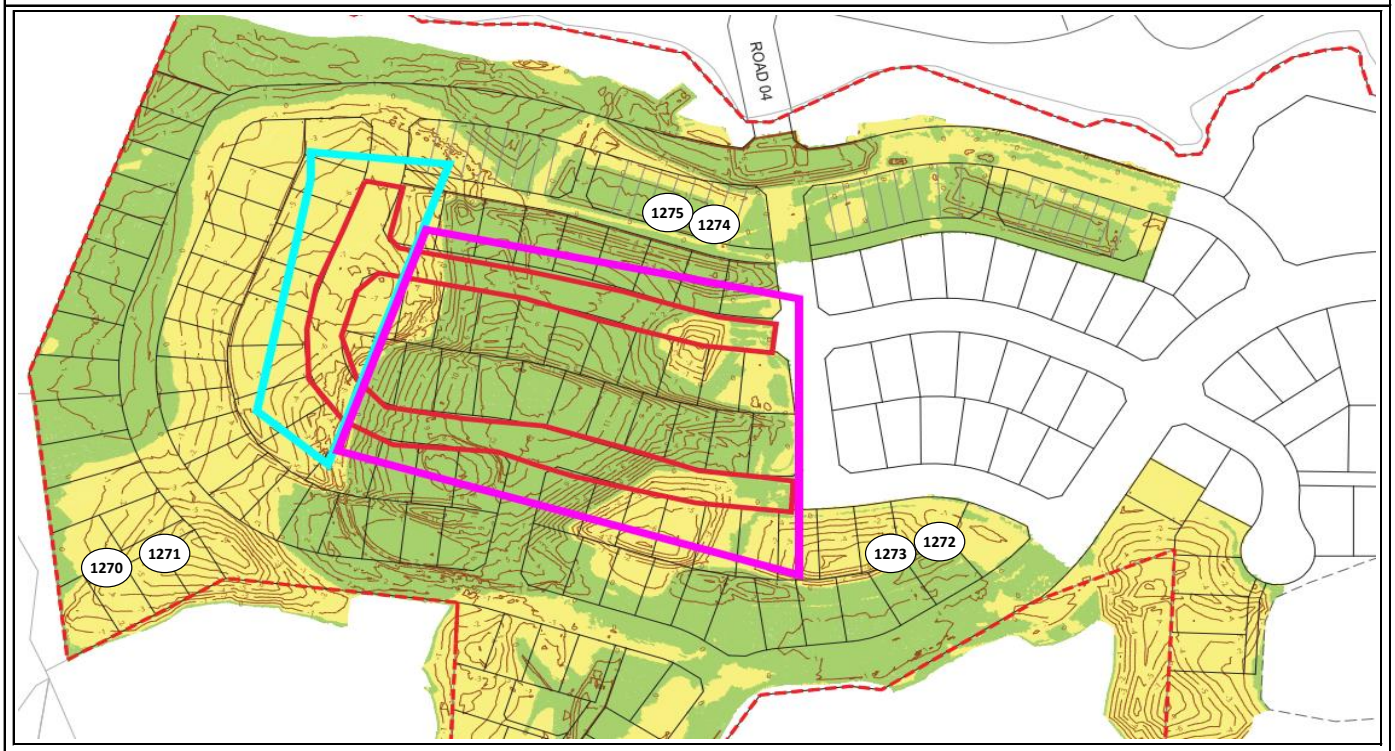
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 26/01/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00074
Page No: 2 of 2

Location: Undercut Area + RE Wall 602 + Silt Pond

Tested by: LW
Date Tested: 22/01/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00083
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00083

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 26/01/2024

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
23/01/2024	ETAM24W00083	SC	1276	1.87	28.3	1.46	2.65	3.8	172	172	201	201	RE Wall 602	1749194	5948837	37.0	Silty CLAY	-
23/01/2024	ETAM24W00083	SC	1277	1.91	27.1	1.50	2.65	2.7	201	201	201	201	RE Wall 602	1749150	5948829	37.0	Silty CLAY	-
23/01/2024	ETAM24W00083	SC	1278	1.91	25.3	1.53	2.65	3.9	192	201	172	188	RE Wall 602	1749073	5948846	37.0	Silty CLAY	-
23/01/2024	ETAM24W00083	SC	1279	1.87	28.0	1.46	2.65	3.8	192	192	172	172	Silt Pond	1749072	5949018	-	Silty CLAY	RL not availale
23/01/2024	ETAM24W00083	SC	1280	1.85	30.1	1.42	2.65	3.4	168	172	192	188	Silt Pond	1749076	5949024	-	Silty CLAY	RL not availale

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00083
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

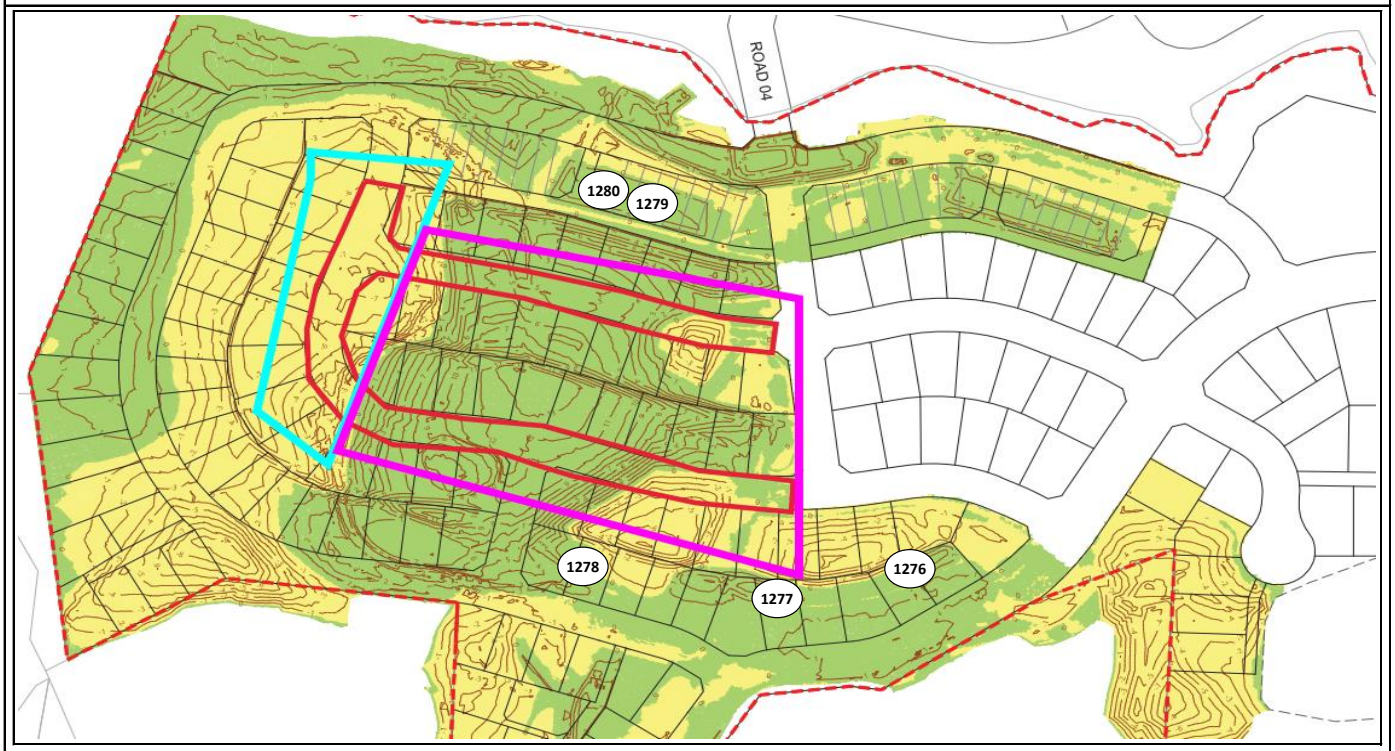
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 26/01/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00083
Page No: 2 of 2

Location: Gully + Silt Pond

Tested by: SC
Date Tested: 23/01/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00097
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00097

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

Project Location: 117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 30/01/2024

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
25/01/2024	ETAM24W00097	SC	1289	1.96	28.9	1.52	2.65	0.0	UTP	UTP	UTP	UTP	Undercut Key	1748856	5948875	-	Silty CLAY	RL not available
25/01/2024	ETAM24W00097	SC	1290	1.89	31.5	1.43	2.65	0.7	188	188	194	194	Undercut Key	1748826	5948872	-	Silty CLAY	RL not available
25/01/2024	ETAM24W00097	SC	1291	1.86	29.3	1.44	2.65	3.6	UTP	UTP	UTP	UTP	Gully Main Fill	1749016	5948854	-	Silty CLAY	RL not available
25/01/2024	ETAM24W00097	SC	1292	1.93	28.9	1.50	2.65	0.2	194	198+	188	194	Gully Main Fill	1748941	5948892	-	Silty CLAY	RL not available

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00097
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

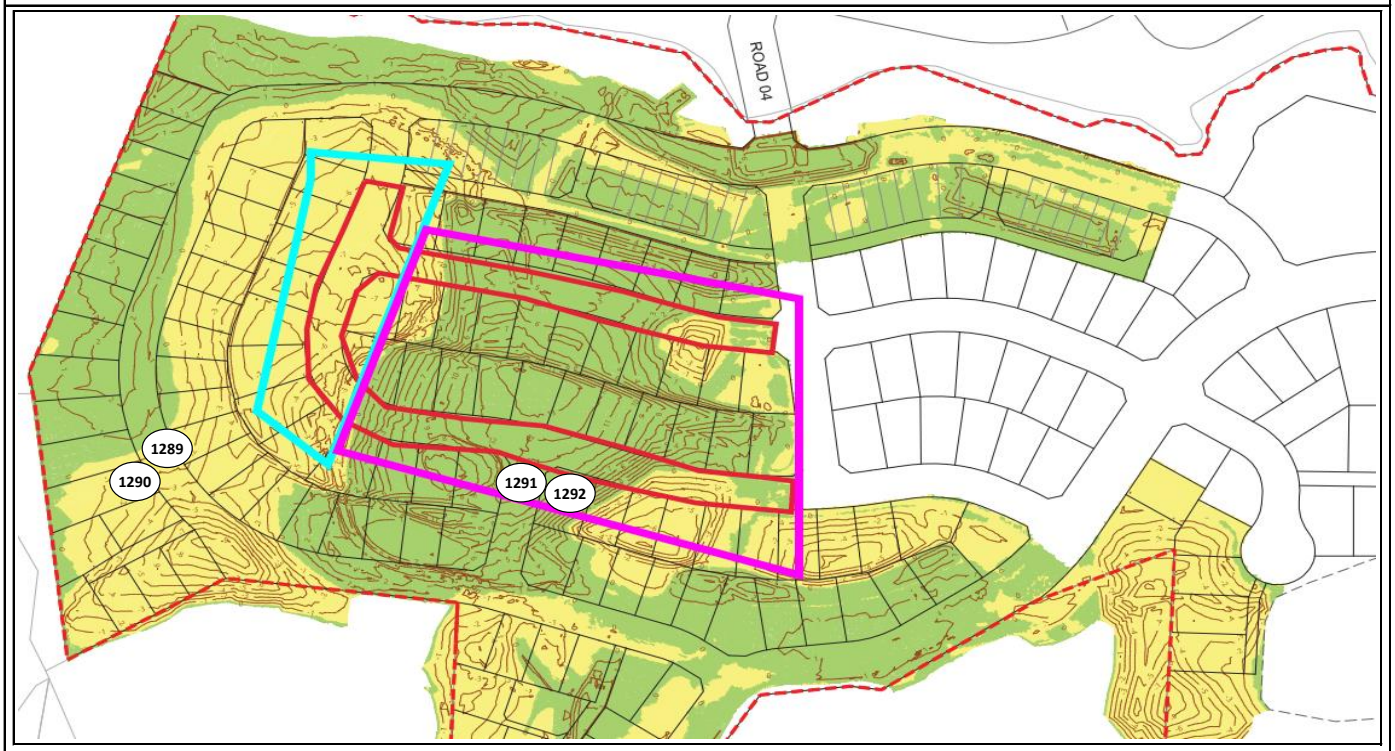
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 30/01/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00097
Page No: 2 of 2

Location: Gully Main Fill + Undercut Key

Tested by: SC
Date Tested: 25/01/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00109
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00109

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 7/02/2024

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
30/01/2024	ETAM24W00109	SC	1298	1.88	27.9	1.47	2.65	3.5	159	159	188	188	Fill Area (refer to plan)	1749041	5948844	-	Silty CLAY	RL not available
30/01/2024	ETAM24W00109	SC	1299	1.94	27.8	1.52	2.65	0.3	177	177	175	175	RE Wall 602	1749095	5948835	38.00	Silty CLAY	-
30/01/2024	ETAM24W00109	SC	1300	1.92	27.2	1.51	2.65	1.8	175	188	185	159	RE Wall 602	1749119	5948826	38.00	Silty CLAY	-
30/01/2024	ETAM24W00109	SC	1301	1.86	27.4	1.46	2.65	4.9	159	159	171	171	RE Wall 602	1749150	5948824	38.00	Silty CLAY	-
30/01/2024	ETAM24W00109	SC	1302	1.68	40.2	1.20	2.65	6.4	95	114	111	102	Wastewater Line K to L	1748925	5949061	18.69	Silty CLAY	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00109
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

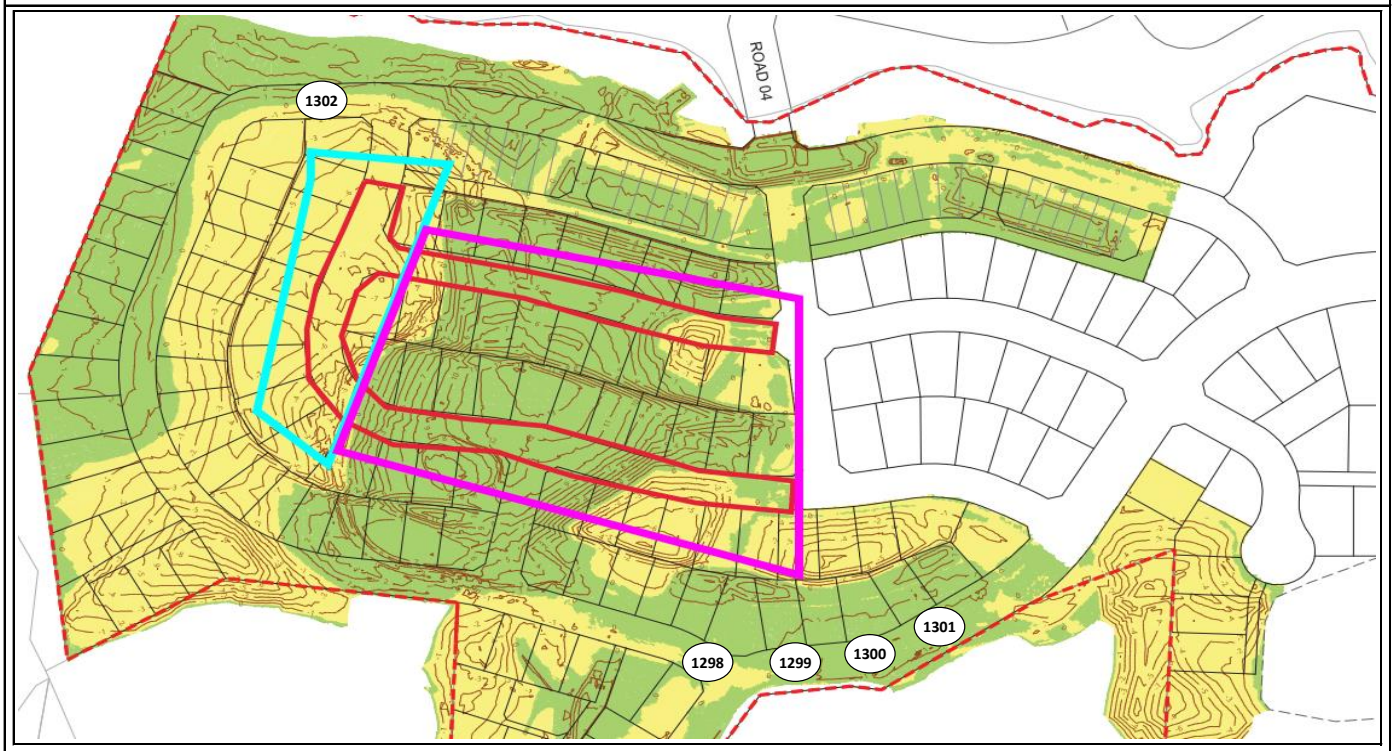
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 7/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00109
Page No: 2 of 2

Location: Fill Areas + RE Wall 602 + Wastewater Line K to L

Tested by: SC
Date Tested: 30/01/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00146
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00146

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

Project Location: 117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 12/02/2024

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
2/02/2023	ETAM24W00146	RP	1315	1.82	30.0	1.40	2.65	5.5	198+	198+	UTP	UTP	Undercut Area	1748834	5948862	-	Silty CLAY	RL not available
2/02/2023	ETAM24W00146	RP	1316	1.89	25.9	1.50	2.65	4.5	UTP	UTP	UTP	UTP	Undercut Area	1748822	5948868	-	Silty CLAY	RL not available
2/02/2023	ETAM24W00146	RP	1317	1.86	26.2	1.47	2.65	5.9	UTP	UTP	UTP	UTP	RE Wall 603	1748927	5948889	-	Silty CLAY	RL not available
2/02/2023	ETAM24W00146	RP	1318	1.92	28.0	1.50	2.65	1.3	UTP	198+	198+	198+	RE Wall 603	1748901	5948906	-	Silty CLAY	RL not available
2/02/2023	ETAM24W00146	RP	1319	1.88	27.8	1.47	2.65	3.8	UTP	UTP	UTP	198+	RE Wall 602	1749048	5948851	-	Silty CLAY	RL not available
2/02/2023	ETAM24W00146	RP	1320	1.89	25.7	1.51	2.65	4.4	UTP	UTP	UTP	UTP	RE Wall 602	1749084	5948835	-	Silty CLAY	RL not available
2/02/2023	ETAM24W00146	RP	1321	1.71	26.5	1.35	2.65	13.4	UTP	UTP	UTP	UTP	Silt Pond	1749064	5949028	16.66	Silty CLAY	-
2/02/2023	ETAM24W00146	RP	1322	1.84	26.8	1.45	2.65	6.2	UTP	UTP	UTP	UTP	Silt Pond	1749054	5949029	16.26	Silty CLAY	-
2/02/2023	ETAM24W00146	RP	1323	1.85	31.1	1.41	2.65	2.9	UTP	UTP	UTP	UTP	Silt Pond	1749084	5949017	17.21	Silty CLAY	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00146
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

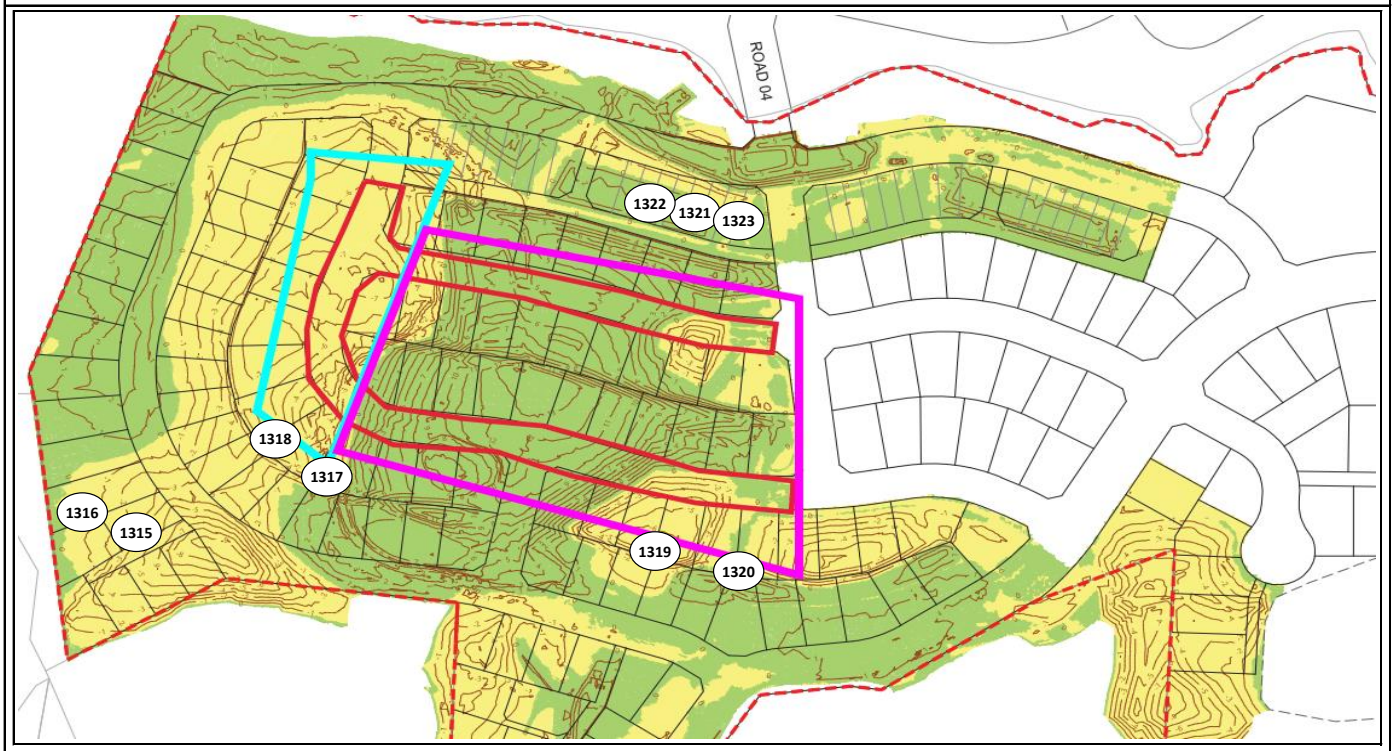
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 12/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00146
Page No: 2 of 2

Location: Undercut Area + RE Wall 602 + 603 + Silt Pond

Tested by: RP
Date Tested: 2/02/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00172
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00172

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

Project Location: 117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 13/02/2024

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/02/2024	ETAM24W00172	SC	1324	1.89	27.9	1.48	2.65	2.8	191	191	188	188	RE Wall 602	1749052	5948709	-	Silty CLAY	RL not available
7/02/2024	ETAM24W00172	SC	1325	1.91	32.0	1.44	2.65	0.0	UTP	UTP	188	188	RE Wall 602	1749085	5948835	-	Silty CLAY	RL not available
7/02/2024	ETAM24W00172	SC	1326	1.98	25.6	1.58	2.65	0.0	UTP	UTP	198	198	RE Wall 603	1748900	5948910	37.5	Silty CLAY	-
7/02/2024	ETAM24W00172	SC	1327	1.95	29.5	1.50	2.65	0.0	188	188	194	194	RE Wall 603	1748935	5948883	37.5	Silty CLAY	-
7/02/2024	ETAM24W00172	SC	1328	1.99	26.3	1.58	2.65	0.0	198+	198+	198+	198+	SPR 7	1749056	5949031	-	Silty CLAY	RL not available
7/02/2024	ETAM24W00172	SC	1329	1.99	26.2	1.58	2.65	0.0	UTP	UTP	UTP	UTP	SPR 7	1749070	5949033	-	Silty CLAY	RL not available

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00172
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

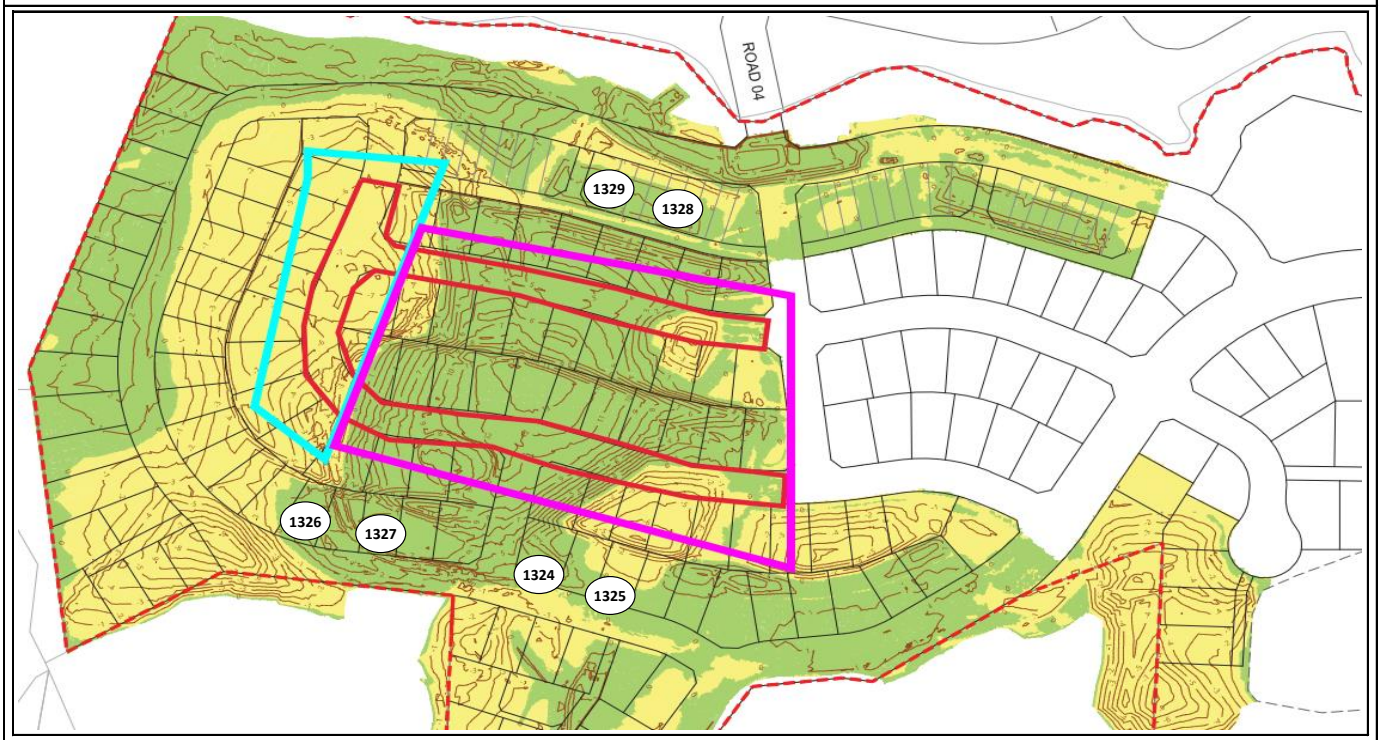
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 13/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00172
Page No: 2 of 2

Location: RE Wall 602 + 603 + SPR 7

Tested by: SC
Date Tested: 7/02/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00179
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00179

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

Project Location: 117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 13/02/2024

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
8/02/2024	ETAM24W00179	SC	1330	1.84	29.9	1.42	2.65	4.0	175	175	171	171	RE Wall 602	1749085	5948837	42.00	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1331	1.86	30.4	1.43	2.65	2.7	185	175	188	183	RE Wall 602	1749064	5948839	42.00	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1332	1.90	21.4	1.56	2.65	7.4	UTP	UTP	UTP	UTP	RE Wall 603	1748900	5948905	38.00	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1333	1.88	27.8	1.47	2.65	3.8	UTP	UTP	UTP	UTP	RE Wall 603	1748942	5948879	38.00	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1334	1.92	31.3	1.46	2.65	0.0	UTP	UTP	UTP	UTP	Lot 11 Undercut	1748826	5948891	39.40	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1335	1.92	32.4	1.45	2.65	0.0	188	188	185	185	Lot 12 Undercut	1748817	5948870	41.65	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1336	2.01	25.9	1.60	2.65	0.0	UTP	UTP	UTP	UTP	Silt Pond (Retest)	1749064	5949028	16.66	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1337	1.89	25.2	1.51	2.65	5.0	UTP	UTP	UTP	UTP	Silt Pond (Retest)	1749048	5949029	16.66	Silty CLAY	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00179
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

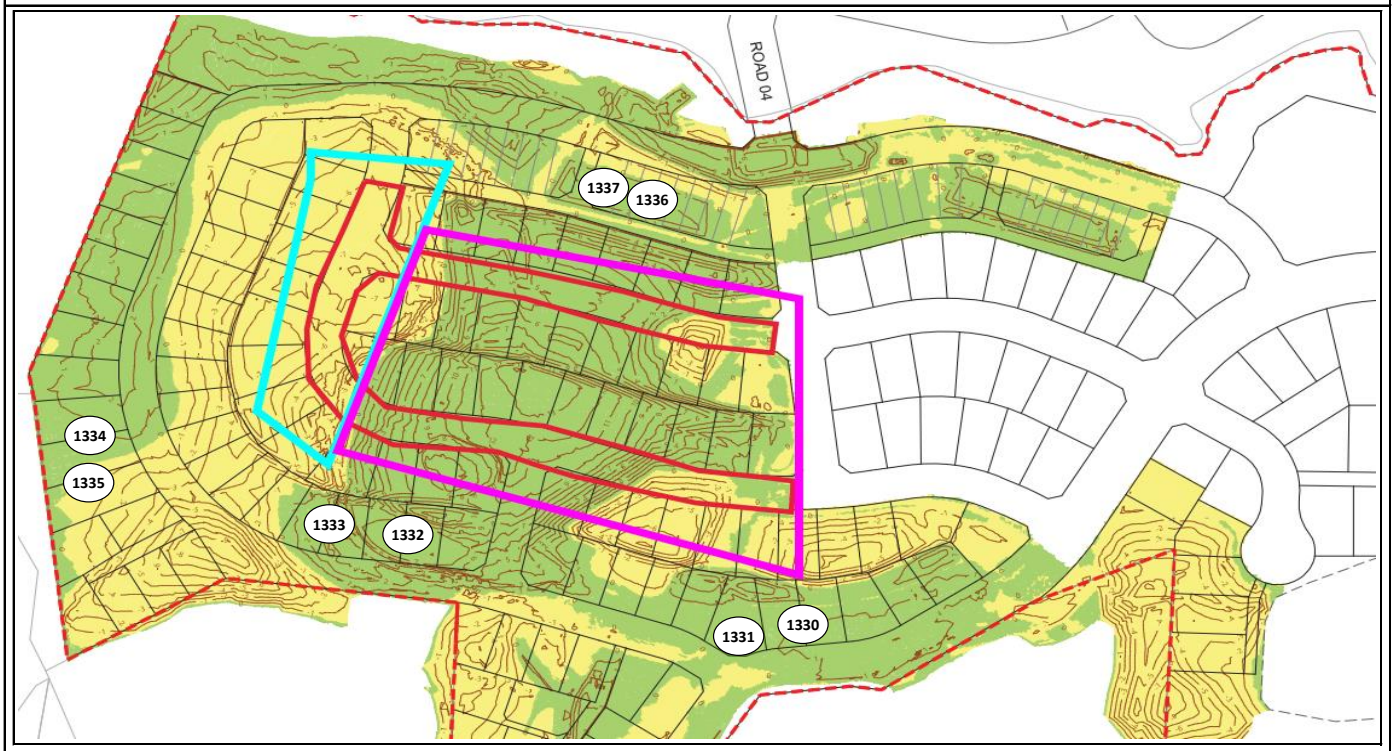
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 13/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00179
Page No: 2 of 2

Location: RE Wall 602 & 603 + Lot 11 & 12 Undercut + Silt Pond

Tested by: SC
Date Tested: 8/02/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00183
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00183

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 13/02/2024

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
9/02/2024	ETAM24W00183	RP	1338	1.87	28.1	1.46	2.65	3.9	UTP	UTP	UTP	198+	Undercut Area	1748839	5948862	-	Silty CLAY	RL not available
9/02/2024	ETAM24W00183	RP	1339	1.86	31.2	1.42	2.65	2.1	198+	UTP	UTP	UTP	Undercut Area	1748850	5948883	-	Silty CLAY	RL not available
9/02/2024	ETAM24W00183	RP	1340	2.01	23.8	1.63	2.65	0.0	UTP	UTP	UTP	UTP	Silt Pond	1749074	5949019	17.60	Silty CLAY	-
9/02/2024	ETAM24W00183	RP	1341	1.90	27.1	1.50	2.65	2.9	UTP	UTP	UTP	UTP	Silt Pond	1749053	5949032	17.00	Silty CLAY	-
9/02/2024	ETAM24W00183	RP	1342	1.81	31.7	1.38	2.65	4.5	198+	UTP	UTP	UTP	Drainage Line	1748881	5949068	-	Silty CLAY	RL not available

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00183
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

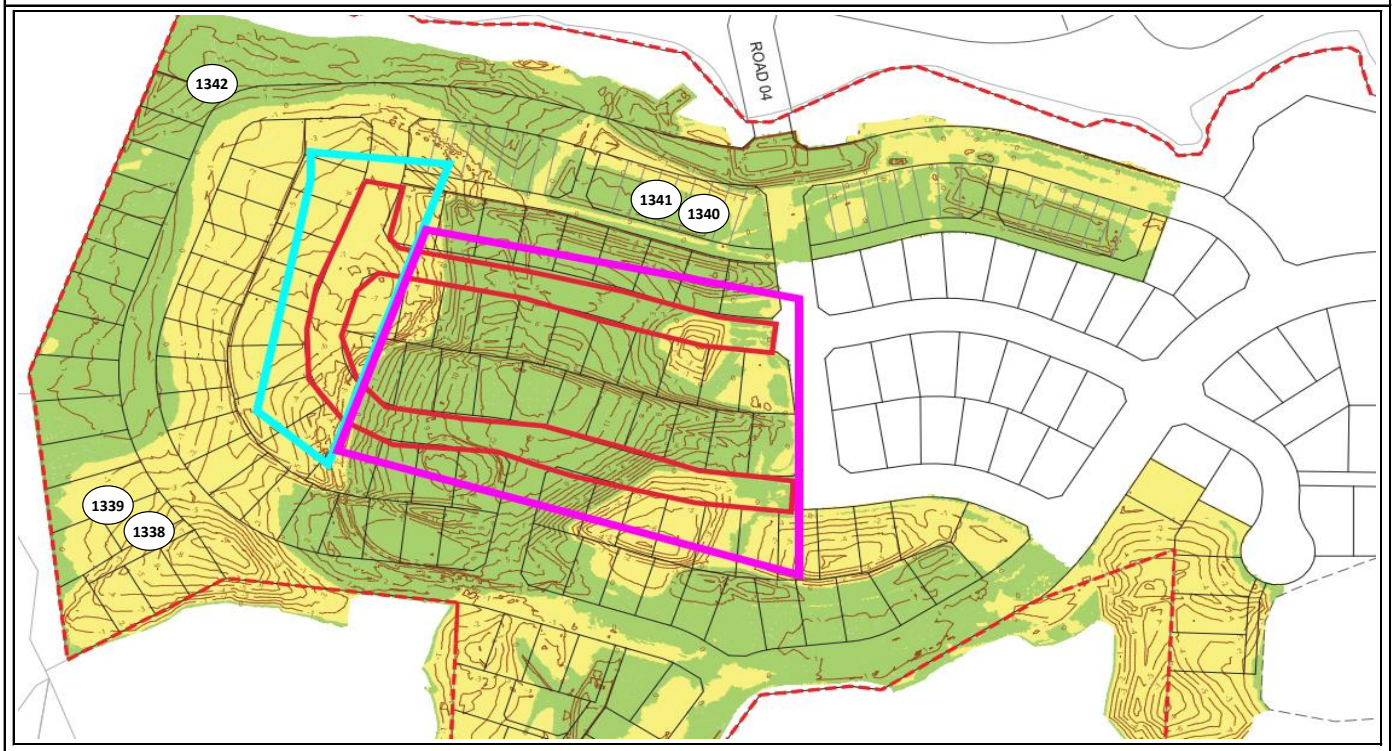
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 13/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00183
Page No: 2 of 2

Location: Undercut Area + Silt Pond + Drainage Line

Tested by: RP
Date Tested: 9/02/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00285
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00285

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Managing Director-Testing
IANZ Site Number: 105
Date of Issue: 27/02/2024

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
20/02/2024	ETAM24W00285	LW	1358	1.85	30.6	1.41	2.65	3.3	220+	220+	220+	220+	RE Wall 603	1748968	5948888	-	Silty CLAY	RL not available
20/02/2024	ETAM24W00285	LW	1359	1.85	31.0	1.41	2.65	2.8	220+	220+	220+	220+	RE Wall 603	1748947	5948890	-	Silty CLAY	RL not available
20/02/2024	ETAM24W00285	LW	1360	1.91	30.9	1.46	2.65	0.0	UTP	UTP	UTP	UTP	04/01 - 04/02	1748884	5949063	-	Silty CLAY	At Finish Level
20/02/2024	ETAM24W00285	LW	1361	1.82	29.3	1.40	2.65	5.8	220+	220+	220+	220+	03/10 - 03/11	1748869	5948969	-	Silty CLAY	At Finish Level

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00285
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

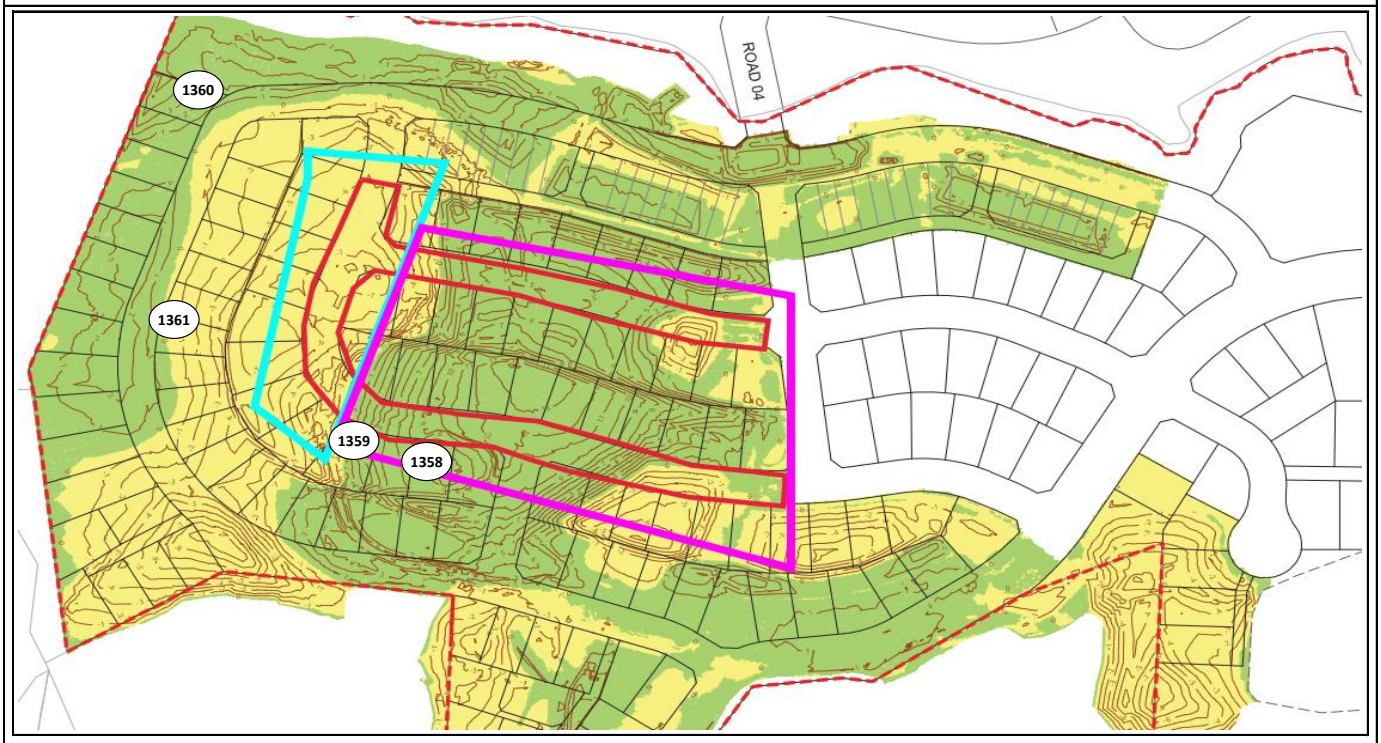
Approved Signatory: Eric Paton
(Managing Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 27/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00285
Page No: 2 of 2

Location: RE Wall 603 + 04/01-04/02 + 03/10-03/11

Tested by: LW
Date Tested: 20/02/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01456
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01456

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 1/12/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
30/11/2021	ETAM21W01456	LW	566	1.94	28.7	1.51	2.70	1	UTP	UTP	UTP	UTP	Gully	1749031	5948895	29.90	Clayey SILT	
30/11/2021	ETAM21W01456	LW	567	1.93	29.6	1.49	2.70	1	UTP	UTP	UTP	UTP	Gully	1749056	5948964	26.00	Clayey SILT	

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

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01456
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01456

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 1/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01462
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01462

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 2/12/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
1/12/2021	ETAM21W01462	LW	568	1.82	35.9	1.34	2.70	2	163	170	159	156	Shear Key	1748982	5949096	6.24	Silty CLAY	
1/12/2021	ETAM21W01462	LW	569	1.83	35.6	1.35	2.70	2	149	142	163	177	Shear Key	1748998	5949089	6.28	Silty CLAY	

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

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01462
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01462

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

ACCREDITED IANZ TESTING LABORATORY

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

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 2/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01470
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01470

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 3/12/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
2/12/2021	ETAM21W01470	LW	570	1.93	27.3	1.52	2.70	3	185+	185+	185+	185+	Shear Key	1748990	5949080	7.30	Clayey SILT	
2/12/2021	ETAM21W01470	LW	571	1.93	28.7	1.50	2.70	1	185+	185+	185+	185+	Shear Key	1748989	5949091	7.35	Clayey SILT	

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

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01470
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01470

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 3/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01476
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01476

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 6/12/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
3/12/2021	ETAM21W01476	LW	572	1.88	32.8	1.41	2.70	1	149	172	175+	175+	Shear Key	1748998	5949081	8.10	Clayey SILT	
3/12/2021	ETAM21W01476	LW	573	1.89	33.3	1.42	2.70	0	175+	175+	175+	164	Shear Key	1748991	5949076	9.30	Clayey SILT	
3/12/2021	ETAM21W01476	LW	574	1.87	31.4	1.42	2.70	3	137	175+	175+	153	Gully	1748976	5948881	31.95	Clayey SILT	
3/12/2021	ETAM21W01476	LW	575	1.84	34.1	1.37	2.70	2	149	160	156	153	Gully	1748995	5948918	29.55	Clayey SILT	
3/12/2021	ETAM21W01476	LW	576	1.93	27.6	1.51	2.70	2	UTP	UTP	175+	175+	Gully	1749072	5948958	26.90	Clayey SILT	
3/12/2021	ETAM21W01476	LW	577	1.91	26.7	1.51	2.70	4	UTP	UTP	UTP	175+	Gully	1749105	5948969	27.10	Clayey SILT	

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

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01476
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01476

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 6/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01485
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01485

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 7/12/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
6/12/2021	ETAM21W01485	LW	578	1.85	28.5	1.44	2.70	6	175+	175+	175+	UTP	Shear Key	1748987	5949075	12.20	Silty CLAY	
6/12/2021	ETAM21W01485	LW	579	1.91	31.3	1.45	2.70	1	UTP	UTP	175+	UTP	Shear Key	1748994	5949082	10.50	Silty CLAY	
6/12/2021	ETAM21W01485	LW	580	1.88	30.6	1.44	2.70	3	UTP	175+	175+	UTP	Manhole Backfill	1749174	5949001	-	Silty CLAY	Base of manhole

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

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01485
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01485

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 7/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01492
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01492

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 8/12/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
7/12/2021	ETAM21W01492	LW	581	1.90	30.9	1.45	2.70	1	149	164	175+	175+	Gully	1748965	5948906	31.60	Clayey SILT	
7/12/2021	ETAM21W01492	LW	582	1.98	27.9	1.55	2.70	0	UTP	UTP	UTP	UTP	Gully	1749002	5948937	30.20	Clayey SILT	
7/12/2021	ETAM21W01492	LW	583	1.92	33.2	1.44	2.70	0	UTP	UTP	175+	175+	Gully	1749063	5948944	27.60	Clayey SILT	
7/12/2021	ETAM21W01492	LW	584	1.87	30.5	1.43	2.70	3	175+	175+	175+	172	Gully	1749084	5948969	27.40	Clayey SILT	
7/12/2021	ETAM21W01492	LW	585	1.90	33.9	1.42	2.70	0	175+	175+	164	153	Shear Key	1748989	5949067	13.00	Clayey SILT	
7/12/2021	ETAM21W01492	LW	586	1.89	36.9	1.38	2.70	0	175+	160	149	164	Shear Key	1748977	5949066	11.60	Clayey SILT	

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

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01492
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01492

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 8/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01526
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01526

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 14/12/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
13/12/2021	ETAM21W01526	LW	593	1.94	29.8	1.50	2.70	0	172	149	143	156	Shear Key	1748970	5949086	6.10	Clayey SILT	
13/12/2021	ETAM21W01526	LW	594	1.93	30.0	1.48	2.70	0	164	175	146	153	Shear Key	1748978	5949092	6.25	Clayey SILT	

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

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01526
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01526

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 14/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01550
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01550

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 21/12/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
20/12/2021	ETAM21W01550	LW	595	1.96	27.8	1.53	2.70	1	UTP	UTP	UTP	UTP	Shear Key	1748962	5949091	7.80	Silty CLAY	
20/12/2021	ETAM21W01550	LW	596	1.93	26.2	1.53	2.70	4	UTP	UTP	UTP	UTP	Shear Key	1748979	5949091	8.60	Silty CLAY	

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

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01550
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01550

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 21/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01557
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01557

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 23/12/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
22/12/2021	ETAM21W01557	LW	597	1.88	32.4	1.42	2.70	1	175+	175+	175+	160	Shear Key	1748950	5949089	8.30	Clayey SILT	
22/12/2021	ETAM21W01557	LW	598	1.91	29.9	1.47	2.70	2	175+	175+	175+	175+	Shear Key	1748974	5949084	9.00	Clayey SILT	
22/12/2021	ETAM21W01557	LW	599	1.85	37.5	1.35	2.70	0	175+	175+	175+	175+	Gully	1749022	5948881	29.60	Clayey SILT	
22/12/2021	ETAM21W01557	LW	600	1.86	31.8	1.41	2.70	3	175+	175+	175+	175+	Gully	1749046	5948916	29.20	Clayey SILT	
22/12/2021	ETAM21W01557	LW	601	1.98	31.8	1.50	2.70	0	UTP	UTP	UTP	UTP	Gully	1749098	5948940	28.00	Clayey SILT	
22/12/2021	ETAM21W01557	LW	602	1.96	31.8	1.49	2.70	0	UTP	UTP	UTP	UTP	Gully	1749080	5948970	27.80	Clayey SILT	
22/12/2021	ETAM21W01557	LW	603	1.94	30.1	1.49	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749110	5949033	8.80	Clayey SILT	
22/12/2021	ETAM21W01557	LW	604	1.97	29.2	1.52	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749119	5949035	9.00	Clayey SILT	

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

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01557
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01557

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 23/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00006
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00006

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 11/01/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/01/2022	ETAM22W00006	LW	605	1.91	34.4	1.42	2.70	-1.5	UTP	UTP	UTP	UTP	Gully	1749009	5948891	-	Clayey Silt	-
7/01/2022	ETAM22W00006	LW	606	1.93	35.2	1.43	2.70	-3.0	UTP	UTP	UTP	175	Gully	1749036	5948905	-	Clayey Silt	-
7/01/2022	ETAM22W00006	LW	607	1.94	33.1	1.46	2.70	-2.1	UTP	UTP	UTP	UTP	Gully	1749082	5948942	-	Clayey Silt	-
7/01/2022	ETAM22W00006	LW	608	1.93	33.8	1.44	2.70	-2.1	UTP	UTP	UTP	UTP	Gully	1749078	5948960	-	Clayey Silt	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00006
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00006

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 11/01/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00013
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00013

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 14/01/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
10/01/2022	ETAM22W00013	LW	609	1.86	29.8	1.43	2.70	4.3	175	175	175	143	Gully	1749054	5948899	-	Clayey Silt	-
10/01/2022	ETAM22W00013	LW	610	1.91	31.2	1.45	2.70	0.8	175	153	175	172	Gully	1749091	5948943	-	Clayey Silt	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00013
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00013

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 14/01/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00017
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00017

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 14/01/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
11/01/2022	ETAM22W00017	LW	611	1.98	27.2	1.55	2.70	0.1	UTP	UTP	UTP	UTP	Gully	1748966	5948916	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	612	1.96	31.1	1.50	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1748998	5948902	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	613	1.95	29.5	1.51	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1749052	5948933	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	614	1.97	30.5	1.51	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1749085	5948972	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	615	1.97	16.7	1.69	2.70	9.4	UTP	UTP	UTP	UTP	RW701	1749126	5949032	11.0	Clayey silt	-
11/01/2022	ETAM22W00017	LW	616	1.96	21.8	1.61	2.70	5.5	UTP	UTP	UTP	UTP	RW701	1749087	5949036	11.2	Clayey silt	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00017
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00017

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 14/01/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00032
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00032

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 18/01/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
13/01/2022	ETAM22W00032	LW	621	1.94	32.3	1.46	2.70	0.0	175	175	175	175	Gully	1749069	5948970	26.4	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	622	1.94	30.5	1.49	2.70	0.0	175	175	175	175	Gully	1749082	5948942	26.9	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	623	1.93	25.3	1.54	2.70	4.2	UTP	UTP	UTP	UTP	Gully	1749060	5948913	29.8	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	624	1.94	25.6	1.55	2.70	3.1	175	175	175	175	Gully	1749037	5948891	30.3	Clayey Silt	-

Comments:

Oven Moistures

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00032
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00032

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

ACCREDITED IANZ TESTING LABORATORY

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 18/01/2022

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00039
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00039

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 18/01/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
14/01/2022	ETAM22W00039	LW	625	1.96	27.1	1.54	2.70	1.1	UTP	UTP	175	175	Undercut Area	1749018	5949021	3.0	Clayey Silt	To Finish Level
14/01/2022	ETAM22W00039	LW	626	1.95	25.7	1.55	2.70	2.6	UTP	UTP	UTP	UTP	Gully	1749053	5948923	29	Clayey Silt	-
14/01/2022	ETAM22W00039	LW	627	1.97	26.8	1.55	2.70	1.0	UTP	UTP	UTP	UTP	Gully	1749018	5948903	29.3	Clayey Silt	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00039
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00039

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 18/01/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00072
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00072

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 26/01/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
19/01/2022	ETAM22W00072	LW	636	1.84	31.9	1.40	2.70	3.7	175	175	175	175	Gully	1749057	5948921	27.05	Silty Clay	-
19/01/2022	ETAM22W00072	LW	637	1.87	32.3	1.42	2.70	1.8	175	175	175	175	Gully	1749048	5948902	28.00	Silty Clay	-
19/01/2022	ETAM22W00072	LW	638	1.83	31.9	1.39	2.70	4.4	175	175	175	175	Gully	1749012	5948897	28.15	Silty Clay	-
19/01/2022	ETAM22W00072	LW	639	1.85	32.3	1.40	2.70	3.2	175	175	175	175	Gully	1748899	5948888	28.60	Silty Clay	-
19/01/2022	ETAM22W00072	LW	640	1.86	29.0	1.44	2.70	4.7	175	175	175	175	RW 701	1749119	5949040	11.00	Silty Clay	-
19/01/2022	ETAM22W00072	LW	641	1.85	28.7	1.44	2.70	5.3	175	175	175	175	RW 701	1749100	5949042	10.8	Silty Clay	-
19/01/2022	ETAM22W00072	LW	642	1.88	24.0	1.52	2.70	7.5	175	175	175	175	RE Wall 604 A	1749090	5949062	8.05	Silty Clay	-
19/01/2022	ETAM22W00072	LW	643	1.89	24.7	1.51	2.70	6.5	175	175	175	175	RE Wall 604 A	1749085	5949067	7.95	Silty Clay	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00072
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00072

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 26/01/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00113
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00113

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 2/02/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
20/01/2022	ETAM22W00113	LW	644	1.85	40.1	1.32	2.70	0.0	175	175	149	160	Gully	1749034	5948927	28.95	Silty CLAY	-
20/01/2022	ETAM22W00113	LW	645	1.87	42.5	1.31	2.70	0.0	146	140	172	175	Gully	1748977	5948921	29.1	Silty CLAY	-
20/01/2022	ETAM22W00113	LW	646	1.84	42.0	1.30	2.70	0.0	175	175	175	137	Gully	1749009	5948886	29.55	Silty CLAY	-
20/01/2022	ETAM22W00113	LW	647	1.85	44.7	1.28	2.70	0.0	149	164	175	146	Gully	1748991	5948873	30.15	Silty CLAY	-
20/01/2022	ETAM22W00113	LW	648	1.95	26.4	1.54	2.70	2.2	UTP	UTP	UTP	175	RE Wall 604A	1749076	5949073	8.85	Silty CLAY	-
20/01/2022	ETAM22W00113	LW	649	1.89	25.5	1.51	2.70	5.9	175	175	175	UTP	RE Wall 604A	1749077	5949061	8.75	Silty CLAY	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00113
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00113

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 2/02/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00140
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00140

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 4/02/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
1/02/2022	ETAM22W00140	LW	657	1.90	38.7	1.37	2.70	0.0	175	175	175	UTP	Gully	1749000	5948931	30.85	Clayey silt	-
1/02/2022	ETAM22W00140	LW	658	1.90	33.7	1.42	2.70	0.0	175	175	175	UTP	Gully	1749048	5948916	28.15	Clayey silt	-
1/02/2022	ETAM22W00140	LW	659	1.95	34.6	1.45	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1748992	5948891	30.75	Clayey silt	-
1/02/2022	ETAM22W00140	LW	660	1.94	40.1	1.39	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1749014	5948902	29.60	Clayey silt	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00140
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00140

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
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Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 4/02/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00158
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00158

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 4/02/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
2/02/2022	ETAM22W00158	LW	661	1.88	38.3	1.36	2.70	0.0	175	175	175	175	Gully	1748975	5948863	31.15	Clayey Silt	-
2/02/2022	ETAM22W00158	LW	662	1.89	37.7	1.37	2.70	0.0	175	175	175	175	Gully	1749006	5948863	31.15	Clayey Silt	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00158
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00158

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 4/02/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00168
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00168

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 7/02/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
3/02/2022	ETAM22W00168	LW	663	1.90	29.5	1.47	2.70	2.3	UTP	175	175	175	Gully	1749085	5948941	26.95	Silty CLAY	-
3/02/2022	ETAM22W00168	LW	664	1.87	32.8	1.41	2.70	1.5	175	175	175	175	Gully	1749110	5948936	25.80	Silty CLAY	-
3/02/2022	ETAM22W00168	LW	665	1.90	30.2	1.46	2.70	1.7	175	175	175	175	Gully	1748990	5948931	29.55	Silty CLAY	-
3/02/2022	ETAM22W00168	LW	666	1.93	30.2	1.48	2.70	0.3	UTP	UTP	175	175	Gully	1749028	5948888	29.45	Silty CLAY	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00168
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00168

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 7/02/2022

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00179
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00179

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 8/02/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
4/02/2022	ETAM22W00179	LW	667	1.86	32.6	1.41	2.70	2.1	149	160	175	175	RE Wall 604A	1749068	5949063	9.7	Silty Clay	-
4/02/2022	ETAM22W00179	LW	668	1.89	32.4	1.43	2.70	0.7	175	175	175	175	RE Wall 604A	1749075	5949054	9.8	Silty Clay	-
4/02/2022	ETAM22W00179	LW	669	1.90	33.3	1.43	2.70	0.0	175	175	175	175	RW 701	1749100	5949041	11.3	Silty Clay	-
4/02/2022	ETAM22W00179	LW	670	1.88	34.8	1.39	2.70	0.1	172	140	149	156	RW 701	1749116	5949042	11.35	Silty Clay	-
4/02/2022	ETAM22W00179	LW	671	1.92	30.8	1.47	2.70	0.3	146	143	153	140	Gully	1748980	5948855	31.3	Silty Clay	-
4/02/2022	ETAM22W00179	LW	672	1.89	29.7	1.46	2.70	2.7	160	175	175	160	Gully	1748990	5948900	29.85	Silty Clay	-
4/02/2022	ETAM22W00179	LW	673	1.95	29.6	1.50	2.70	0.0	175	175	175	175	Gully	1749009	5948909	28.15	Silty Clay	-
4/02/2022	ETAM22W00179	LW	674	1.85	29.4	1.43	2.70	4.8	153	156	140	146	Gully	1749026	5948921	28.05	Silty Clay	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00179
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00179

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 8/02/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00242
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00242

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 22/02/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
18/02/2022	ETAM22W00242	SC	681	1.77	34.2	1.32	2.70	6.3	188	168	176	184	Ref to plan	1749816	5948951	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	682	1.79	36.2	1.32	2.70	3.7	168	188	188	184	Ref to plan	1749022	5948987	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	683	1.84	30.7	1.41	2.70	4.7	188	188	UTP	UTP	Gully	1748984	5948917	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	684	1.94	26.5	1.53	2.70	2.4	UTP	UTP	188	188	Gully	1749022	5948894	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	685	1.84	41.7	1.30	2.70	0.0	UTP	UTP	UTP	UTP	Silt Pond	1749065	5948937	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	686	1.93	26.5	1.52	2.70	3.2	UTP	UTP	UTP	UTP	Silt Pond	1749109	5948928	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	687	1.86	27.0	1.46	2.70	6.2	UTP	UTP	UTP	UTP	RW 312 Backfill	1749058	5949002	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	688	1.80	31.5	1.37	2.70	6.2	UTP	UTP	UTP	UTP	RW 312 Backfill	1749081	5948998	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	689	1.73	37.9	1.26	2.70	5.8	146	155	146	160	Stage 1 Rock	1749321	5948750	-	Silty Clay	250mm below F/L

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00242
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00242

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 22/02/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00255
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00255

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 23/02/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
21/02/2022	ETAM22W00255	SC	690	1.80	30.9	1.38	2.70	6.6	208	208	158	158	Silt Pond Backfill	1749021	5948967	-	Silty Clay	-
21/02/2022	ETAM22W00255	SC	691	1.81	24.9	1.45	2.70	10.2	205	205	UTP	UTP	Silt Pond Backfill	1749013	5949002	-	Silty Clay	-
21/02/2022	ETAM22W00255	SC	692	1.87	25.9	1.49	2.70	6.4	208	208	208	208	Gully	1749015	5948882	-	Silty Clay	-
21/02/2022	ETAM22W00255	SC	693	1.87	28.6	1.45	2.70	4.6	188	188	188	188	Gully	1749001	5948861	-	Silty Clay	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00255
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00255

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 23/02/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00261
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00261

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 23/02/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
22/02/2022	ETAM22W00261	SC	694	1.87	28.4	1.45	2.70	5.0	188	188	168	168	Siltpond Backfill	1749016	5948957	-	Silty Clay	-
22/02/2022	ETAM22W00261	SC	695	1.83	33.2	1.37	2.70	3.5	168	168	168	168	Gully	1749076	5948939	-	Silty Clay	-
22/02/2022	ETAM22W00261	SC	696	1.89	27.5	1.48	2.70	4.3	168	168	188	188	Main Gully	1749025	5948902	-	Silty Clay	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00261
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00261

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 23/02/2022

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00276
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00276

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 25/02/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
24/02/2022	ETAM22W00276	SC	700	1.87	30.0	1.44	2.70	3.8	UTP	UTP	168	168	Refer to Plan	1749096	5948920	-	Silty CLAY	RL unavailable
24/02/2022	ETAM22W00276	SC	701	1.76	37.6	1.28	2.70	4.5	146	155	168	146	Silt Pond	1749017	5948946	-	Silty CLAY	RL unavailable
24/02/2022	ETAM22W00276	SC	702	1.79	32.2	1.35	2.70	6.5	146	155	146	155	Silt Pond	1749009	5948975	-	Silty CLAY	RL unavailable
24/02/2022	ETAM22W00276	SC	703	1.87	31.1	1.43	2.70	2.7	168	168	180	180	Gully	1748994	5948873	-	Silty CLAY	RL unavailable
24/02/2022	ETAM22W00276	SC	704	1.87	31.2	1.43	2.70	2.6	160	168	155	160	Gully	1749001	5948917	-	Silty CLAY	RL unavailable

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00276
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00276

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 25/02/2022

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00308
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00308

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 3/03/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
1/03/2022	ETAM22W00308	SC	707	1.77	38.2	1.28	2.70	3.9	168	176	160	160	Undercut 3	1748985	5949026	18.40	Silty CLAY	-
1/03/2022	ETAM22W00308	SC	708	1.81	33.2	1.36	2.70	4.5	176	176	160	160	Undercut 3	1749000	5949019	18.43	Silty CLAY	-
1/03/2022	ETAM22W00308	SC	709	1.89	29.3	1.46	2.70	3.1	176	176	176	176	Silt Pond Fill	1749011	5948986	-	Silty CLAY	RL unavailable
1/03/2022	ETAM22W00308	SC	710	1.86	27.4	1.46	2.70	6.0	168	168	176	176	Silt Pond Fill	1749005	5948952	-	Silty CLAY	RL unavailable
1/03/2022	ETAM22W00308	SC	711	1.89	27.1	1.48	2.70	4.9	UTP	UTP	UTP	UTP	Gully 2	1749125	5948916	-	Silty CLAY	RL unavailable
1/03/2022	ETAM22W00308	SC	712	1.90	27.8	1.49	2.70	3.6	UTP	UTP	UTP	UTP	Gully 2	1749075	5948945	-	Silty CLAY	RL unavailable
1/03/2022	ETAM22W00308	SC	713	1.92	26.6	1.52	2.70	3.3	UTP	UTP	UTP	UTP	Gully 2	1749002	5948912	-	Silty CLAY	RL unavailable
1/03/2022	ETAM22W00308	SC	714	1.89	26.8	1.49	2.70	4.7	UTP	UTP	UTP	UTP	Gully 2	1748987	5948881	-	Silty CLAY	RL unavailable

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00308
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00308

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 3/03/2022

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00316
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00316

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 4/03/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
2/03/2022	ETAM22W00316	SC	715	1.81	37.6	1.31	2.70	2.0	UTP	UTP	168	168	RW312 Fill	1749096	5948987	-	Silty CLAY	RL unavailable
2/03/2022	ETAM22W00316	SC	716	1.77	34.7	1.32	2.70	5.5	160	168	168	160	RW312 Fill	1749077	5949001	-	Silty CLAY	RL unavailable
2/03/2022	ETAM22W00316	SC	717	1.79	32.5	1.35	2.70	5.9	172	172	168	168	Silt Pond Fill	1749014	5948982	-	Silty CLAY	RL unavailable
2/03/2022	ETAM22W00316	SC	718	1.80	37.3	1.31	2.70	2.5	160	150	168	160	Silt Pond Fill	1748998	5948968	-	Silty CLAY	RL unavailable

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

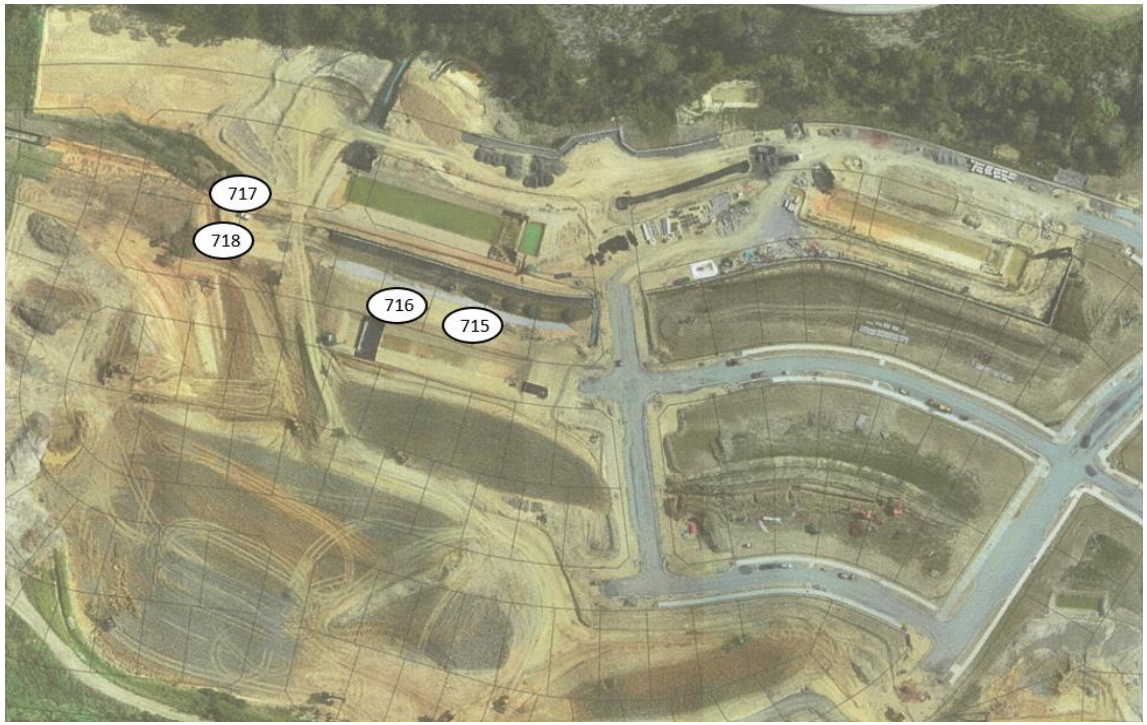
Earthworks Fill Report

Report No: EFIL:ETAM22W00316
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00316

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 4/03/2022



Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00341
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00341

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

Project Location: 117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 9/03/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/03/2022	ETAM22W00341	SC	723	1.90	28.3	1.48	2.70	3.2	208+	208+	208+	UTP	Gully 2	1748981	5948889	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	724	1.87	29.3	1.45	2.70	4.1	208+	208+	UTP	UTP	Gully 2	1749004	5948916	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	725	1.90	31.9	1.44	2.70	1.0	188	188	208+	208+	Gully 2	1749060	5948901	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	726	1.83	29.5	1.42	2.70	5.8	200	200	UTP	UTP	Silt Pond	1749004	5948988	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	727	1.74	23.0	1.41	2.70	15.3	UTP	UTP	UTP	UTP	A7-A15	1749168	5948985	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	728	1.69	25.0	1.35	2.70	16.1	UTP	UTP	UTP	UTP	A15-15B	1749200	5948998	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	729	1.68	25.6	1.34	2.70	16.1	UTP	UTP	UTP	UTP	15B-15C	1749220	5948990	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	730	1.84	29.5	1.42	2.70	5.5	UTP	UTP	UTP	UTP	15C-15D	1749248	5948982	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	731	1.73	23.4	1.40	2.70	15.3	UTP	UTP	UTP	UTP	15-15D	1749275	5948977	-	Silty CLAY	At finished level

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00341
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00341

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 9/03/2022

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00378
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00378

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 14/03/2022

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
11/03/2022	ETAM22W00378	SC	745	1.86	35.3	1.37	2.70	0.7	208	208	200	200	Main Gully Fill	1748980	5948912	-	Silty Clay	-
11/03/2022	ETAM22W00378	SC	746	1.91	29.2	1.48	2.70	2.0	UTP	UTP	UTP	UTP	Main Gully Fill	1749034	5948881	-	Silty Clay	-
11/03/2022	ETAM22W00378	SC	747	1.78	35.7	1.31	2.70	4.6	160	145	155	160	Silt Pond	1749021	5948974	-	Silty Clay	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00378
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00378

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 14/03/2022

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00263
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00263

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 7/03/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
1/03/2023	ETAM23W00263	SC	1057	1.88	31.8	1.42	2.65	1.0	173	167	186	186	Shear Key	1748890	5949104	7.33	Clayey Silt	-
1/03/2023	ETAM23W00263	SC	1058	1.89	28.8	1.46	2.65	2.6	186	186	182	167	Shear Key	1748905	5949102	7.31	Clayey Silt	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00263
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00263

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 7/03/2023

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00603
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00603

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 5/04/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
3/04/2023	ETAM23W00603	MA	1126	1.90	28.8	1.47	2.65	1.9	UTP	UTP	UTP	UTP	Gully 2 Fill	1749011	5948869	-	CLAY	-
3/04/2023	ETAM23W00603	MA	1127	1.91	27.4	1.50	2.65	2.3	150	152	161	150	Gully 2 Fill	1748980	5948856	-	CLAY	-
3/04/2023	ETAM23W00603	MA	1128	1.92	24.6	1.54	2.65	4.1	152	170	161	150	Gully 2 Fill	1749016	5948845	-	CLAY	-
3/04/2023	ETAM23W00603	MA	1129	1.84	31.0	1.40	2.65	3.4	170	152	164	161	RE Wall 604E	1748921	5949089	16.0	CLAY	-
3/04/2023	ETAM23W00603	MA	1130	1.95	27.0	1.54	2.65	0.6	UTP	UTP	UTP	UTP	Shear Key	1748897	5949096	14.75	CLAY	-

Comments:

Oven Corrected Moistures, Random Locations Chosen by the Technician

Auckland Laboratory

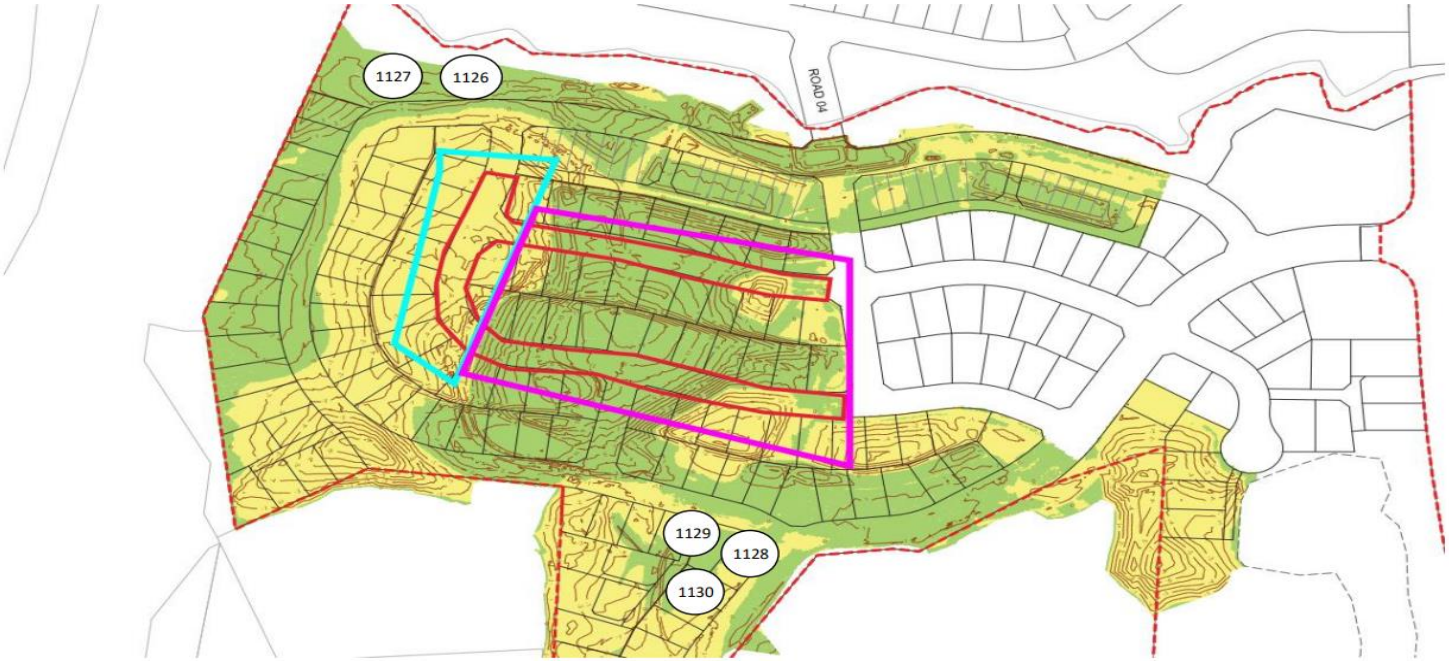
GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00603
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00603

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 5/04/2023



SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00716
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00716

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 26/04/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
18/04/2023	ETAM23W00716	LW	1137	1.91	31.1	1.46	2.65	0.0	188	180	167	184	Shear Key	1748914	5949088	16.90	Silty Clay	-
18/04/2023	ETAM23W00716	LW	1138	1.91	31.7	1.45	2.65	0.0	175	191	203	167	Shear Key	1748897	5949096	16.00	Silty Clay	-

Comments:

Auckland Laboratory

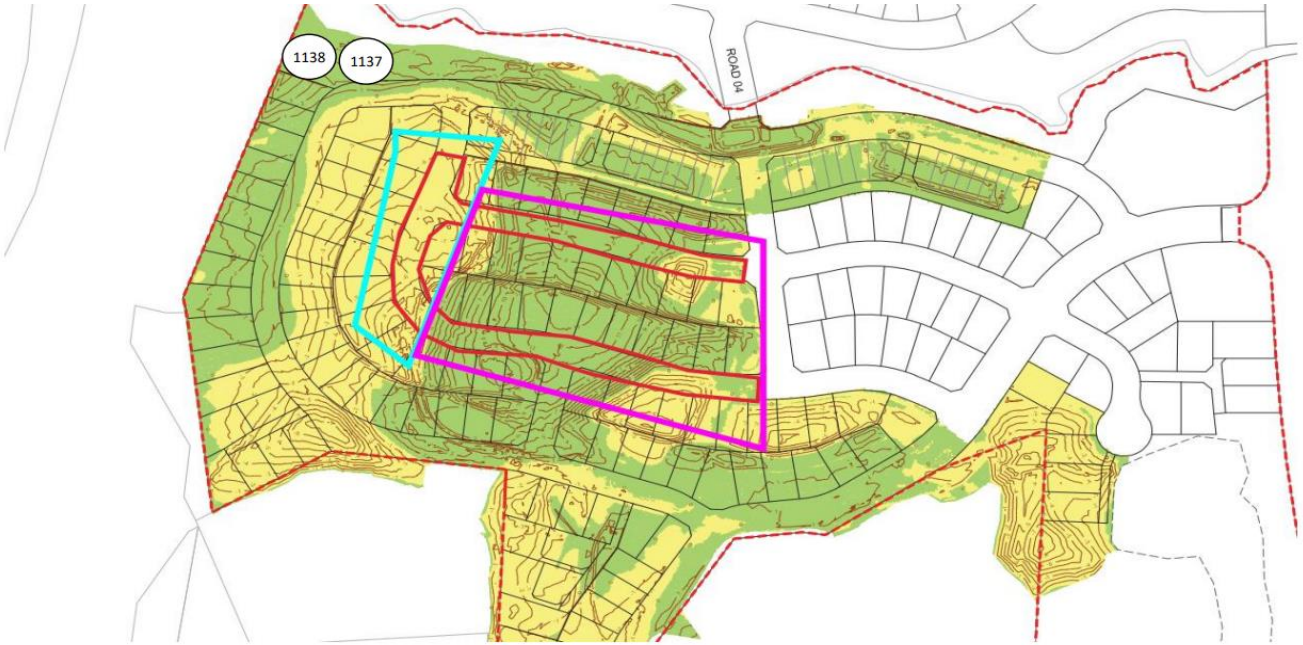
GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00716
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00716

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 26/04/2023



SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00726
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00726

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 26/04/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
20/04/2023	ETAM23W00726	SC	1139	1.81	32.1	1.37	2.65	4.1	170	170	170	170	Gully 2	1749034	5948876	-	Clayey Silt	-
20/04/2023	ETAM23W00726	SC	1140	1.86	34.8	1.38	2.65	0.0	170	170	186	186	Gully 2	1748980	5948884	-	Clayey Silt	-
20/04/2023	ETAM23W00726	SC	1141	1.86	25.8	1.47	2.65	6.3	186	186	186	186	Gully 2	1749021	5948838	-	Clayey Silt	-
20/04/2023	ETAM23W00726	SC	1142	1.90	27.9	1.48	2.65	2.7	192	192	192	192	Gully 2	1748981	5948842	-	Clayey Silt	-
20/04/2023	ETAM23W00726	SC	1143	1.82	32.0	1.38	2.65	3.9	158	158	170	170	Shear Key	1748914	5949079	17.06	Clayey Silt	-
20/04/2023	ETAM23W00726	SC	1144	1.85	30.5	1.42	2.65	3.2	186	186	170	170	Shear Key	1748942	5949074	17.08	Clayey Silt	-

Comments:

Auckland Laboratory

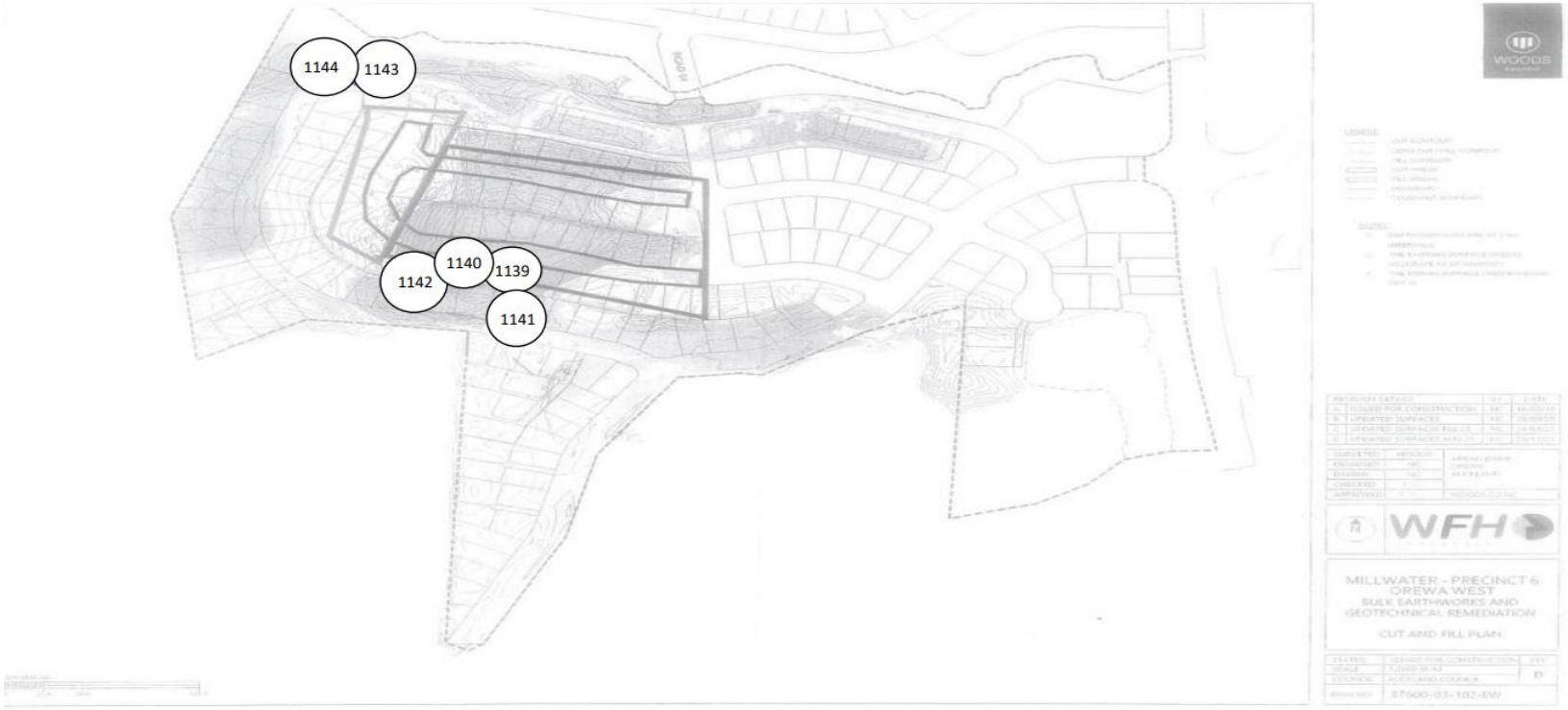
GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00726
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00726

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 26/04/2023



Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00786
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00786

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 2/05/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
26/04/2023	ETAM23W00786	SC	1148	1.79	34.2	1.33	2.65	4.0	152	150	150	152	Shear Key	1748906	5949094	18.0	Silty Clay	-
26/04/2023	ETAM23W00786	SC	1149	1.85	33.7	1.38	2.65	1.4	147	147	150	140	Shear Key	1748896	5949081	17.6	Silty Clay	-

Comments:

Auckland Laboratory

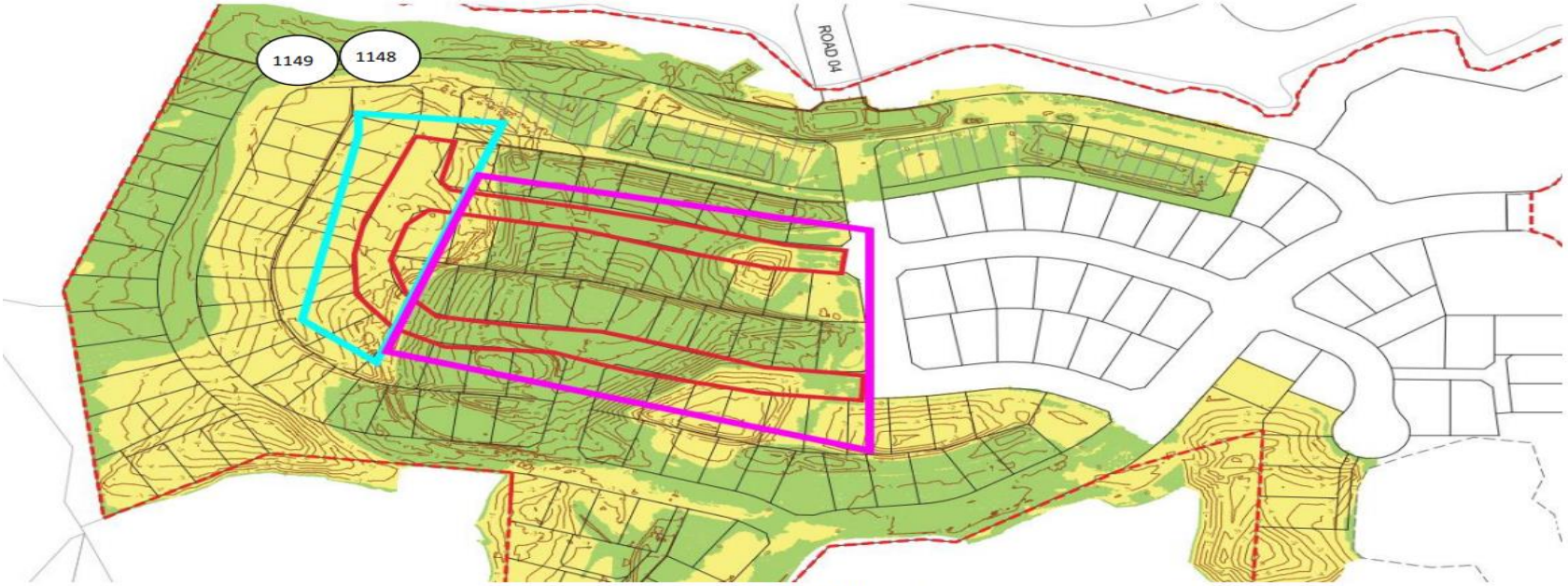
GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00786
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00786

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 2/05/2023



SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01110
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01110

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 13/06/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
9/06/2023	ETAM23W01110	LW	1156	1.85	32.6	1.40	2.65	1.7	178	164	164	173	RW 303 Fill	1748852	5949081	17.00	Silty Clay	-
9/06/2023	ETAM23W01110	LW	1157	1.86	32.1	1.41	2.65	1.9	182	155	187	169	RW 303 Fill	1748865	5949072	17.20	Silty Clay	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01110
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01110

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 13/06/2023

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01832
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01832

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 27/10/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
20/10/2023	ETAM23W01832	LW	1172	1.90	29.1	1.47	2.65	1.7	140	146	153	137	Gully 2	1748890	5949070	36.60	Silty CLAY	-
20/10/2023	ETAM23W01832	LW	1173	1.90	28.7	1.47	2.65	2.1	140	149	164	172	Gully 2	1748872	5949062	36.70	Silty CLAY	-
20/10/2023	ETAM23W01832	LW	1174	1.89	29.5	1.46	2.65	2.0	137	143	137	140	Western Fill Area	1748833	5948917	36.40	Silty CLAY	-
20/10/2023	ETAM23W01832	LW	1175	1.88	30.4	1.44	2.65	1.9	149	160	137	160	Western Fill Area	1748865	5948908	40.00	Silty CLAY	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W01832
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

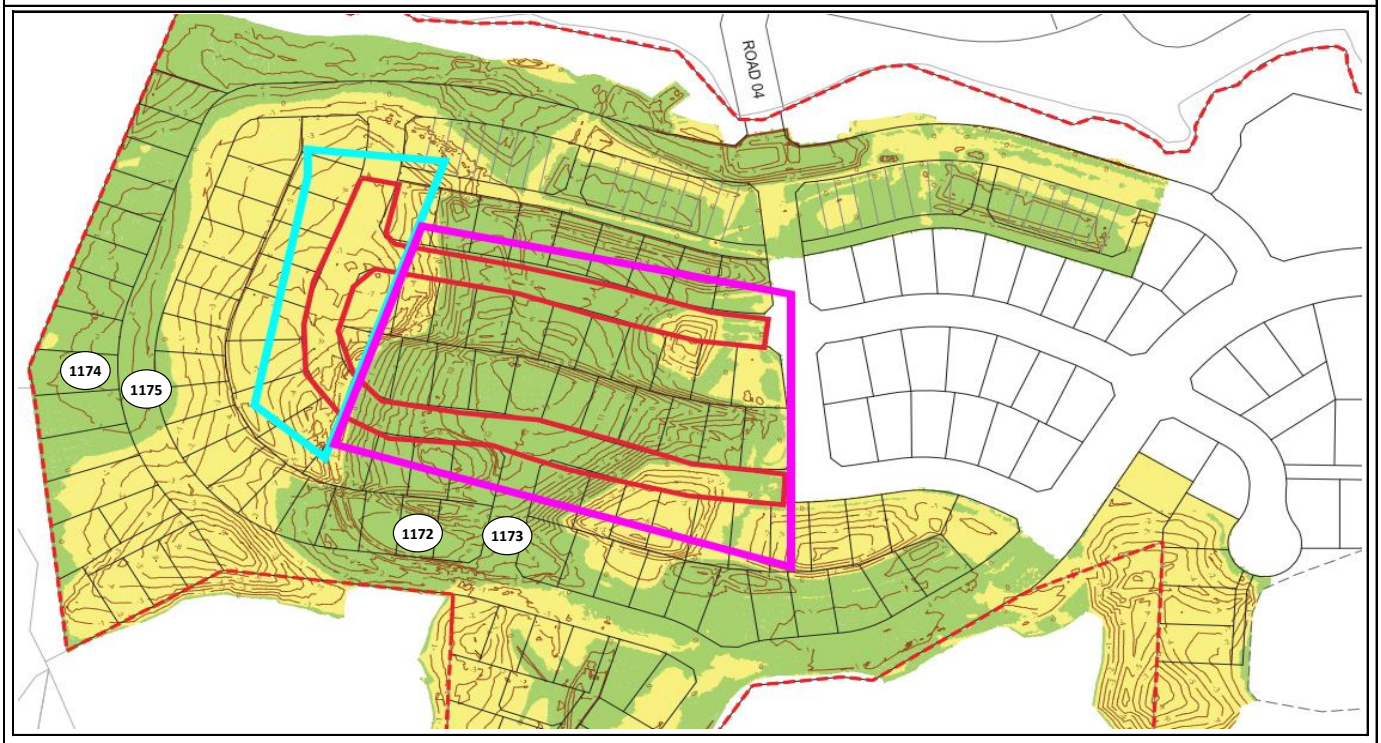
Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 27/10/2023

SITE PLAN
* NOT TO SCALE *

Project No: 773-ETAM01553
Work Order No: ETAM23W01832

Location Gully 2 and Western Fill area
(See Below)

Tested by: LW
Date Tested: 20/10/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02123
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02123

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 21/12/2023

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
19/12/2023	ETAM23W02123	RP	1230	1.84	35.8	1.36	2.65	0.1	155	159	188	188	Western Fill Area	1748882	5949036	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1231	1.91	27.7	1.50	2.65	2.0	UTP	UTP	UTP	UTP	Western Fill Area	1748869	5949009	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1232	1.91	26.5	1.51	2.65	3.2	UTP	UTP	UTP	UTP	Road Undercut	1748882	5948872	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1233	1.95	29.0	1.51	2.65	0.0	UTP	UTP	UTP	UTP	Road Undercut	1748916	5948846	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1234	1.91	27.5	1.50	2.65	2.4	UTP	UTP	UTP	UTP	Gully 2	1749018	5948848	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1235	1.97	24.3	1.59	2.65	1.5	UTP	UTP	UTP	UTP	Gully 2	1748999	5948876	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1236	1.87	25.4	1.49	2.65	5.8	UTP	UTP	UTP	UTP	Undercut 9	1748913	5948894	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1237	1.93	24.9	1.54	2.65	3.3	UTP	UTP	UTP	UTP	Undercut 9	1748930	5948885	-	Silty CLAY	RL not available

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02123
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

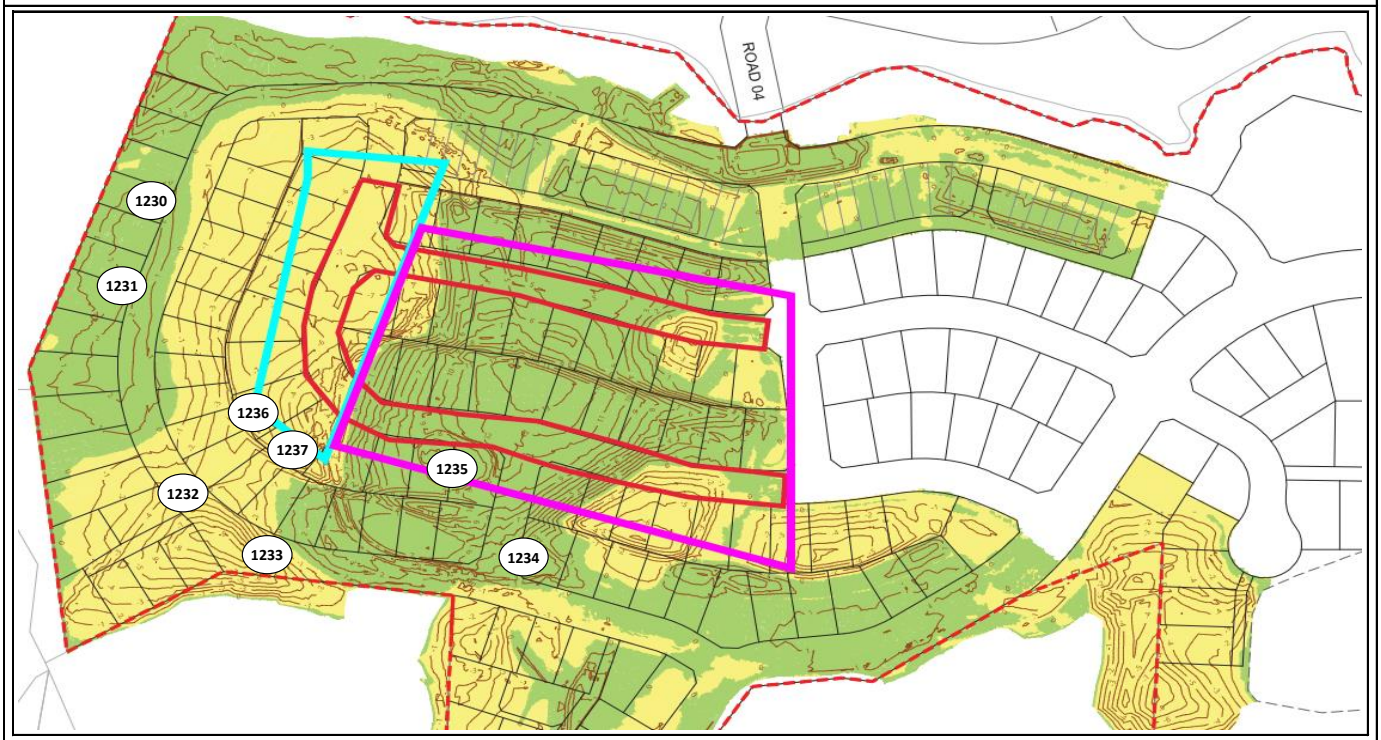
Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 21/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02123
Page No: 2 of 2

Location: Western Area + Gully 2 + Road Undercut

Tested by: RP
Date Tested: 19/12/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00094
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00094

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 28/01/2024

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
24/01/2024	ETAM24W00094	SC	1281	1.90	29.0	1.47	2.65	1.6	175	175	175	175	Gully Main Fill	1749020	5948858	-	Silty CLAY	RL not available
24/01/2024	ETAM24W00094	SC	1282	1.85	32.2	1.40	2.65	2.4	162	162	171	171	Gully Main Fill	1748980	5948881	-	Silty CLAY	RL not available
24/01/2024	ETAM24W00094	SC	1283	1.94	25.6	1.54	2.65	2.3	UTP	UTP	UTP	UTP	Gully Main Fill	1748940	5948893	-	Silty CLAY	RL not available
24/01/2024	ETAM24W00094	SC	1284	1.90	24.9	1.52	2.65	4.8	UTP	UTP	UTP	UTP	Gully Main Fill	1748977	5948871	-	Silty CLAY	RL not available
24/01/2024	ETAM24W00094	SC	1285	1.99	28.6	1.55	2.65	0.0	UTP	UTP	UTP	UTP	Undercut Key	1748831	5948867	-	Silty CLAY	RL not available
24/01/2024	ETAM24W00094	SC	1286	1.93	29.3	1.49	2.65	0.1	UTP	UTP	UTP	UTP	Undercut Key	1748854	5948878	-	Silty CLAY	RL not available
24/01/2024	ETAM24W00094	SC	1287	1.93	29.9	1.49	2.65	0.0	175	175	171	171	RE Wall 602	1749142	5948829	37.5	Silty CLAY	-
24/01/2024	ETAM24W00094	SC	1288	1.92	28.7	1.49	2.65	1.0	198+	198+	188	188	RE Wall 602	1749087	5948842	37.5	Silty CLAY	-

Comments:

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

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00094
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

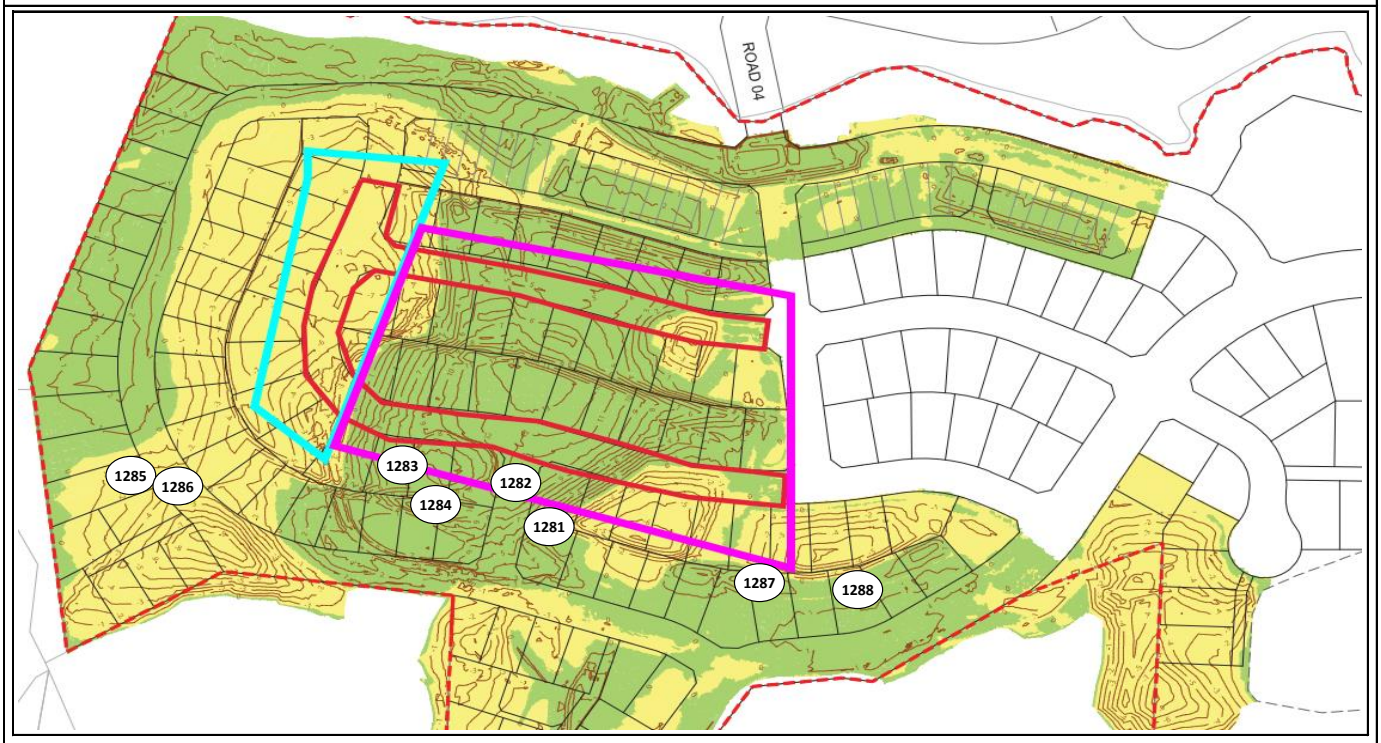
Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 28/01/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00094
Page No: 2 of 2

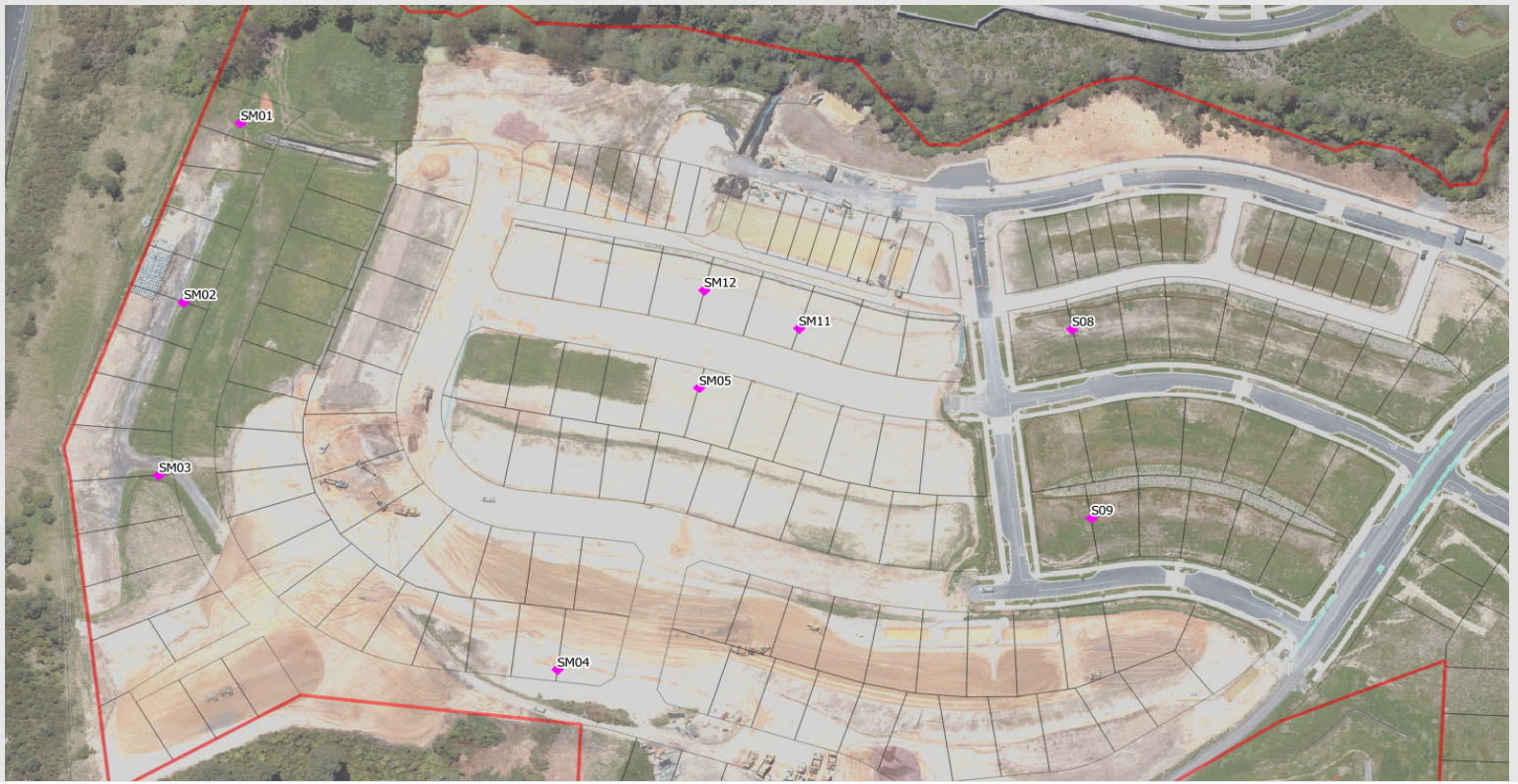
Location: Gully Main Fill + Undercut Key + RE Wall 602

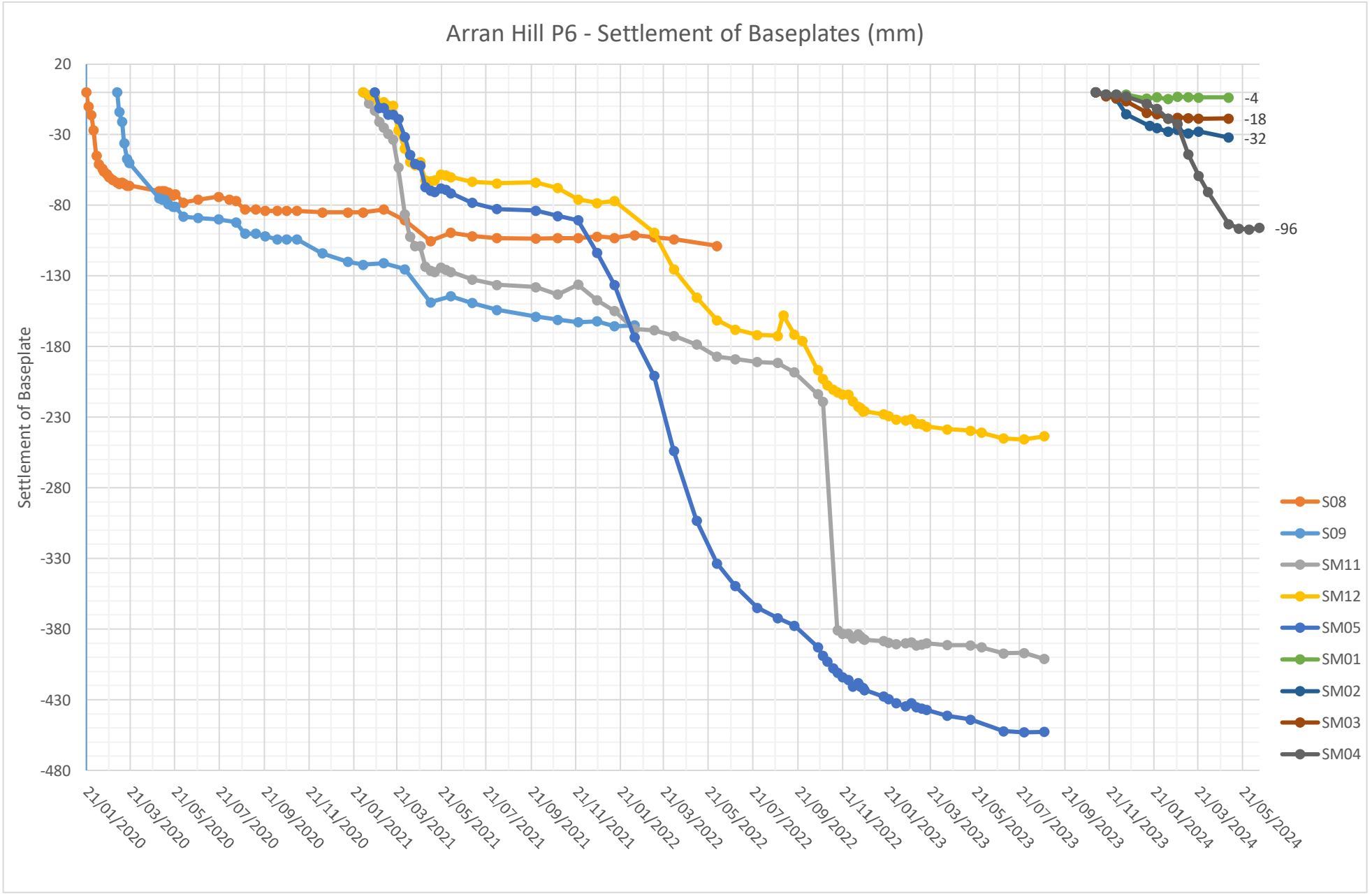
Tested by: SC
Date Tested: 24/01/2024



SITE PLAN * NOT TO SCALE *

APPENDIX E: MONITORING RESULTS


SM01
SM02
SM03
SM04
SM05
SM11
SM12
S08
S09


Arran Hill P6 - Settlement of Baseplates (mm)
Settlement of Baseplate
20
-30
-80
-130
-180
-230
-280
-330
-380
-430
-480
21/01/2020
21/03/2020
21/05/2020
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-4
-18
-32
-96
S08
S09
SM11
SM12
SM05
SM01
SM02
SM03
SM04

APPENDIX F: PRODUCER STATEMENTS – CONSTRUCTION REVIEW (PS4)

TETRA TECH COFFEY

Level 4, 25 Teed Street, Newmarket
Auckland
1023 New Zealand

t: +64 9 379 9463

tetratechcoffey.com

25 August 2022

Our ref: 773-AKLGE206639-BI

WFH Properties Limited

Geotechnical Observation of In-Ground Palisade Wall PW805 at Millwater Precinct 6, Orewa West (Building Consent No. BCO10301029-8)

This letter is to confirm the scope of work relating to the attached Producer Statement (PS4 – Construction Review, Geotechnical, In-ground Palisade Wall).

Tetra Tech Coffey carried out regular site visits at Millwater between March and August 2022 to observe the construction of in-ground palisade wall PW805, Precinct 6. The palisade wall extended over 228m and comprised bored in-situ steel reinforced concrete piles embedded 10 to 12m into the ground. Typical pile details included a 1.5m centre-to-centre spacing, 600 and 650mm diameter bored pile holes and a minimum concrete strength of 32MPa, as per the design.

During the course of construction we recorded the pile depth, diameter, spacing, ground conditions and steel section type for each pile, and confirmed accordance with the prescribed design prior to the pouring of concrete within each hole. The material encountered during the pile hole drilling was as anticipated and comprised natural, inorganic, orange and grey, moderately plastic, residual clayey silts and silty clays overlying competent East Coast Bays Formation bedrock.

On the basis of our construction observations and in-situ soils testing, we are satisfied that the ground conditions exposed within the in-ground palisade wall pile holes were generally consistent with those that formed the basis of the recommendations contained in our Geotechnical Design Report referenced 773-AKLGE206639-AY Rev.1, dated 12 November 2021.

Furthermore, the pile details, including the steel sections placed within the bored holes, were in accordance with the design provided in the aforementioned design report.

Accordingly, we attach our PS4 certificate for the completed works.

For and on behalf of Tetra Tech Coffey

Prepared by:

Stephen Parkes
Senior Engineering Geologist

Reviewed and authorised by:

Lee Buhagiar
Principal Geotechnical Engineer
BE(Hons) CMEng.NZ CPEng Int PE(NZ)

Attachments – Producer Statement - Construction Review (PS4)

engineering new zealand

ace new zealand

association of consulting and engineering

Building Code Clause(s) B1 Structure

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

ISSUED BY: TETRA TECH COFFEY (NZ) LIMITED
(Construction Review Firm)

TO: WFH PROPERTIES LIMITED
(Owner/Developer)

TO BE SUPPLIED TO: AUCKLAND COUNCIL
(Building Consent Authority)

IN RESPECT OF: GEOTECHNICAL OBSERVATIONS OF PALISADE WALL PW805 DURING CONSTRUCTION
(Description of Building Work)

AT: MILLWATER - OREWA WEST - PRECINCT 6
(Address)

Town/City: AUCKLAND (Address) **LOT** 2 **DP** 463561 **SO**

We TETRA TECH COFFEY (NZ) LIMITED (Construction Review Firm) have been engaged by WFH PROPERTIES LIMITED

To provide ☐ CM1 ☐ CM2 ■ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ☐ observation as per agreement with owner/developer WFH PROPERTIES LIMITED

or ☐ other ..... (Extent of Engagement) services

in respect of clause(s) B1 STRUCTURE of the Building Code for the building work described in documents relating to Building Consent No. BCO10301029-8 and those relating to Building Consent Amendment(s) Nos. N/A issued during the course of the works. We have sighted these Building Consents and the conditions of attached to them.

Authorised instructions/variations(s) No. N/A (copies attached) or by the attached Schedule ☐ have been issued during the course of the works.

On the basis of ■ this review ☐ these review(s) and information supplied by the contractor during the course of the works and **on behalf of the firm** undertaking this Construction Review, **I believe on reasonable grounds** that ■ All or ☐ Part only of the building works have been completed in accordance with the relevant requirements of the Building Consent and Building Consent Amendments identified above, with respect to Clause(s) B1 STRUCTURE of the Building Code. I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary competency to do so.

I, L.R. BUHAGIAR (Name of Construction Review Professional) am: ■ CPEng.# 242293

I am a member of: ■ Engineering New Zealand and hold the following qualifications BE (Hons)

The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.

The Construction Review Firm is a member of ACE New Zealand: ■

SIGNED BY L.R. BUHAGIAR (Name of Construction Review Professional) (Signature) LRBuhagiar

ON BEHALF OF TETRA TECH COFFEY (NZ) LIMITED (Construction Review Firm) Date 25/08/2022

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

This form is to accompany **Forms 6 or 8 of the Building (Form) Regulations 2004** for the issue of a Code Compliance Certificate.

GUIDANCE ON USE OF PRODUCER STATEMENTS

Producer statements were first introduced with the Building Act 1991. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects, Institution of Professional engineers New Zealand (now Engineering New Zealand), ACE New Zealand in consultation with the Building Officials Institute of New Zealand. The original suit of producer statements has been revised at the date of this form as a result of enactment of the Building Act (2004) by these organisations to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with reasonable grounds for the issue of a Building Consent or a Code Compliance Certificate, without having to duplicate design or construction checking undertaken by others.

PS1 Design Intended for use by a suitably qualified independent design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;

PS2 Design Review Intended for use by a suitably qualified independent design professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;

PS3 Construction Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2013 or Schedules E1/E2 of NZIA's SCC 2011[2]

PS4 Construction Review Intended for use by a suitably qualified independent design professional who undertakes construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate.

This must be accompanied by a statement of completion of building work (Schedule 6).

The following guidelines are provided by ACE New Zealand and Engineering New Zealand to interpret the Producer Statement.

Competence of Design Professional

This statement is made by a Design Firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its designers.

A competent design professional will have a professional qualification and proven current competence through registration on a national competence based register, either as a Chartered Professional Engineer (CPEng) or a Registered Architect.

Membership of a professional body, such as Engineering New Zealand (formerly IPENZ), provides additional assurance of the designer's standing within the profession. If the design firm is a member of the ACE New Zealand, this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent design professional".

*Professional Indemnity Insurance

As part of membership requirements, ACE New Zealand requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI Insurance minimum stated on the front of this form reflects standard, small projects. If the parties deem this inappropriate for large projects the minimum may be up to $500,000.

Professional Services during Construction Phase

There are several levels of service which a Design Firm may provide during the construction phase of a project (CM1-CM5 for Engineers[3]). The Building Consent Authority is encouraged to require that the service to be provided by the Design Firm is appropriate for the project concerned.

Requirement to provide Producer Statement PS4

Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design firm's engagement.

Attached Particulars

Attached particulars referred to in this producer statement refer to supplementary information appended to the producer statement.

Refer Also:

1 Conditions of Contract for Building & Civil Engineering Construction NZS 3910: 2013

2 NZIA Standard Conditions of Contract SCC 2011

3 Guideline on the Briefing & Engagement for Consulting Engineering Services (ACE New Zealand/IPENZ 2004)

4 PN Guidelines on Producer Statements

www.acenz.org.nz
www.engineeringnz.org

ace new zealand
association of consulting and engineering
engineering new zealand