

# Millwater Arran Hills Residential Subdivision Precinct 6 Stage 2

## Geotechnical Completion Report

WFH Properties Limited



Reference: 773-AKLGE206639-BU

20 October 2023

# MILLWATER ARRAN HILLS RESIDENTIAL SUBDIVISION, PRECINCT 6, STAGE 2

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**Report reference number: 773-AKLGE206639-BU**

20 October 2023

## PREPARED FOR

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## Document authorisation

Our ref: 773-AKLGE206639-BU

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 2 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



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## 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 2 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 Precinct 6 - Stage 2 Subdivision As-Built Plans**

Title	Reference No.	Date
Final Surface As-built Plans	P21-400-00-1000-AB	04/10/2023
Cut and Fill As-built Plan – Original Surface to Final Surface	P21-400-00-1100-AB	05/10/2023
Cut and Fill As-built Plan – Original Surface to Lowest Surface	P21-400-00-1101-AB	05/10/2023
Cut and Fill As-built Plan – Lowest Surface to Final Surface	P21-400-00-1102-AB	05/10/2023
Subsoils As-Built Plan	P21-400-00-1200-AB	05/10/2023
Retaining Wall As-built Plan	P21-400-00-1400 to 1402AB	05/10/2023
Stormwater As-Builts	P21-400-00-3000 to 3007AB	05/10/2023
Wastewater As-Builts	P21-400-00-4000 to 4004AB	09/10/2023

The following Tetra Tech Coffey (formerly Coffey) and Woods Limited (Woods) Precinct 6 construction drawings, Woods Limited North South Link as-built drawings, Tonkin and Taylor North South Link 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 Plan	BU/001	27/10/2023
Tetra Tech Coffey Geotechnical Investigation Plan <sup>(1)</sup>	BU/002	04/09/2023
Tetra Tech Coffey Geotechnical Works Plan <sup>(2)</sup>	BU/003	16/10/2023
Tetra Tech Coffey Geotechnical Remediation Plans Rev. D	AG/001, AG/002, and AG/003.	14/06/2022
Tetra Tech Coffey Subsoil Drainage Standard Details Rev. C	AG/007	18/06/2021
Tetra Tech Coffey Undercut Detail Plan Rev. C	AG/008	14/08/2021
Woods Retaining Wall 312 Longitudinal Section	37600-01-158-EW	26/11/2021
Coffey Wall 312 / RE Slope 312 Design Detail Drawing	AL/005	18/06/2020
Woods Reinforced Earth Wall 601 Longitudinal Section	37600-03-1170-EW	26/11/2021
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

Auckland Council Stormwater Pipe and Manhole Construction Clearance Requirements	AC-STD-SW22	17/01/2022
Auckland Council Pipe and Manhole Construction Clearance	WW26	04/12/2017
Auckland Council Building Close to or Over Local Network Wastewater	WW27	04/12/2017
Auckland Council Guideline for Building Close to or Over Transmission Wastewater	WW28	13/07/2018

Notes (relating to Table 2)

- (1) Depicts Tetra Tech Coffey Geotechnical Investigation locations, carried out at the completion of Stage 2 subdivision works to assess ultimate bearing capacity and topsoil depths on the completed lots.
- (2) Depicts all geotechnical works carried out within the subdivision boundary, including geotechnical works certified prior to issue of this report.

This GCR covers the construction period April 2019 to August 2023 and is intended to be used for certification purposes for the following lots associated with subdivision consent SUB60305557:

- 35 residential lots numbered Lots 72 to 85 (inclusive) and Lots 102 to 123 (inclusive);
- 2 new public roads named Pekanga Road (formerly Road 2), and Kaupeka Road (formerly Road 3).

The subdivision encompasses portions of existing properties 119 Kowhai Road (legal description Lot 2 DP 311431, SECT 3 SO 537746) and 138 Kowhai Road (legal description Lot 2 DP 463561).

Stage 2 is bound by future subdivision stages currently undergoing bulk earthworks to the north, west, and south. Previously completed subdivision stages bound the site to the east.

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

## 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-AE Rev.1, dated 29 November 2019 – Geotechnical Design Report for Shear Key 2;
- 773-AKLGE206639-AC Rev. 2, dated 29 November 2019 – Geotechnical Works Specification
- 773-AKLGE206639-AD Rev.1, dated 24 October 2019 – Geotechnical Design Philosophy
- 773-AKLGE206639-AF Rev.2, dated 12 April 2022 – Geotechnical Design Report for RE600 to RE603, dated 11 May 2022;
- 773-AKLGE206639-AG Rev. 1, dated 25 August 2020 – General Earthworks Design Report
- 773-AKLGE206639-AI, dated 9, December 2019 – Settlement Assessment Report;
- 773-AKLGE206639-AL Rev. 2, dated 15 April 2021 – Geotechnical Design Report for Mass Block Walls;
- 773-AKLGE2066369-AN Rev.2, dated 13 May 2020 – Geotechnical Monitoring Protocol;
- 773-AKLGE206639-BH, dated 16 June 2022 – Producer Statement – PS4 (Construction Review) for Retaining Walls 311 and 312.
- 773-AKLGE206639 NTE16 Rev. 1, dated 10 December 2020 – Gully 2 Geotechnical Works
- 773-AKLGE206639 NTE38, dated 15 October 2021 – Upper Gully 2 Additional Underfill Drainage
- 773-AKLGE206639 NTE39 Rev. 1, dated 23 November 2021 – Wall 312 Drainage

- 773-AKLGE206639 Tetra Tech Coffey S2 NTE001, dated 9 November 2022 - Additional Settlement Monitoring
- 773-AKLGE206639 Tetra Tech Coffey S2002 NTE001, dated 3 April 2023 – Batter Drainage Stormwater Connections

The following historical reports were prepared by Tonkin and Taylor (T&T) for various aspects of this stage of the development, and were reviewed as part of the writing of this report;

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

## 3. CONSTRUCTION WORKS

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### 3.1 PLANT

The main items of plant used by the main contractor for bulk earthworks, Hick Bros. Civil Construction Limited, comprised:

- 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

The main items of plant used by the main contractor for civil works on Stage 2, J G Civil Limited, were:

- 22.5-tonne excavators
- 13.5-tonne excavator
- 5-tonne excavators
- 1.5-tonne excavators
- 6-wheel dump trucks
- Tractor and pulled discs
- Smooth drum roller
- Pad-foot roller
- Grader
- Front-end loader

- 25-tonne water truck

## 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 T&T. This work is detailed and certified in the T&T Geotechnical Completion Report reference 21854.0034/AHP6EW.v1, dated June 2019.

In summary, the enabling earthworks carried out within Stage 2 involved:

- Stripping of vegetation and organic material;
- Installation of an underfill drain through the invert of existing Gully 2;
- Excavation of a 5m deep undercut (Undercut 2) and installation of accompanying blanket drainage; and
- Earthworks involving fill placement to depths of up to 10m.

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

### 3.2.2 Bulk Earthworks (April 2019 to September 2022)

Bulk earthworks carried out under the main earthworks contract encompassing Stage 2 commenced in April 2019 with the stripping of topsoil and construction of a sediment retention pond (SRP) within Gully 2.

Stockpiling of cut material from elsewhere in Precinct 6 was undertaken within the southwestern portion of the Stage 2 area throughout the first and second bulk earthworks seasons. Prior to placement of the stockpiles, to ensure adequate factors of safety against instability in the temporary case were maintained, stability analysis was carried out incorporating a range of stockpile heights and volumes to provide the contractor with limits on the size and extent of material to be placed.

Settlement monitoring accompanied by monitoring of pore pressures within the underlying compressible natural soils via a vibrating wire piezometer was carried out at the toe of the stockpile throughout the earthworks.

Throughout the 2019-2020 earthworks season, cuts progressed across the eastern half of Stage 2 to reduce the elevation of the existing ridgeline to design levels.

To maintain global stability in the long-term, a Shear Key (SK2) was prescribed for north of the Stage 2 boundary. Excavation 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), reaching completion in December 2021.

Development of Gully 2, north of the Enabling Works extent of works, commenced in December 2020. The purpose of these works was to create a suitable foundation for the bulk filling beneath Stage 2, and installation of drainage to relieve sub-fill pore water pressures.

The Gully 2 works commenced with the removal of organic and soft compressible alluvial soils down to more competent Residual East Coast Bays Formation soils. Following this, as described in Coffey report 773-AKLGE206639-NTE16 referenced in Section 2, several layers of underfill drainage were installed to provide some redundancy within the drainage network. Elements of this involved thrusting a pipe to intersect previously installed drainage constructed in the Enabling Works package, and installation of a manhole for discharging of the upper gully drainage to ensure the upper and lower gully's discharged via separate outfall structures.

The Gully 2 manhole was raised vertically with placement of additional risers as the filling operation progressed to provide an outlet point for future retaining wall drainage. The manhole was capped 3m below finished ground level.

Outlet structures comprising precast concrete wingwalls and riprap set in a concrete apron were installed adjacent to the stream north of the Stage 2 boundary to allow discharging of the subsoil drainage network into the adjoining watercourse.

Upon completion of the Gully 2 works in January 2021, the fill operation could be progressed across the entirety of the Stage 2 area. Cut and fill earthworks were ongoing throughout the subsequent two earthworks seasons, generally reaching finished subgrade levels in November 2022.

Over the course of the earthworks, several areas of natural soils were subject to undercuts to provide a suitable foundation for proposed RE slopes or retaining walls and prevent bearing capacity and deep-seated rotational slope failures. These undercuts (namely Undercuts 3, 4 10 and 11, as shown on the appended Tetra Tech Coffey Figure BU/003) comprised excavations 2m deep x 8m wide at the base, which were replaced with engineered clay fill compacted and tested to the Geotechnical Works Specification requirements.

Construction of RE601 commenced in May 2022 with the installation of drainage which was extended along downslope lot boundaries to be tapped into future public stormwater manholes. The RE slope was then constructed gradually with the placement of geogrids and compaction of engineered clay fill until the slope reached design height in July 2021.

Retaining Wall and RE Slope 312, located adjacent to the northern Stage 2 development boundary, were commenced in February 2022 with the preparation of the Wall 312 foundation and installation of drainage. The wall and slope construction progressed through the remainder of the season, reaching design height in September 2022.

During the earthworks, two areas of exposed natural ground within Stage 2 exhibited excessive groundwater seepage. Accordingly, two counterfort drains were installed at the locations shown on Figure BU/003 to intersect this groundwater and divert it to an appropriate outfall structure.

### 3.2.3 Civil Works (January 2023 to August 2023)

Stage 2 civil construction works commenced in late January 2023 with the installation of stormwater, wastewater, and underchannel drainage, and the gulleting of Roads 2 and 3.

All necessary road undercuts were completed, filled, and trimmed to design subgrade for Roads 2 and 3 in early March 2023 and then lime stabilised. Stabilisation was completed by mid-March.

GAP 65 sub base course layer was compacted on all roads by the end of March. Nuclear Densometer testing was conducted on the GAP65 in April. Kerbing works begin early April.

By April 2023, all stormwater and wastewater drainage was completed, which included a connection of the Retaining Wall 306 drainage outlets into the stormwater manholes.

All kerbing was completed by May 2023.

By June 2023, all footpaths were completed.

All service installation and water mains were completed by the end of July 2023.

TNZ40 basecourse metal was placed on Roads 2 and 3 in May 2023 and was completed by August 2023.

By mid-August 2023, all roads were sealed with asphalt.



Installation of Geoweb erosion protection and topsoiling of RE312 and RE601 commenced in June 2023 and was completed by August 2023. The geoweb was fixed in position via anchoring behind the slope crest with duckbill anchors.

By the end of September all footpaths and road marking were completed, and road signage was installed. All batters were also planted and landscaping works were completed.

## 4. QUALITY ASSURANCE AND CONTROLS

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### 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;
- Placement of geogrid reinforcement and drainage for reinforced earth (RE) slopes, including connection of drainage to the sealed public stormwater network;
- Excavation and construction of one retaining wall including foundation preparation, geogrid placement and lateral extent, drainage placement and backfill compaction;
- Ground conditions and founding material exposed in undercuts beneath retaining walls and RE slopes;
- Construction of pedestrian barriers along the crests of retaining walls;
- Observations of the removal of soft alluvial and organic natural soils and placement of underfill drainage in natural Gully 2 beneath the main fill area, prior to fill placement;
- Construction of counterfort drains; and
- Flush testing of the underfill and counterfort drains upon completion.

Test measurements undertaken during site inspections included:

- Compaction Testing of clay fill in accordance with the Tetra Tech Coffey Geotechnical Works Specification;
- Compaction Testing of hardfill for the segmental block (Mass Block) retaining wall backfill;
- Dynamic Cone Penetrometer Tests (Scalas) 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.

### 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 1500m<sup>3</sup> 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: 110 kPa

- Average Value: 140 kPa

In-situ density, shear strength and water content tests 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 full details are appended.

In addition, laboratory Triaxial Tests of Engineered fill sampled from high importance areas (i.e. RE Slope backfill) has been carried out to confirm design soil parameters. Testing was carried out in accordance with test method AS1289.6.4.2 (Note 4).

## 5. PROJECT EVALUATION

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### 5.1 STABILITY EVALUATION

Global stability conditions in Precinct 6 Stage 2 have been assessed under a range of groundwater conditions and seismic loading. The soil parameters used for the analyses (as referred to in our design philosophy report referenced 773-AKLGE206639-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 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 Stage 2 residential lots 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 than was considered in the aforementioned Tetra Tech Coffey investigation and design reports (see referenced reports 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 our confidence in the aforementioned stability analysis results, the Tetra Tech Coffey Geotechnical Building Limitation Zones Plan, reference BU-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 include:

- No-Build Zone;
- Specific Design Zone (Slope);
- Specific Design Zone (Retaining Walls)

Full descriptions of the limitations associated with each of these zones are presented in the Suitability Statement below.

### 5.2 RETAINING WALLS

#### 5.2.1 Existing Retaining Walls

One Mechanically Stabilised Earth (MSE) retaining wall (Wall 312) was constructed in Precinct 6 Stage 2. Wall 312 was constructed under Building Consent number BCO10301029-3 respectively. The Producer Statement – Construction Review (PS4s) for this walls is provided in Appendix F.

Table 3 below summarises the retaining wall construction details.

**Table 3: Summary of Segmental Block Retaining Wall Construction Details**

Wall #	Retaining Wall Length (m)	Retaining Wall Facing System	Wall Backfill	Geogrid Type	Max. Geogrid Embedment Length (m)	Design Wall Surcharge Load (kPa)
312	171	Mass Bloc	3m width of GAP65 hardfill behind the blocks, then engineered clay fill to the extent of geogrid reinforcement	Tensar RE580	5.5	12

The retaining wall was constructed with subsoil drainage, which incorporates regular outlet connections into the sealed public stormwater drainage network and the Gully 2 Manhole at the locations shown on the Woods Retaining Wall as-built drawings reference P21-400-00-1400 to 1402-AB. If any of the retaining wall 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 retaining wall drains to function should not be reduced or compromised as blocked retaining wall drainage can in some circumstances, lead to failure of the retaining wall.

The retaining walls were designed to accommodate a 12 kPa uniformly distributed surcharge load above the walls (or behind the crest of adjoining upslope RE Slopes) to take into account potential future fill placement or load from dwellings. Any greater loading will require specific design to transfer the load to a foundation system below the zone of influence of the wall. Details on the Specific Design Zone requirements on the residential lots adjoining the retaining walls is provided below in Section 5.4.3 and in the Suitability Statement (Section 6).

Survey monitoring of the retaining walls was carried out post-construction in accordance with the Tetra Tech Coffey Geotechnical Monitoring Protocol referenced above in Section 2, to confirm vertical and lateral movements were within design tolerances for the retaining walls. The majority of the deflections of the monitoring points observed were accredited to earthworks plant operating in the area. As such, we are satisfied that any post-construction movements have now likely attenuated. The monitoring results are provided in Appendix E.

The retaining wall design drawings are provided in Appendix B for reference.

## 5.2.2 Future Retaining Walls on the Private Lots

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, $\gamma$ (kN/m <sup>3</sup> )	Effective Cohesion, $c'$ (kPa)	Effective Internal Angle of Frictional Resistance, $\phi'$ (degrees)	Undrained Shear Strength of Foundation Soils, $s_u$ (kPa)
18	0	30	50

Retaining wall designs should give due regard to 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.

### 5.3 REINFORCED EARTH SLOPES

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

Table 5 below summarises the RE slope construction details.

**Table 5: Summary of RE Slope Construction Details**

RE Slope #	Vertical Slope Height (m)	Geogrid Type	Geogrid Embedment Lengths	Design Surcharge Load at Slope Crest (kPa)
312	3	Tensar SS20	Alternating 2m and 5m lengths at 0.5m vertical centres	12
601	6	Tensar SS20	Alternating 2m and 5m lengths at 0.5m vertical centres	12

The RE Slopes were constructed with subsoil drainage comprising a 300mm wide SAP50 scoria blanket drain behind the geogrid reinforced block, with regular outlet connections into the sealed public stormwater drainage network at the locations shown on the Woods Limited as-built drawings reference P21-400-00-1400 to 1402AB. 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 or compromised as blocked RE Slope drainage can in some circumstances, 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 Duckbill anchors installed into the ground at approximately 2m lateral centres at the slope crest. The installation of Geoweb was observed by the supplier (Geofabrics), who issued a letter attesting to the correct installation of the Geoweb. This letter is attached in Appendix G. It is important that no drainage or service trenches are excavated immediately behind the slope crest on the residential lots as this may cause damage to anchors resulting in surficial slumping of the topsoil on the batter faces.

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 provided in Appendix B for reference.

### 5.4 BUILDING LIMITATION ZONES

The steeper areas of filled and natural ground in Stage 2 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 (No Build Zones) and Specific Design Zones pertaining to cutting near batter toes or filling/loading near batter crests (Specific Design Zone (Slope)) to maintain the long-term integrity of these areas.

In addition to this, Specific Design Zones have been applied to land adjoining Retaining Wall 312, to ensure the long-term integrity of wall components.

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

### 5.4.1 No Build Zone

It is not considered desirable from a geotechnical perspective to develop on land comprising slope gradients steeper than 1V:2H (50%), or on batters consisting of geogrid reinforcement integral to maintaining long term factors of safety against instability. For these reasons, two RE slopes have been designated as No Build Zones.

Building slabs may be suspended and cantilevered into the No Build Zone areas, but no foundations or earthworks are permitted within the No Build Zones.

To reduce the potential for scour and erosion of the RE batter faces, topsoil has been placed on the batter faces and planted. These features should be able to remain in place long term without 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. Further, depths of mulch and topsoil applied to these areas should be limited to less than 150mm (combined) to reduce the risks of saturation leading to their localised slumping on batter faces. The contribution of appropriate vegetation cover to erosion control should not be underestimated. Weeds are permitted to be removed, but landscaped vegetation in the No Build Zones must be protected and preserved.

### 5.4.2 Specific Design Zone (Slope)

Specific Design Zone (Slope) has been applied to all sloping lot areas comprising gradients of between 1V:2H and 1V:4H (as shown on the Woods Limited Final Surface As Built Plan referenced P21-400-00-1000-AB) or land located immediately upslope or downslope of RE Slopes. Any future earthworks and any future building development 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. The design engineer should consider the effects of filling behind batter crests or cutting at batter toes, on the stability of the adjacent batters.

Individual lot developers must 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 slope portions, covering excavations with polythene to prevent ingress of rain, installation of temporary retention piles prior to excavation works (i.e. top-down construction methodologies) and careful planning of works to avoid poor weather and to ensure that excavations are only left unsupported for short periods of time.

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.

### 5.4.3 Specific Design Zone (Retaining Walls)

Specific Design Zone (Retaining Walls) has been applied to areas within the residential lots located immediately above Wall 312. Development within these zones should be designed and certified by a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report, to ensure that:

1. The geogrid reinforcement and engineered fill that form part of the segmental block walls is protected; and

2. The surcharge loads applied above the existing block walls do not exceed the loads assumed in the design; and

Further details on the requirements on each individual lot is provided in the Suitability Statement.

## 5.5 FILL INDUCED SETTLEMENT

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

A series of settlement monitoring devices were installed across Stage 2 to measure induced settlements. The locations are shown on the Settlement Monitoring Location plan in Appendix E. Settlement plates were placed on the stripped natural ground level 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 in the finished ground surface to monitor surface movements upon completion of the earthworks.

Each of the monitoring locations were selected to observe settlements at locations of maximum anticipated magnitude (maximum fill depths), as well as at specific locations of interest, such as on proposed public drainage alignments.

The monitoring results in Appendix E show that settlement rates appear to have attenuated to low levels and that  $T_{90}$  (90% of total settlement) has most likely been attained. The markers were decommissioned to allow site operations to continue, following approval Tetra Tech Coffey.

## 5.6 SUBSOIL DRAINAGE

The following sub-sections contain a description of the underfill and counterfort drainage (collectively referred to as subsoil drainage) installed during bulk earthworks to control groundwater levels across Stage 2 and to allow for the dissipation of generated pore water pressures. The drain locations are shown on the Woods Subsoil Drainage as-built plans referenced P21-400-00-1200-AB in Appendix A. The subsoil drain design details are shown on the Coffey Subsoil Drainage Standard Details drawing 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 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 of the subsoil drainage system is maintained.

### 5.6.1 Underfill Drains

Perforated underfill drains were placed in mucked out gully inverts prior to filling to tap groundwater seepage and also in cut benches formed prior to filling, as required by NZS 4431.

These drains were intended to intercept localised groundwater seepage and springs during earthworks and to help provide general control over groundwater. These drains require no specific maintenance.

The locations of the underfill drains are shown on Woods drawings P21-400-00-1200-AB. These drains have been installed beneath the fill areas, which is in places is over 10m deep. 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.



## 5.6.2 Counterfort Drains

During earthworks construction two counterfort drains were installed under direction from Tetra Tech Coffey, to assist in controlling local groundwater levels in areas where groundwater seepage was observed. Typical trench excavation depths for the counterfort drains was up to 5m from the undercut ground level, and a typical trench width of 600mm. Drainage aggregate used for the counterfort drains was SAP50 scoria.

These drains were connected into the sealed stormwater network via adjacent retaining wall drainage, or outlet into the adjacent watercourse to the north via a specifically designed outfall structure.

The counterfort drains were generally aligned beneath lot boundaries and constructed with a minimum 2m cap of engineered clay fill above the drains.

## 5.6.3 Flushing of Subsoil Drains

Flush testing of the subsoil drains to confirm their function was undertaken using water carts connected to the drain inlet Novaflos. A Tetra Tech Coffey engineer was on-site to observe flushing operations. Each of the subsoil drains was successfully flush tested prior to placing of the clay cap.

## 5.7 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 300 kPa (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 300 kPa is required, further site-specific investigation and design of foundations should be carried out prior to Building Consent application.

It should be noted that NZS 3604 only allows a maximum fill depth of 600mm above finished ground level across the building platform of 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.

## 5.8 EXPANSIVE SOILS

Nine sets of Laboratory Expansive Soil Tests were carried out on soil samples retrieved from Lots 73, 74, 75, 79, 84, 107, 112, 115, and 120 (as shown on Tetra Tech Coffey drawing BU/002 in Appendix B) and from within the zone of likely influence of shallow building foundations.

Testing to assess the 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 report 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 of the soils on site, we have assessed the AS2870 expansive site class as M (Moderately 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. 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 be carried out by individual lot owners to ascertain the expansive site class for each individual lot.

## 5.9 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.

## 5.10 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 available in Watercare COP1, namely WW53 and WW54, which are standard construction drawings. All aforementioned details are provided in Appendix B.

A number of the lots are shown to have public drainage trenches within their boundaries as shown on the Woods Stormwater and Wastewater as-built plans referenced P21-400-00-3000 to 3007AB and P21-400-00-4000 to 4004AB respectively (provided in Appendix A). The resulting limitations are discussed in the following Suitability Statement.

## 5.11 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 BU/002 in Appendix B) to assess indicative topsoil depths on all residential lots.

Depths of topsoil were found to range from 150 to 450mm, however, due to the nature of the method of investigation, variation in topsoil depths across the lots is expected.

Site specific findings are presented in the Suitability Statement Summary (Table 7) in Section 6. However, we strongly recommend that lot purchasers complete their own checks of actual topsoil depths across their specific lot.

## 5.12 PUBLIC ROAD AND JOAL SUBGRADES

Scala Penetration Resistance (Dynamic Cone Penetrometer) Tests were undertaken at regular intervals along the road subgrades in Stage 2. 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.

## 5.13 CONTRACTORS WORK

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

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

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

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I, Chris Armstrong of Tetra Tech Coffey (NZ) Limited, Auckland, hereby confirm that:

1. I am a Chartered Professional Engineer experienced in the field of geotechnical engineering as defined in Section 1.2.3 of NZS 4404 and was retained by the Owner/Developer as the Geotechnical Engineer for Stage 2, Precinct 6 of the Millwater Subdivisional Development.
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 above 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 in 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 Precinct 6 Stage 2 construction and shown on the appended Woods Limited as-built plans, excluding fills placed during enabling earthworks, 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 P21-400-00-1000-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 areas comprise geogrid reinforcement whose structural integrity is critical in maintaining the stability of these areas.

Accordingly, limitations incorporating No Build Zone and Specific Design Zone (Slope) have been applied as depicted on Tetra Tech Coffey Geotechnical Building Limitation Zone Plan BU/001, dated 20/07/2023, and described as follows:

- i. **No Build Zone** has been applied to portions of land in Lots 77 to 85 (inclusive), and Lots 102 to 123 (inclusive) and encompasses land comprising geogrid reinforced earth (RE) slopes and/or slope gradients of 1V:2H or steeper. No building or earthworks are permitted within these zones as development in these areas could have a detrimental effect on land stability.
- ii. **Specific Design Zone (Slope)** has been applied to portions of land in Lots 72 to 75 (inclusive), Lots 77 to 85 (inclusive), and Lots 102 to 123 (inclusive), and encompasses land having slope gradients of 1(v) in 4(h) to 1(v) in 2(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 Zones (Slope) 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 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, and consider the implications of temporary (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, and also to fills on, or immediately above the batter slopes. Risk mitigation for construction of these works should also be considered.

Foundations constructed within the Specific Design Zone (Slope) in Lots 72 to 75 (inclusive), Lots 77 to 85 (inclusive), and Lots 102 to 123 (inclusive) should include the piling of leading (downslope) edge foundations and deck foundations. Suggested parameters for design of pile foundations are as follows:

**Table 6: Pile Design Parameters**

Effective Internal Angle of Frictional Resistance, $\phi'$ (degrees)	Undrained Shear Strength, $s_u$ (kPa)	Geotechnical ultimate end bearing capacity beyond 1.0m depth (kPa)	Ultimate side adhesion beyond 1.0m depth (kPa)*
30	50	450kPa	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) One MSE retaining wall (namely Wall 312) comprising geogrid reinforcement and drainage that extends back into the residential lots is present adjacent to the northern stage boundary.

Accordingly, **Specific Design Zone (Retaining Walls)** have been applied as depicted on Tetra Tech Coffey Geotechnical Building Limitation Zone Plan BU-001, dated 20/07/2023, and described as follows:

**Specific Design Zone (Retaining Walls)** has been applied to portions of land within Lots 77 and 85 to ensure the geogrid reinforcement and drainage comprising the adjacent retaining walls which extends into Lots 77 and 85 is not damaged and that surcharge loads applied within the Specific Design Zone (Retaining Walls) in Lots 77 and 85 do not exceed the design surcharge loads for the adjacent retaining wall.

Fills to create building platforms within the Specific Design Zone (Retaining Walls) in Lots 77 and 85 are limited to a maximum depth of 500mm. Cuts of any depth to create building platforms within these zones in Lots 77 and 85 are not permitted.

- (c) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for shallow foundation design on all residential lots in Stage 2.

Where a geotechnical ultimate bearing capacity greater than 300 kPa 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.

- (d) The function of the subsoil drains (including outlets), as depicted on the appended Woods Limited Subsoil Drainage as-built plans referenced P21-400-00-1200-AB, should not be compromised by any future building development or 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.**
- (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-degree 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 issues 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 P21-400-00-3000 to 3007AB and P21-400-00-4000 to 4004AB should be referred to for the locations of public drainage lines 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/adjacent to public wastewater pipes are shown on Watercare drawings, namely WW53 and WW54, 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 AS 2870 Sxpansive Site Class is M (Moderately reactive) for Lots 72 to 85 (inclusive) and Lots 102 to 123 (inclusive). 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 within 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 2, shallow foundation design may be carried out in accordance with AS 2870 (Class M), 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

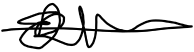
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The professional opinion contained within this report is furnished to Auckland Council and WFH Properties Limited for their purposes alone on the express condition that it will not be relied upon by any other person. Prospective purchasers should still 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:



**Ethan Potter**  
Engineering Geologist  
BSc



**Stephen Parkes**  
Associate Engineering Geologist  
CMEngNZ PEngGeol

Reviewed and Authorised By:



**Chris Armstrong**  
Principal Geotechnical Engineer  
CMEngNZ, CPEng



**Table 7: Suitability Statement Summary**

Lot #	Comments	Tospoil Depth (mm)	Ultimate Bearing Capacity (kPa)	AS2870 Expansive Site Class
72	<p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	450	300	M
73	<p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	450	300	M
74	<p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	400	300	M

75	<p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	400	300	M
77	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Specific Design Zone (Retaining Walls) limitations apply (refer to Clause 6.4(b))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	250	300	M
78	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	250	300	M

79	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	250	300	M
80	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	300	300	M
81	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	350	300	M

82	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	350	300	M
83	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	300	300	M
84	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	250	300	M

85	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Specific Design Zone (Retaining Walls) limitations apply (refer to Clause 6.4(b))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	250	300	M
102	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	200	300	M
103	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to</p>	200	300	M

	section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations			
104	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	200	300	M
105	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	200	300	M
106	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing</p>	200	300	M



	depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations			
107	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	200	300	M
108	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	200	300	M
109	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	200	300	M
110	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p>	200	300	M

	<p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>			
111	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	200	300	M
112	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	200	300	M
113	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p>	200	300	M

	<p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>			
114	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	200	300	M
115	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	200	300	H
116	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p>	250	300	M

	<p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>			
117	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	250	300	M
118	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	250	300	M
119	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p>	250	300	M

	<p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>			
120	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	200	300	M
121	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	200	300	M
122	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p>	250	300	M

	<p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>			
123	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>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 or pad foundations</p>	400	300	M

## APPENDIX A: WOODS AS-BUILT DRAWINGS

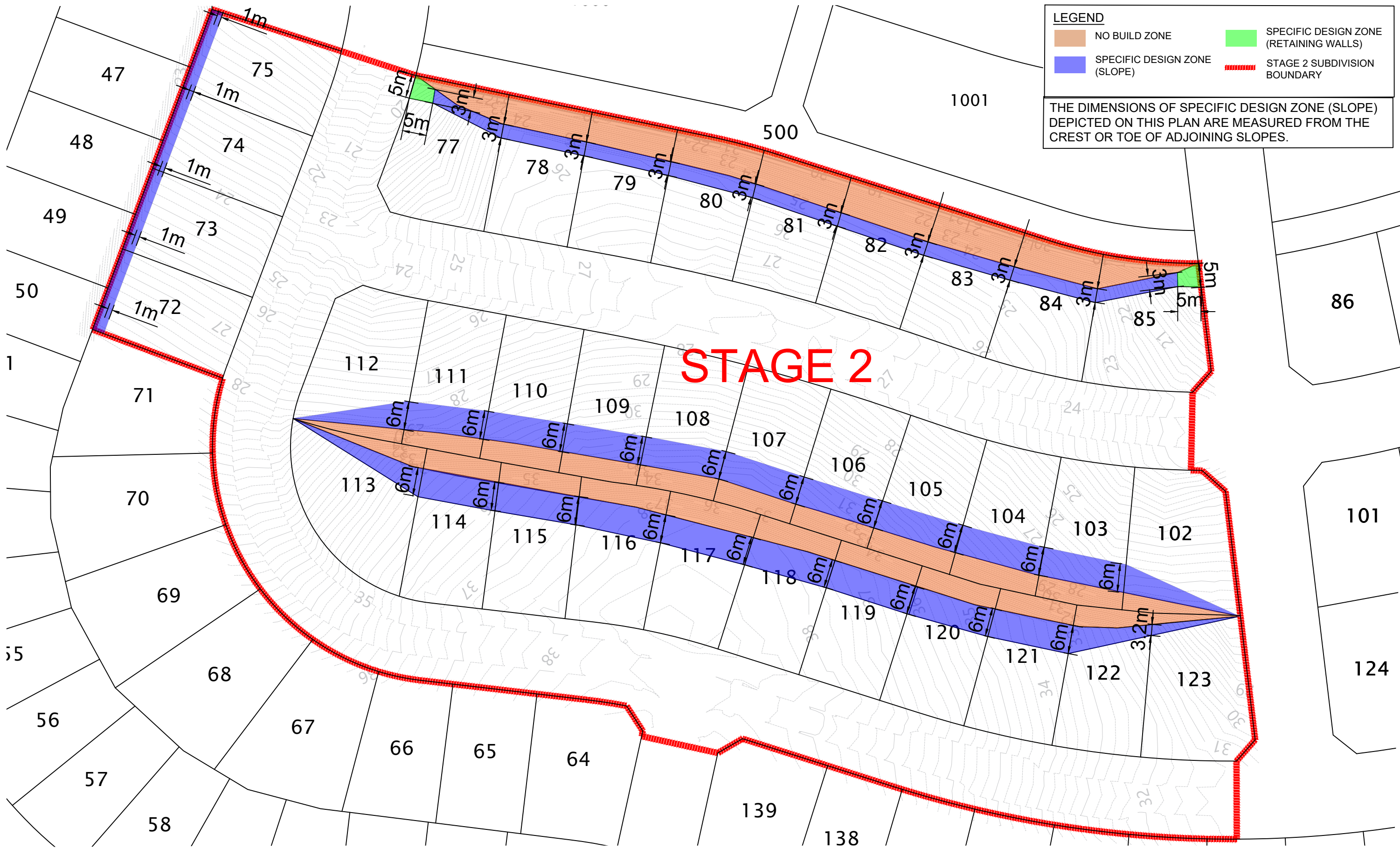
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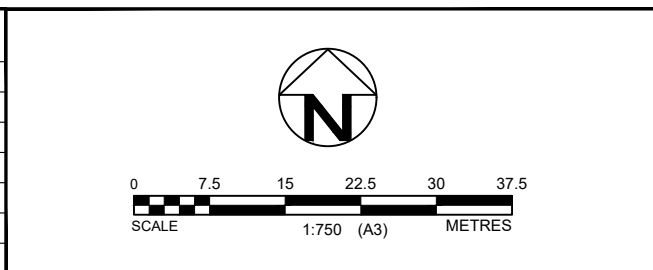
## APPENDIX B: REFERENCE DRAWINGS

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PLOT DATE: 27/10/2023 7:45:53 pm DWG FILE: F:\GEN28 PROJECTS\773-AKLGE PROJECTS\200000-299000\206639 - MILLWATER - OREWA WEST - PRECINCT 67 COFFEY DRAWINGS\CAD\COR PLANS\03 STAGE 2\BD-01 PRELIM SPECIFIC DESIGN ZONE PLAN - FULL.DWG



no.	description	drawn	approved	date
A	ORIGINAL ISSUE	SP	SP	27/10/2023

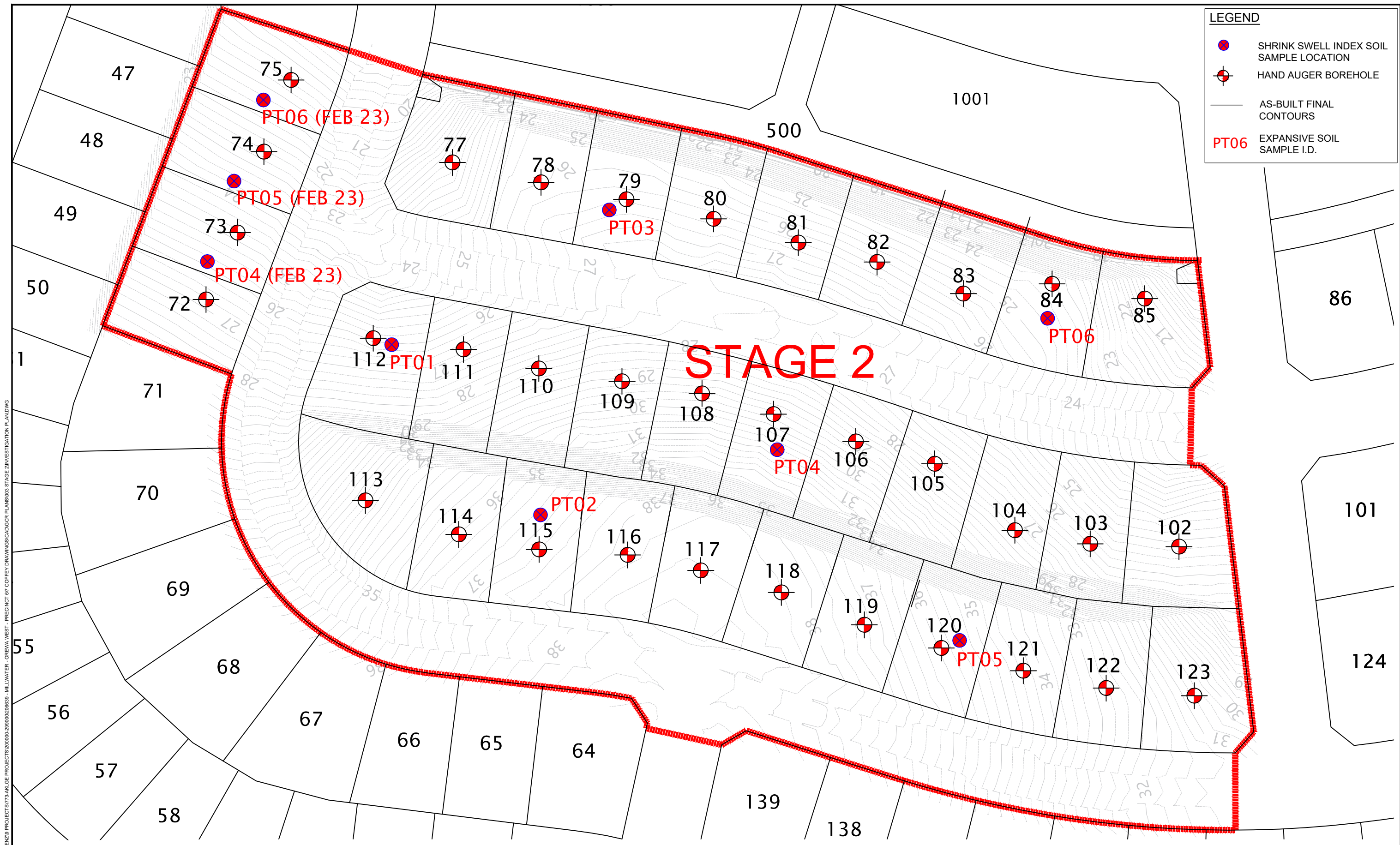


drawn	SP
approved	SP
date	27/10/2023
scale	AS SHOWN
original size	A3



client:	WFH PROPERTIES LIMITED		
project:	MILLWATER ARRAN HILLS PRECINCT 6 - STAGE 2		
title:	GEOTECHNICAL BUILDING LIMITATION ZONE PLAN		
project no.:	773-AKLGE206639	figure no.:	BU/001
rev:	A		



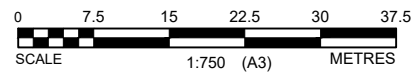


LEGEND	
	SHRINK SWELL INDEX SOIL SAMPLE LOCATION
	HAND AUGER BOREHOLE
	AS-BUILT FINAL CONTOURS
<b>PT06</b>	EXPANSIVE SOIL SAMPLE I.D.

**STAGE 2**

PLOT DATE: 01/11/2023 10:47:03 am DWG FILE: F:\PROJECTS\773-AKLGE\PROJECTS\773-AKLGE\PROJECTS\000000-2900000206639 - MILLWATER - OREWA WEST - PRECINCT 6\COFFEY DRAWINGS\CAD\GR PLANS\003 STAGE 2\INVESTIGATION PLAN.DWG

no.	description	drawn	approved	date
A	FOR STAGE 1C GEOTECHNICAL COMPLETION REPORT	EP	SP	04/09/2023



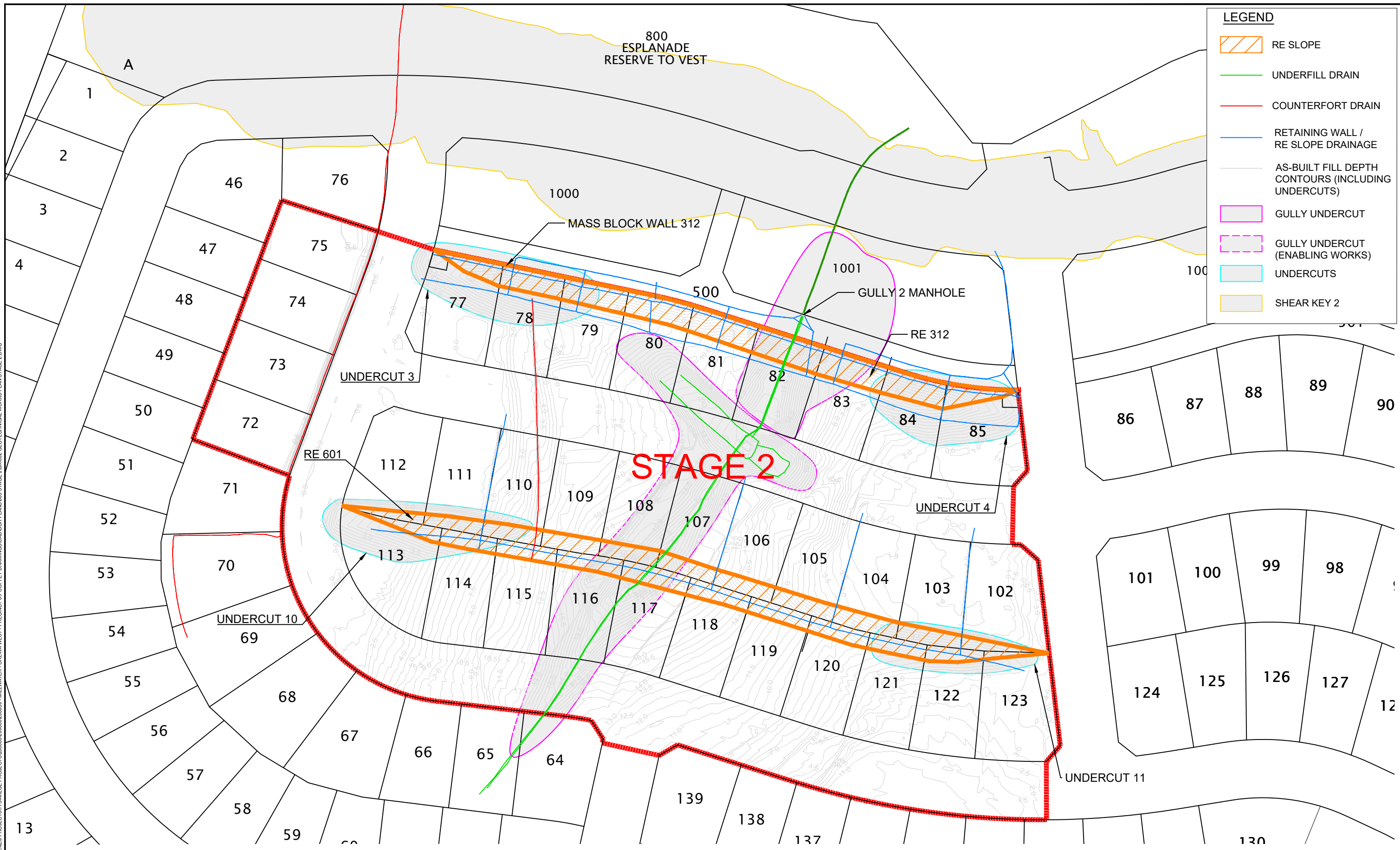
drawn	EP
approved	SP
date	04/09/2023
scale	AS SHOWN
original size	A3



client:	WFH PROPERTIES LTD		
project:	MILLWATER - OREWA WEST - PRECINCT 6 SUBDIVISION STAGE 2		
title:	GEOTECHNICAL INVESTIGATION PLAN		
project no:	773-AKLGE206639	figure no:	BU/002
			rev: A



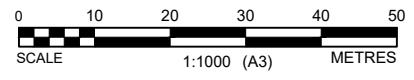
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LEGEND	
	RE SLOPE
	UNDERFILL DRAIN
	COUNTERFORT DRAIN
	RETAINING WALL / RE SLOPE DRAINAGE
	AS-BUILT FILL DEPTH CONTOURS (INCLUDING UNDERCUTS)
	GULLY UNDERCUT
	GULLY UNDERCUT (ENABLING WORKS)
	UNDERCUTS
	SHEAR KEY 2

STAGE 2

no.	description	drawn	approved	date
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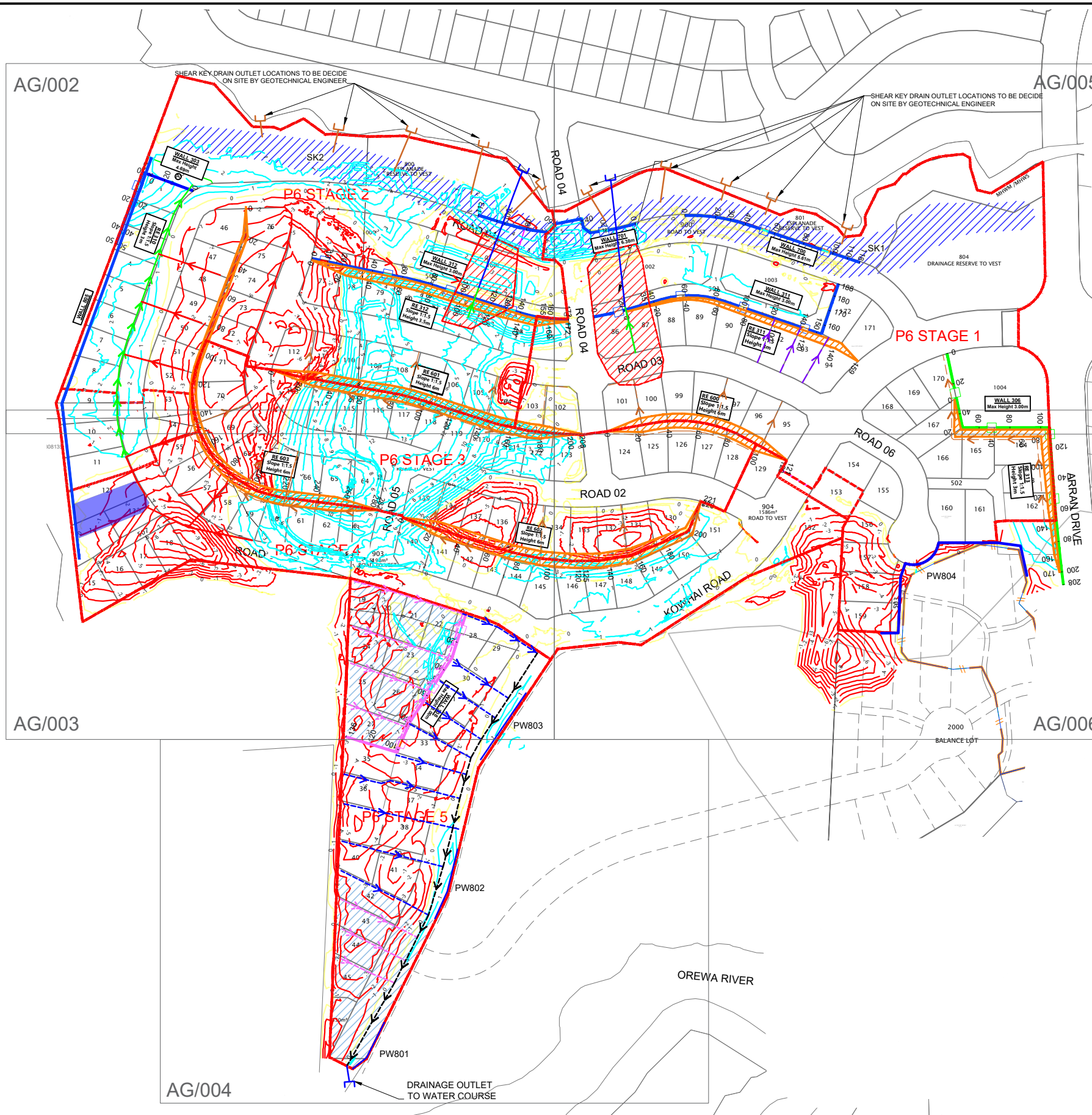


drawn	EP
approved	SP
date	16/10/2023
scale	AS SHOWN
original size	A3



client:	WFH PROPERTIES LTD		
project:	MILLWATER - OREWA WEST - PRECINCT 6 SUBDIVISION STAGE 1C		
title:	GEOTECHNICAL WORKS PLAN		
project no:	773-AKLGE206639	figure no:	BU/003
rev:	A		

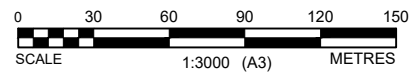
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EARTHWORKS VOLUMES		
STAGE	CUT	FILL
STAGE 1		
STAGE 2		
STAGE 3	26,000m <sup>3</sup>	93,000m <sup>3</sup>
STAGE 4	21,000m <sup>3</sup>	60,400m <sup>3</sup>
STAGE 5	39,000m <sup>3</sup>	-

LEGEND	
	PROPOSED CUT CONTOURS (1m INTERVAL)
	PROPOSED FILL CONTOURS (1m INTERVAL)
	REINFORCED EARTH WALL
	RETAINING WALL - TIMBER
	RETAINING WALL - KEYSTONE
	RETAINING WALL - MASS BLOCK
	BOUNDARY
	STAGE BOUNDARY
	WICK DRAINS
	PALISADE WALL PW806
	SHEAR KEY EXCAVATION
	2.5M NOMINAL UNDERCUTS
	UNSUITABLE UNDERCUTS
	UNDERCUT KEY
	CF DRAINS (DETAIL 1)
	CF DRAINS (DETAIL 2)
	CF DRAINS (DETAIL 3)
	CF DRAINS (DETAIL 4)
	UNDERFILL DRAINS
	RE SLOPE DRAINS
	COLLECTOR DRAINS
	PE OUTLET LINE
	SHEAR KEY OUTLET
	PROPOSED PALISADE WALLS
	PROPOSED MANHOLE LOCATION

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
D	UPDATED AS OF END OF 2021/2022 EARTHWORKS SEASON	SP	SP	14/06/2022



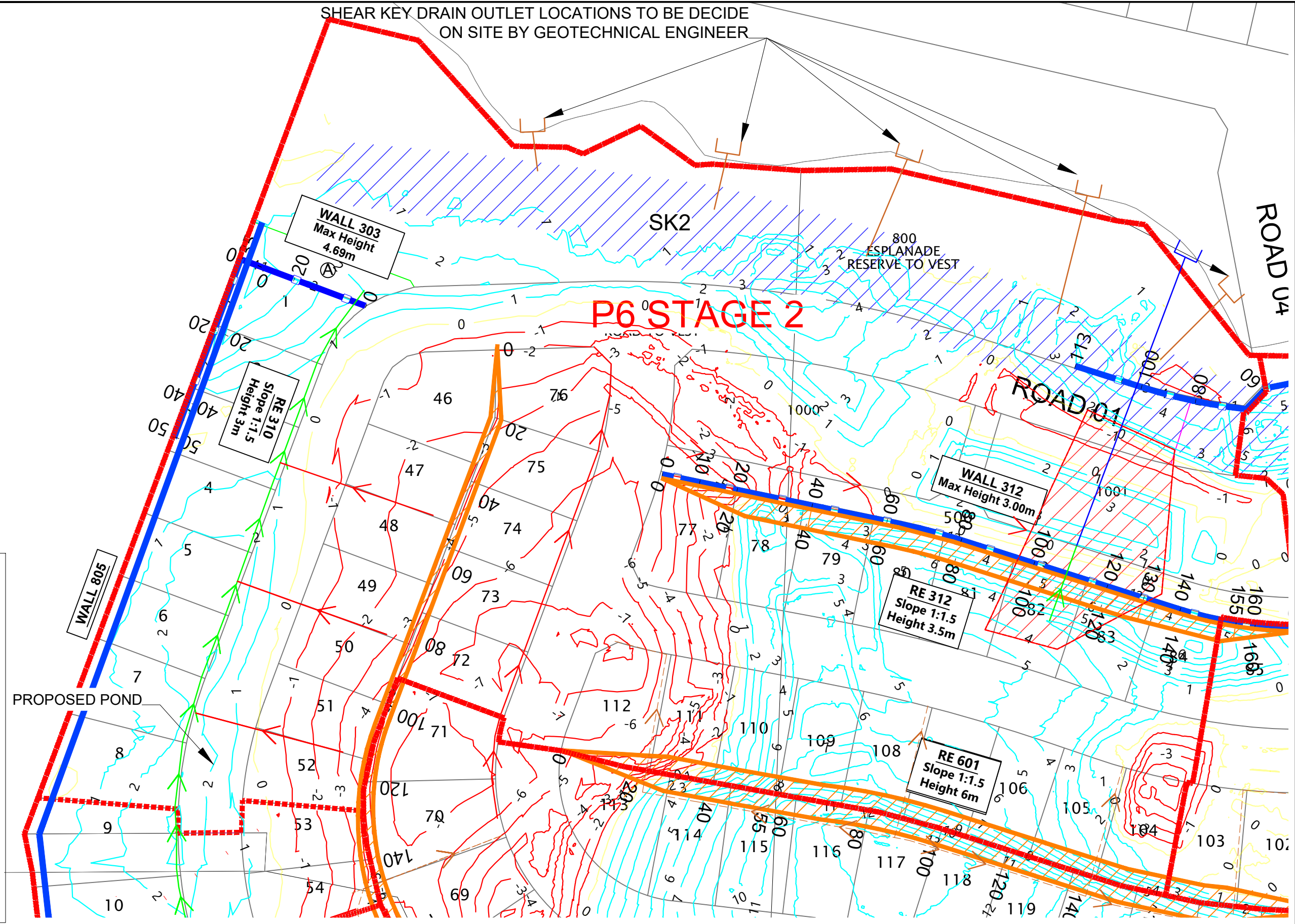
drawn	RZ
approved	SP
date	14/06/2022
scale	AS SHOWN
original size	A3



client:	WFH PROPERTIES LTD		
project:	MILLWATER - OREWA WEST - PRECINCT 6		
title:	GEOTECHNICAL REMEDIATION PLAN		
project no:	773-AKLGE206639	figure no:	AG/001
rev:	D		

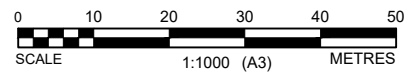


PLOT DATE: 14/06/2022 9:16:28 pm DWG FILE: F:\GEN29 PROJECTS\773-AKGE PROJECTS\202639 - MILLWATER - OREWA WEST - PRECINCT 6\773-AKGE\DRAWINGS\CAD\STEPHEN\773-AKGE20639-AG\_V1773-AKGE20639-AG.DWG



LEGEND	
	PROPOSED CUT CONTOURS (1m INTERVAL)
	PROPOSED FILL CONTOURS (1m INTERVAL)
	REINFORCED EARTH WALL
	RETAINING WALL - TIMBER
	RETAINING WALL - KEYSTONE
	RETAINING WALL - MASS BLOCK
	BOUNDARY
	STAGE BOUNDARY
	WICK DRAINS
	DSM COLUMNS
	SHEAR KEY EXCAVATION
	2.5M NOMINAL UNDERCUTS
	UNSUITABLE UNDERCUTS
	CF DRAINS (DETAIL 1)
	CF DRAINS (DETAIL 2)
	CF DRAINS (DETAIL 3)
	CF DRAINS (DETAIL 4)
	UNDERFILL DRAINS
	RE SLOPE DRAINS
	COLLECTOR DRAINS
	PE OUTLET LINE
	SHEAR KEY OUTLET
	PROPOSED PALISADE WALLS
	PROPOSED MANHOLE LOCATION

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
	D	UPDATED AS OF END OF 2021/2022 EARTHWORKS SEASON	SP	SP	14/06/2022

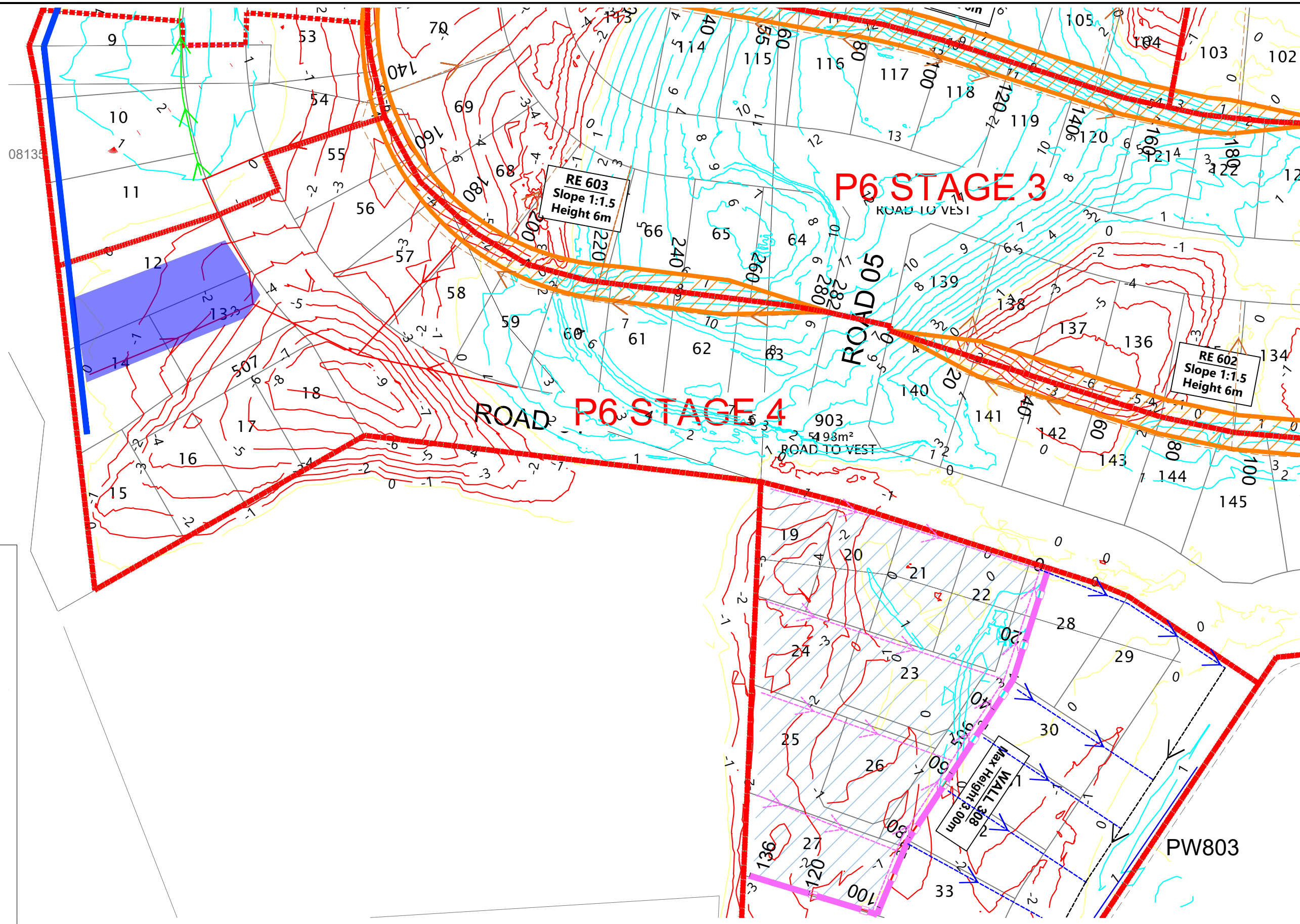


drawn	RZ
approved	SP
date	14/06/2022
scale	AS SHOWN
original size	A3



client:	WFH PROPERTIES LTD		
project:	MILLWATER - OREWA WEST - PRECINCT 6		
title:	GEOTECHNICAL REMEDIATION PLAN		
project no:	773-AKGE206639	figure no:	AG/002
rev:	C		

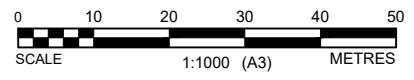
PLOT DATE: 14/06/2022 9:17:04 pm DWG FILE: F:\GEN209 PROJECTS\773-AKLGE PROJECTS\2020639 - MILLWATER - OREWA WEST - PRECINCT 6\773-AKLGE20639-AG\_V1773-AKLGE20639-AG.DWG



**LEGEND**

- PROPOSED CUT CONTOURS (1m INTERVAL)
- PROPOSED FILL CONTOURS (1m INTERVAL)
- REINFORCED EARTH WALL
- RETAINING WALL - TIMBER
- RETAINING WALL - KEYSTONE
- RETAINING WALL - MASS BLOCK
- BOUNDARY
- STAGE BOUNDARY
- WICK DRAINS
- DSM COLUMNS
- SHEAR KEY EXCAVATION
- 2.5M NOMINAL UNDERCUTS
- UNSUITABLE UNDERCUTS
- UNDERCUT KEY
- CF DRAINS (DETAIL 1)
- CF DRAINS (DETAIL 2)
- CF DRAINS (DETAIL 3)
- CF DRAINS (DETAIL 4)
- UNDERFILL DRAINS
- RE SLOPE DRAINS
- COLLECTOR DRAINS
- PE OUTLET LINE
- SHEAR KEY OUTLET
- PROPOSED PALISADE WALLS
- PROPOSED MANHOLE LOCATION

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
D	UPDATED AS OF END OF 2021/2022 EARTHWORKS SEASON	SP	SP	14/06/2022



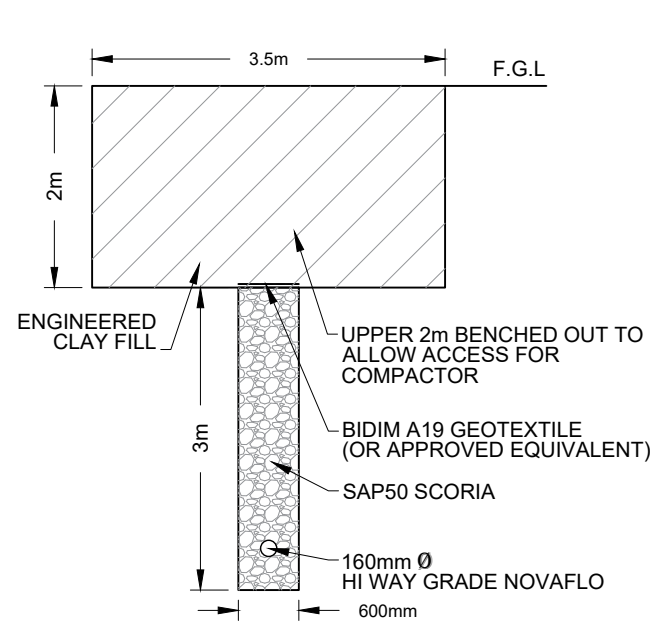
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approved	SP
date	14/06/2022
scale	AS SHOWN
original size	A3



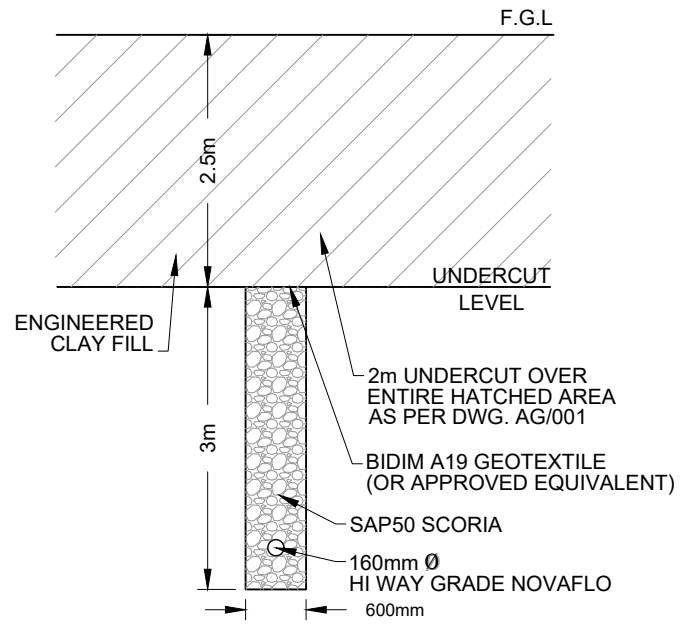
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project:	MILLWATER - OREWA WEST - PRECINCT 6		
title:	GEOTECHNICAL REMEDIATION PLAN		
project no:	773-AKLGE206639	figure no:	AG/003
		rev:	D



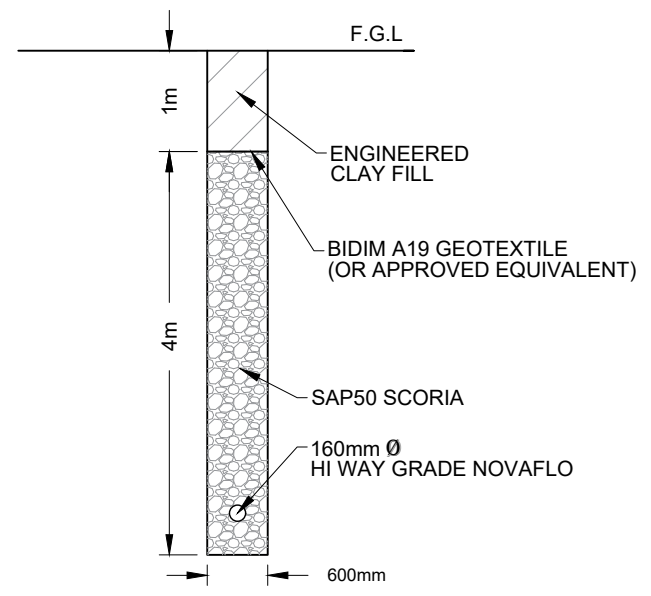
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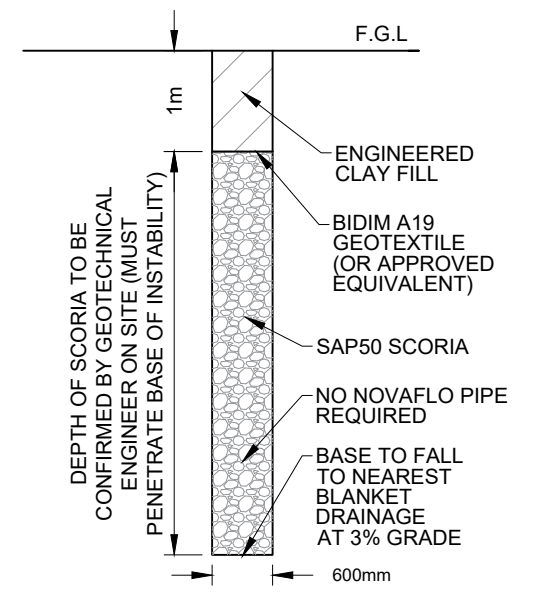
**CF DRAIN DETAIL 1**  
SCALE:1:75



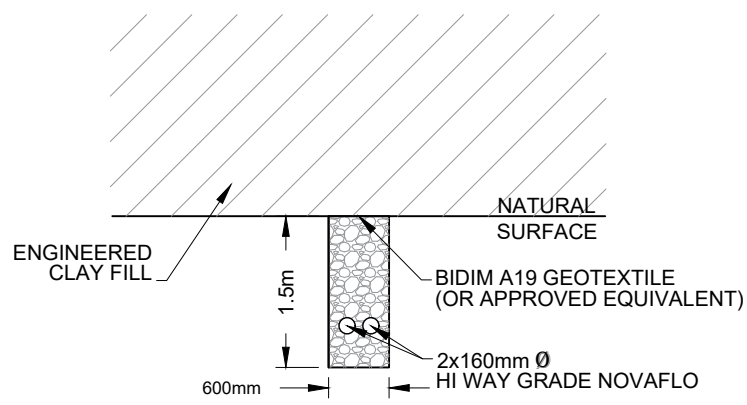
**CF DRAIN DETAIL 2**  
SCALE:1:75



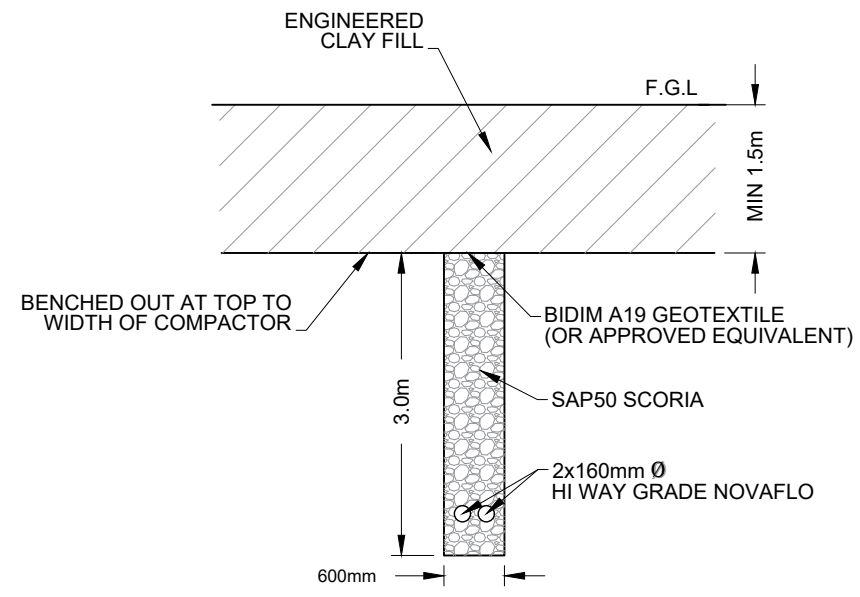
**CF DRAIN DETAIL 3**  
SCALE:1:75



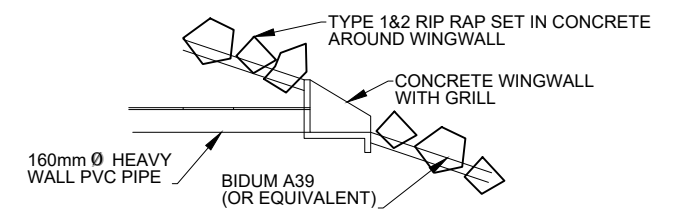
**CF DRAIN DETAIL 4**  
SCALE:1:75



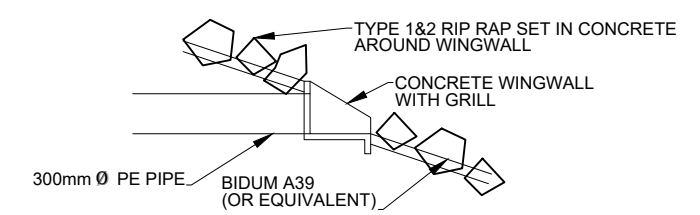
**UNDERFILL DRAIN STANDARD DETAIL**  
SCALE:1:75



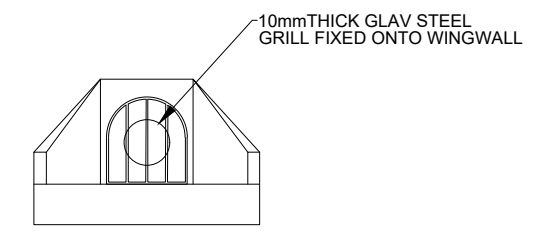
**COLLECTOR DRAIN DETAIL**  
SCALE:1:75



**SHEARKEY OUTLET DETAIL**  
SCALE:1:150



**UNDERFILL OUTLET DETAIL**  
SCALE:1:150



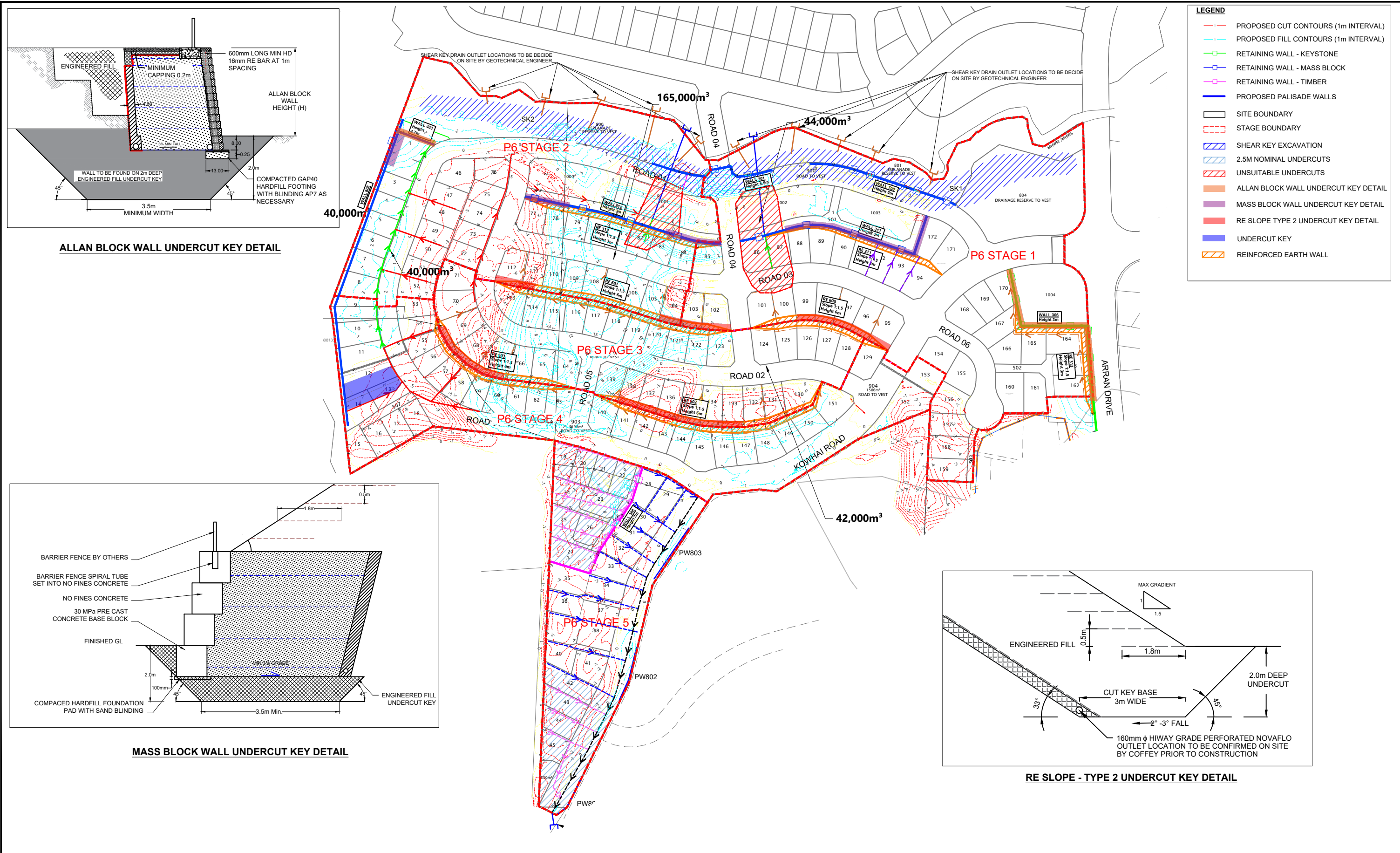
**WINGWALL GRILL DETAIL**  
SCALE:1:150

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

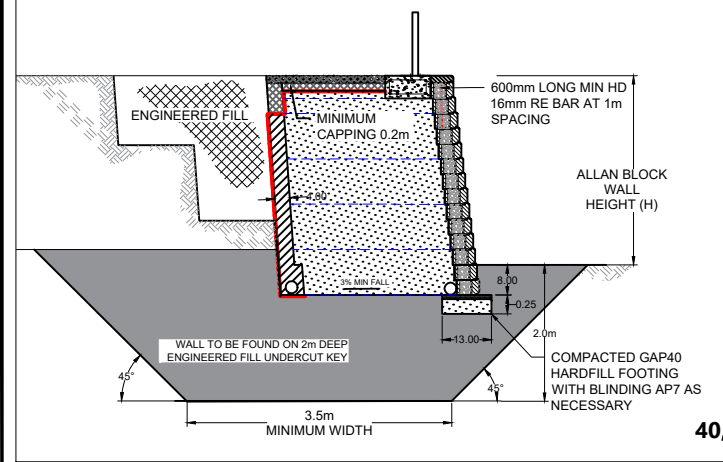
drawn	RZ
approved	SP
date	18/06/2021
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original size	A3



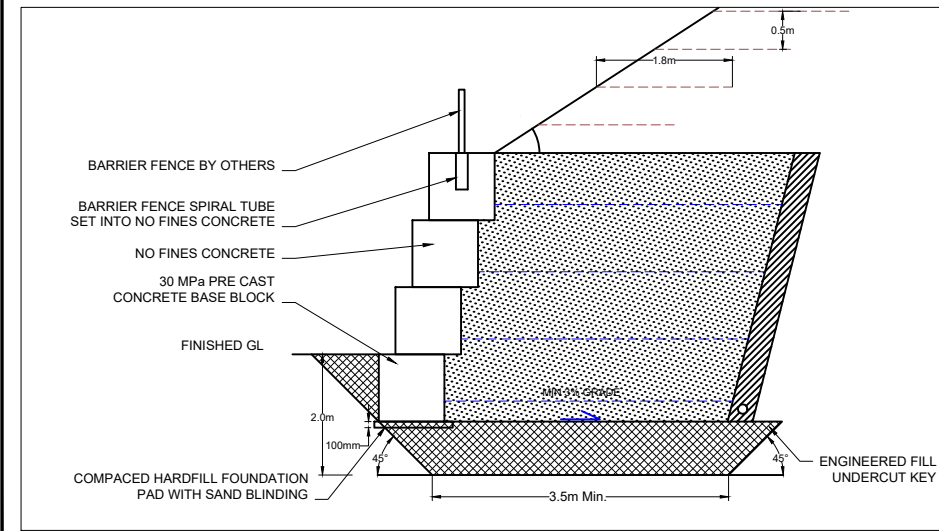
client:	WFH PROPERTIES LTD	
project:	MILLWATER - OREWA WEST - PRECINCT 6	
title:	SUBSOIL DRAINAGE STANDARD DETAILS	
project no:	773-AKLGE206639	figure no: AG/007
		rev: C



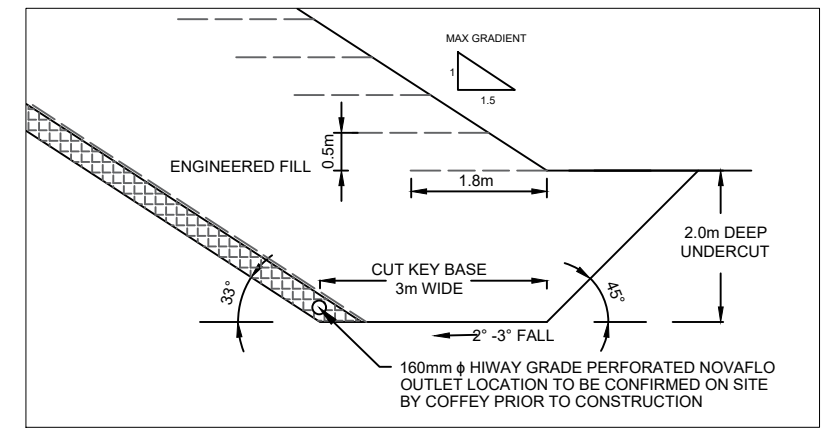
- LEGEND**
- PROPOSED CUT CONTOURS (1m INTERVAL)
  - PROPOSED FILL CONTOURS (1m INTERVAL)
  - RETAINING WALL - KEystone
  - RETAINING WALL - MASS BLOCK
  - RETAINING WALL - TIMBER
  - PROPOSED PALISADE WALLS
  - SITE BOUNDARY
  - STAGE BOUNDARY
  - SHEAR KEY EXCAVATION
  - 2.5M NOMINAL UNDERCUTS
  - 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



**ALLAN BLOCK WALL UNDERCUT KEY DETAIL**

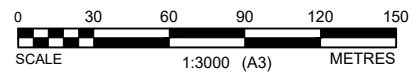


**MASS BLOCK WALL UNDERCUT KEY DETAIL**



**RE SLOPE - TYPE 2 UNDERCUT KEY DETAIL**

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 2022/2023 EARTHWORKS SEASON	SP	SP	14/06/2022



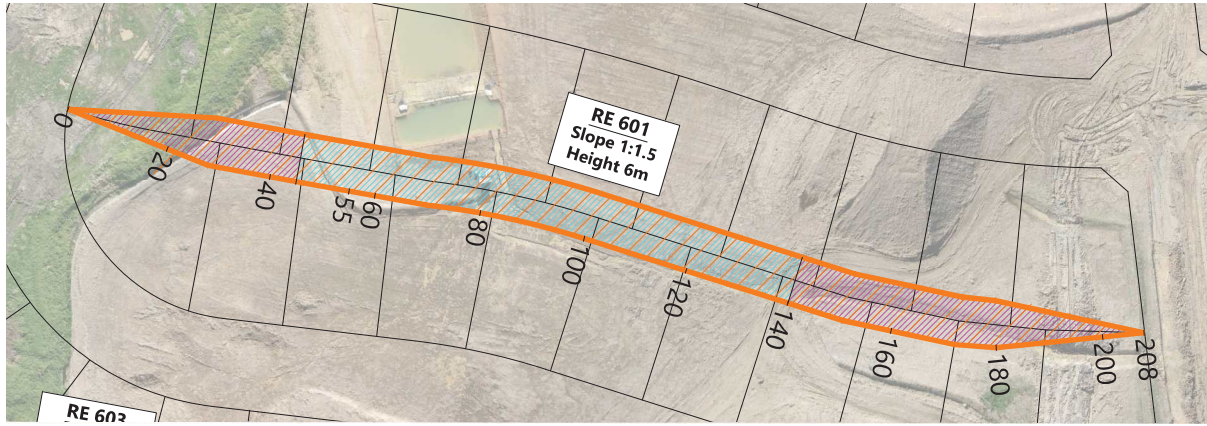
drawn	SP
approved	SP
date	14/06/2022
scale	AS SHOWN
original size	A3



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

PLOT DATE: 14/06/2022 8:45:00 pm DWG FILE: F:\GEN209 PROJECT\173-AKLGE PROJECT\173-AKLGE206639 - MILLWATER - OREWA WEST - PRECINCT 6\173-AKLGE206639-AG - V0173-AKLGE206639-AG.DWG





**LEGEND**

- TOP OF RETAINING WALL
- BOTTOM OF RETAINING WALL
- EXISTING GROUND LEVEL

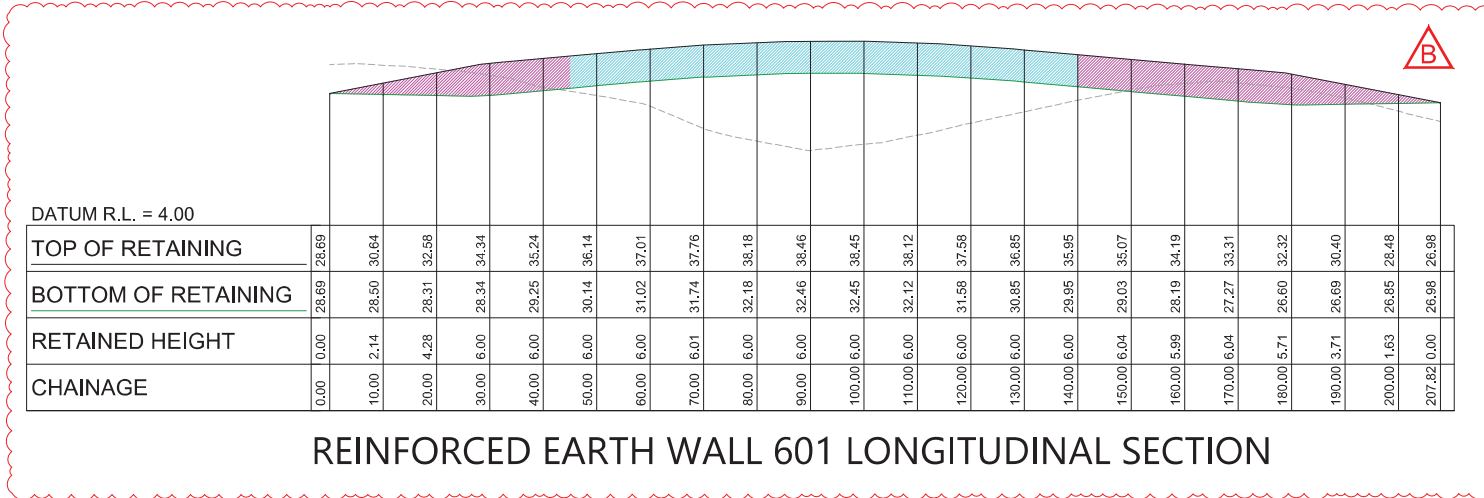
- BATTER DETAIL AS PER RE 601 - DETAIL 1 (REFER TO COFFEY DRAWING AF/001)
- BATTER DETAIL AS PER RE 601 - DETAIL 2 (REFER TO COFFEY DRAWING AF/002)

**REINFORCED EARTH WALL 601 PLAN**

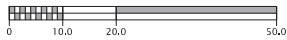
SCALE 1:1000

**NOTES**

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ALL CONCRETE TO BE 17.5MPa 28 DAY CONCRETE STRENGTH.
3. CONTRACTOR IS TO CONFIRM LOCATION AND HEIGHT OF EXISTING SERVICES TO ENGINEER PRIOR TO WORKS COMMENCING.
4. CONTRACTOR TO CONFIRM HEIGHT OF RETAINING WALL PRIOR TO ORDERING OF MATERIALS.
5. WALL SUBSOIL DRAIN TO FEED INTO CESSPITS OR KERB & CHANNEL AS APPROVED BY THE ENGINEER.
6. UNDERFILL DRAINAGE IS TO BE INSTALLED AT THE DIRECTION OF THE ENGINEER. IF THE CONTRACTOR ENCOUNTERS SPRINGS OR OTHER SOURCES OF WATER, THEY ARE TO NOTIFY THE ENGINEER.
7. ALL UNSUITABLE MATERIAL AS DEFINED IN THE SPECIFICATION IS TO BE REMOVED AND THE STRIPPED AREAS INSPECTED BY THE ENGINEER BEFORE COMMENCEMENT.
8. EARTHWORKS ARE NOT TO BE EXTENDED INTO ADJOINING SITES UNLESS THE ENGINEER HAS ISSUED SPECIFIC INSTRUCTIONS.
9. ANY MODIFICATIONS TO THE CONSENTED EROSION AND SEDIMENT CONTROL MEASURES MUST BE APPROVED BY THE ENGINEER PRIOR TO THE CONSTRUCTION.
10. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.
11. THE CONTRACTOR SHALL CLARIFY THE AREAS AND EXTENT OF CLEARING WITH THE ENGINEER BEFORE COMMENCEMENT AND CONFIRM THAT ALL NECESSARY CONSENTS ARE IN PLACE AND ENSURE THAT THEY HAVE A COPY OF THE RESOURCE CONSENT FROM THE ENGINEER.
12. CONTRACTOR TO ENSURE HE HAS ALL APPROVALS FROM LOCAL AUTHORITIES PRIOR TO COMMENCING WORKS.
13. SEDIMENT AND EROSION CONTROL ARE TO BE IN ACCORDANCE WITH GD05 AND ARE TO BE IN PLACE PRIOR TO EARTHWORKS COMMENCING.
14. ALL WORKS ARE TO BE IN ACCORDANCE WITH THE GEOTECHNICAL SPECIFICATION
15. RETAINING WALLS TO BE CLEAR OF BOUNDARIES.



**REINFORCED EARTH WALL 601 LONGITUDINAL SECTION**



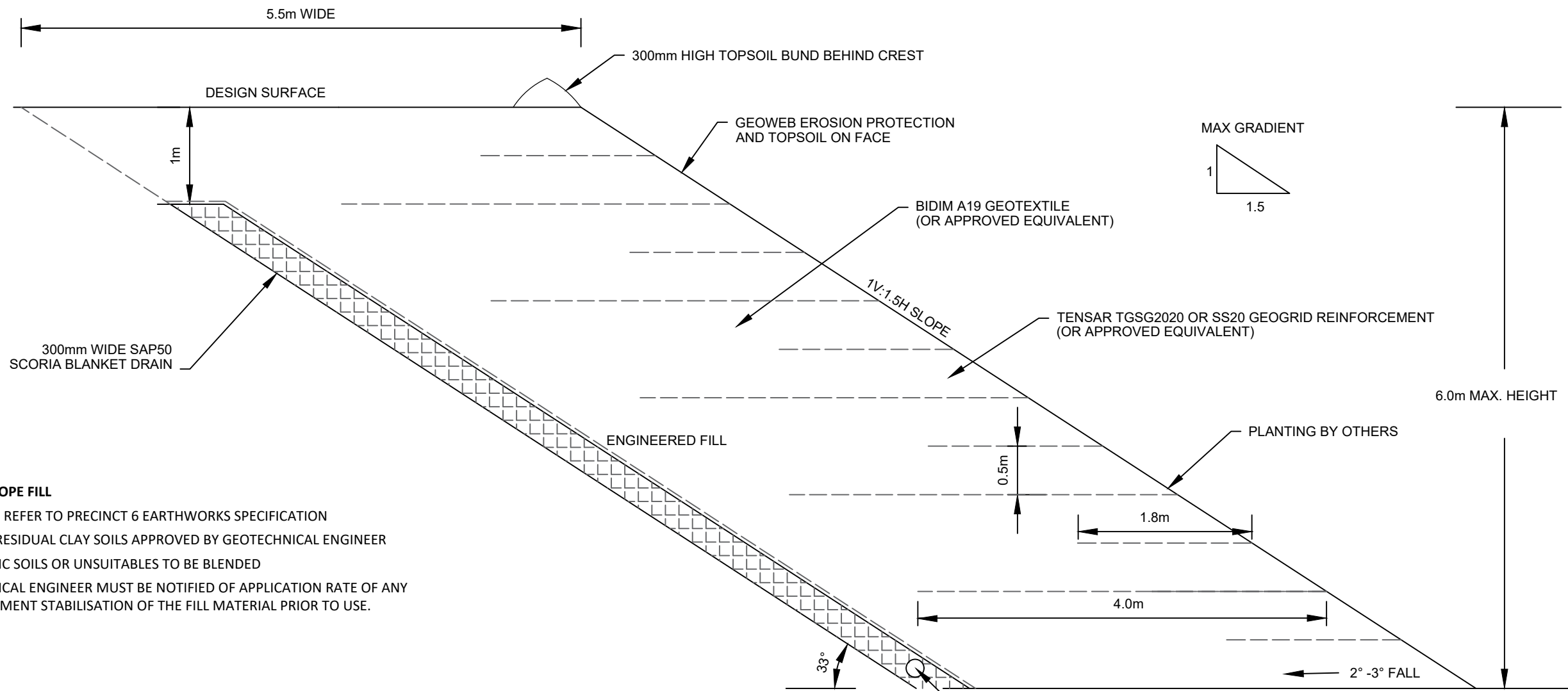
REVISION DETAILS					ARRAN DRIVE OREWA AUCKLAND
INT	DATE	SURVEYED	DESIGNED	NC	
A	ISSUED FOR CONSTRUCTION	NC 16/09/19	DRAWN	NC	WOODS.CO.NZ
B	LONGSECTION UPDATED	NC 26/11/21	CHECKED	RV	
			APPROVED	ME	



MILLWATER - PRECINCT 6  
OREWA WEST  
BULK EARTHWORKS AND GEOTECHNICAL REMEDIATION  
RETAINING WALL PLAN & LONG SECTION



STATUS	ISSUED FOR CONSTRUCTION	REV
SCALE	H 1:1000 @A3 V 1:1000 @A3	B
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37600-03-170-EW	



**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**

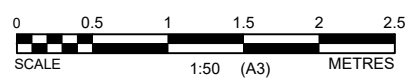
1. DRAINAGE INSTALLATION PRIOR TO BACKFILL;
2. GRID LAYER PLACEMENT;
3. COMPACTION TEST FREQUENCY OF 1 TEST PER METRE;
4. CONNECTION OF DRAINAGE TO PUBLIC STORMWATER NETWORK;
5. PLACEMENT OF TOP SOIL AND GEOWEB.

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

**FOR CONSTRUCTION**

PLOT DATE: 14/06/2022 6:50:40 pm DWG FILE: F:\GEN209 PROJECT\1773-AKLGE PROJECT\1773-AKLGE\DRAWINGS\CAD\1773-AKLGE206639-AF01.DWG - PRECINCT 6\1773-AKLGE PROJECT\1773-AKLGE\DRAWINGS\CAD\1773-AKLGE206639-AF01.DWG

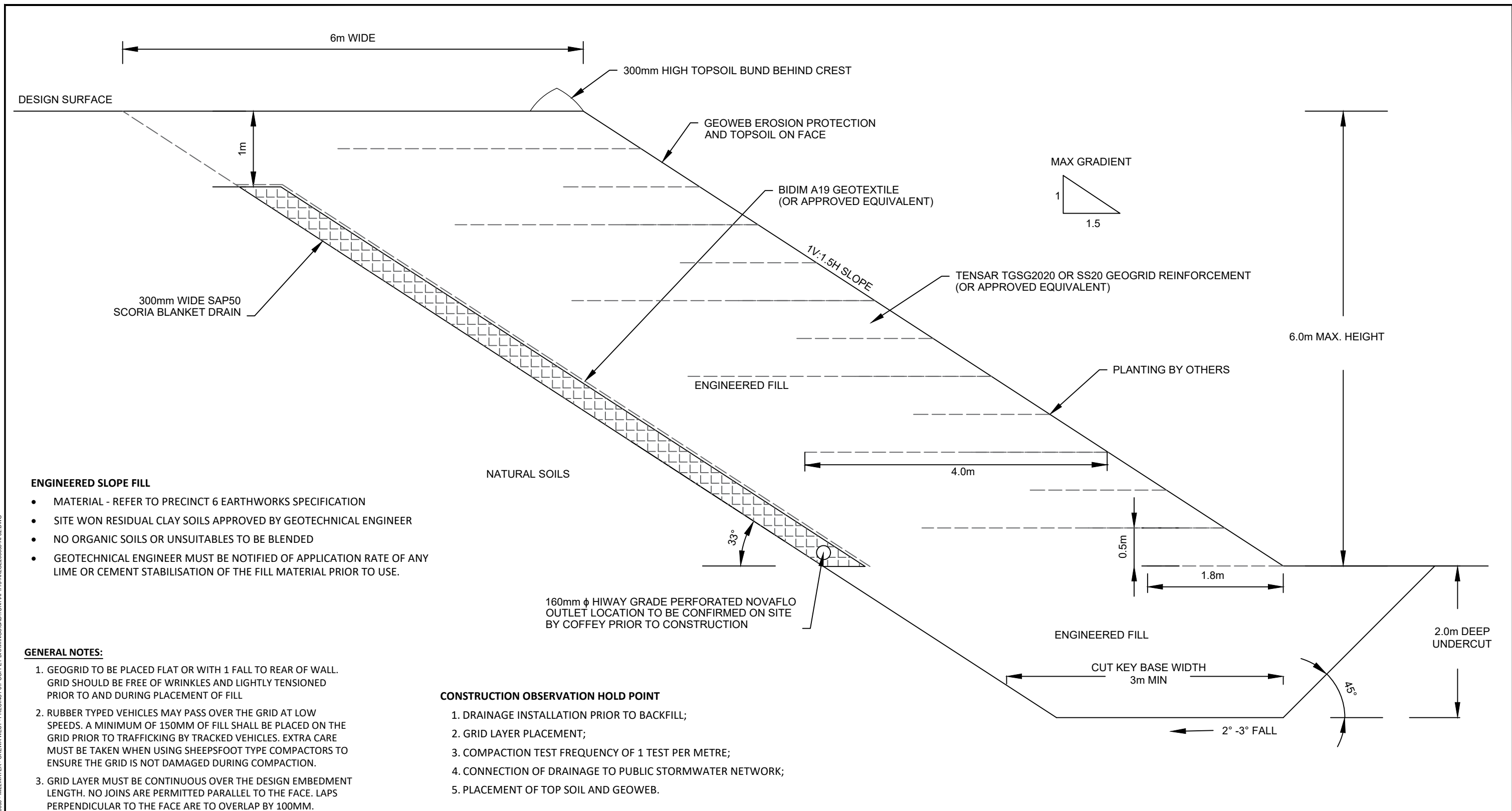
no.	description	drawn	approved	date
A	ORIGINAL ISSUE	RZ	SP	18/07/2019
B	UPDATED AFTER AMENDMENTS TO DESIGN	RZ	AC	26/02/2020
C	FOR CONSTRUCTION	RZ	SP	18/06/2020
D	DESIGN CHANGE	SP	SP	14/06/2022



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



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.

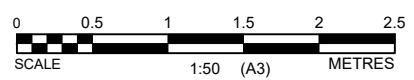
**CONSTRUCTION OBSERVATION HOLD POINT**

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**

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

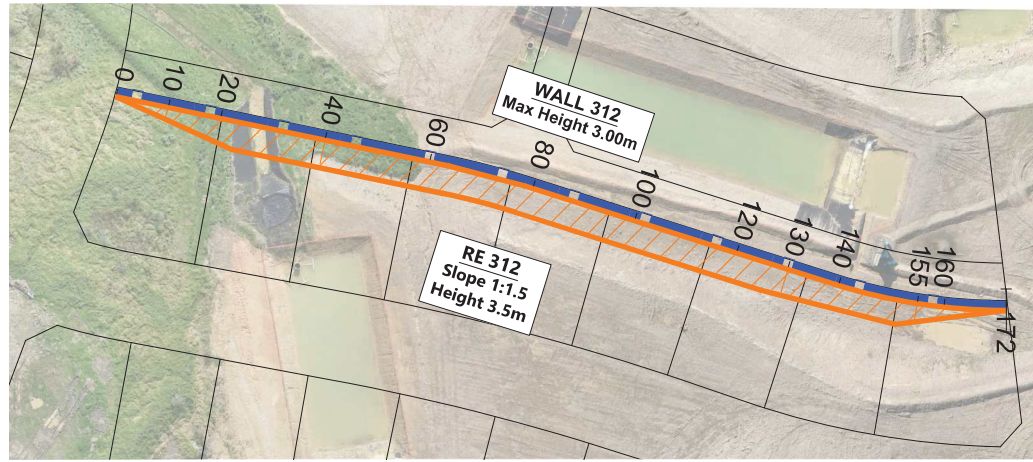


drawn	SP
approved	SP
date	14/06/2022
scale	AS SHOWN
original size	A3



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		

PLOT DATE: 14/06/2022 5:12:29 pm DWG FILE: FUGENZ09 PROJECTS173-AKLGE PROJECTS173-AKLGE206639 - MILLWATER - OREWA WEST - PRECINCT 6 BY COFFEY DRAWINGS\CAD\TO\NY\AF173-AKLGE206639-AR02.DWG



**MASS BLOCK RETAINING WALL 312 PLAN**  
SCALE 1:1000

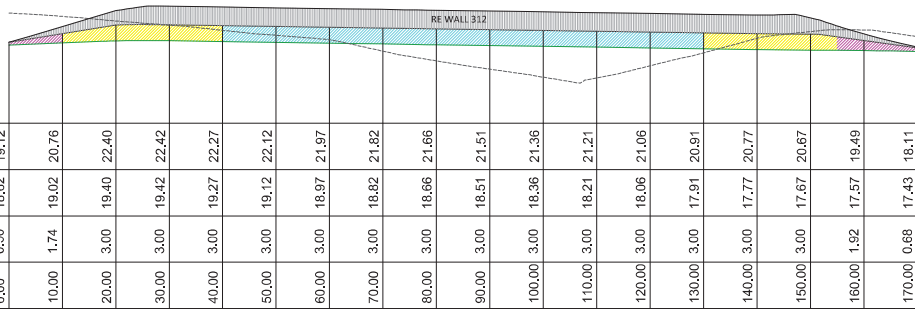
**LEGEND**

- TOP OF RETAINING WALL
- BOTTOM OF RETAINING WALL
- EXISTING GROUND LEVEL

- WALL DESIGN AS PER WALL 312 - DETAIL 1 (REFER TO COFFEY DRAWING AL/005)
- WALL DESIGN AS PER WALL 312 - DETAIL 2 (REFER TO COFFEY DRAWING AL/005)
- WALL DESIGN AS PER WALL 312 - DETAIL 3 (REFER TO COFFEY DRAWING AL/005)

**NOTES**

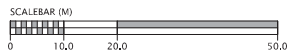
1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ALL CONCRETE TO BE 17.5MPa 28 DAY CONCRETE STRENGTH.
3. CONTRACTOR IS TO CONFIRM LOCATION AND HEIGHT OF EXISTING SERVICES TO ENGINEER PRIOR TO WORKS COMMENCING.
4. CONTRACTOR TO CONFIRM HEIGHT OF RETAINING WALL PRIOR TO ORDERING OF MATERIALS.
5. WALL SUBSOIL DRAIN TO FEED INTO CESSPIPS OR KERB & CHANNEL AS APPROVED BY THE ENGINEER.
6. UNDERFILL DRAINAGE IS TO BE INSTALLED AT THE DIRECTION OF THE ENGINEER. IF THE CONTRACTOR ENCOUNTERS SPRINGS OR OTHER SOURCES OF WATER, THEY ARE TO NOTIFY THE ENGINEER.
7. ALL UNSUITABLE MATERIAL AS DEFINED IN THE SPECIFICATION IS TO BE REMOVED AND THE STRIPPED AREAS INSPECTED BY THE ENGINEER BEFORE COMMENCEMENT.
8. EARTHWORKS ARE NOT TO BE EXTENDED INTO ADJOINING SITES UNLESS THE ENGINEER HAS ISSUED SPECIFIC INSTRUCTIONS.
9. ANY MODIFICATIONS TO THE CONSENTED EROSION AND SEDIMENT CONTROL MEASURES MUST BE APPROVED BY THE ENGINEER PRIOR TO THE CONSTRUCTION.
10. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.
11. THE CONTRACTOR SHALL CLARIFY THE AREAS AND EXTENT OF CLEARING WITH THE ENGINEER BEFORE COMMENCEMENT AND CONFIRM THAT ALL NECESSARY CONSENTS ARE IN PLACE AND ENSURE THAT THEY HAVE A COPY OF THE RESOURCE CONSENT FROM THE ENGINEER.
12. CONTRACTOR TO ENSURE HE HAS ALL APPROVALS FROM LOCAL AUTHORITIES PRIOR TO COMMENCING WORKS.
13. SEDIMENT AND EROSION CONTROL ARE TO BE IN ACCORDANCE WITH GDOS AND ARE TO BE IN PLACE PRIOR TO EARTHWORKS COMMENCING.
14. ALL WORKS ARE TO BE IN ACCORDANCE WITH THE GEOTECHNICAL SPECIFICATION
15. RETAINING WALLS TO BE CLEAR OF BOUNDARIES.



DATUM R.L. = 4.00

TOP OF RETAINING	19.12	20.76	22.40	22.42	22.27	22.12	21.97	21.82	21.66	21.51	21.36	21.21	21.06	20.91	20.77	20.67	19.49	18.11	17.90
BOTTOM OF RETAINING	18.62	19.02	19.40	19.42	19.27	19.12	18.97	18.82	18.66	18.51	18.36	18.21	18.06	17.91	17.77	17.67	17.57	17.43	17.40
RETAINED HEIGHT	0.50	1.74	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	1.92	0.68	0.50
CHAINAGE	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	110.00	120.00	130.00	140.00	150.00	160.00	170.00	171.57

**RETAINING WALL 312 LONGITUDINAL SECTION**



REVISION DETAILS	INT	DATE	SURVEYED	
A ISSUED FOR CONSTRUCTION	NC	16/09/19	DESIGNED	NC
B DESIGN UPDATED	NC	09/07/21	DRAWN	NC
C HATCHING ADDED	NC	26/11/21	CHECKED	RV
			APPROVED	MR

ARRAN DRIVE  
OREWA  
AUCKLAND



WOODS.CO.NZ

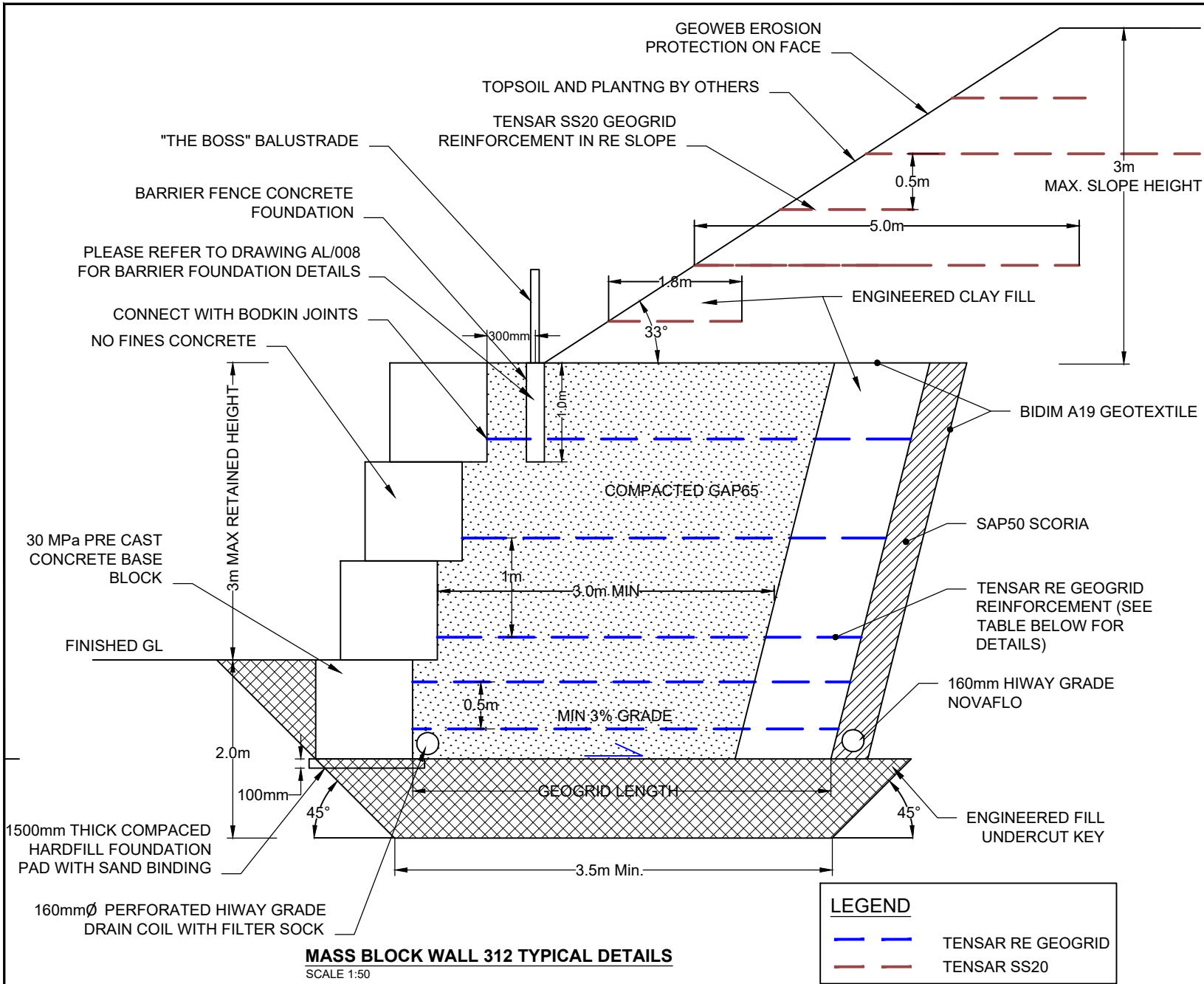
MILLWATER - PRECINCT 6  
OREWA WEST  
BULK EARTHWORKS AND GEOTECHNICAL REMEDIATION  
RETAINING WALL PLAN & LONG SECTION



STATUS	ISSUED FOR CONSTRUCTION	REV
SCALE	H 1:1000 @A3 V 1:1000 @A3	C
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37600-03-158-EW	



PLOT DATE: 18/06/2020 3:43:17 PM DWG FILE: \\NTS\08\952\3808\GEN219\PROJECTS\734\ALGE\PROJECTS\206639 - MILLWATER - OREWA WEST - PRECINCT 6\COFFEY DRAWINGS\CAD\TYPICAL\734-ALGE206639-AL.DWG



**MASS BLOCK WALL 312 TYPICAL DETAILS**  
SCALE 1:50

**LEGEND**

— — — TENSAR RE GEOGRID  
- - - TENSAR SS20

**CONSTRUCTION NOTES:**  
THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE COFFEY DESIGN REPORT FOR REFERENCES AND SPECIFICATIONS AKLGE206639-AL AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.

**FOUNDATION MATERIAL**  
FOUNDATION MATERIAL IS REQUIRED TO HAVE A MINIMUM GEOTECHNICAL ULTIMATE BEARING CAPACITY OF 300KPA OTHERWISE AN UNDERCUT OF UP TO 1.0M DEEP IS REQUIRED, TO BE BACKFILLED WITH COMPACTED GAP65 HARDFILL.

**EXCAVATION**  
WITH ANY EXCAVATION THERE IS A RISK OF BATTER COLLAPSE ESPECIALLY ADJACENT TO BOUNDARIES, STRUCTURES AND SERVICES. THE CONTRACTOR IS RESPONSIBLE AT ALL TIMES FOR ENSURING THE TEMPORARY STABILITY OF THE WORKS. CUT BATTERS SHOULD NOT BE LEFT UNSUPPORTED FOR MORE THAN A FEW DAYS AND NEVER DURING HEAVY RAIN. WHERE BATTERS ARE EXPOSED FOR MORE THAN A FEW DAYS, POLYETHENE SHEETING SHOULD BE INSTALLED TO COVER THE EXPOSED CUT FACE, THIS POLYETHENE MUST BE REMOVED PRIOR TO BACKFILLING.

**UNFORSEEN GROUND CONDITIONS**  
THE CONTRACTOR SHALL REFER TO THE DESIGN ENGINEER AS SOON AS POSSIBLE FOR FURTHER INSTRUCTION SHOULD ANY UNFORSEEN CIRCUMSTANCES OR ABNORMAL SITE CONDITIONS BE ENCOUNTERED DURING CONSTRUCTION.

**GEOGRID & BACKFILL MATERIAL**

- THE GEOGRID PRODUCT MUST MATCH THAT SPECIFIED IN THE RECENT GEOTECHNICAL DESIGN REPORT AND DESIGN DRAWINGS. ALTERNATIVE PRODUCTS SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY THE DESIGN ENGINEER. GEOGRID HANDLING, TENSIONING, SECURING, AND PLACEMENT MUST BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND SPECIFICATIONS. IN PARTICULAR, THE CORRECT ORIENTATION OF UNIAXIAL TYPE GRIDS IS CRITICAL.
- GEOGRID SPECIFICATIONS ARE SHOWN IN THE SEGMENTAL BLOCK WALL TABLE BELOW. BACKFILL TO BE GAP65 AND GAP20 FOR WALL ROCK OR SIMILAR APPROVED.
- BACKFILL MATERIAL SHOULD BE PLACED AND COMPACTED IN LAYERS TO 95% OF THE MAXIMUM DRY DENSITY (MDD), AND IN ACCORDANCE WITH THE COFFEY GEOTECHNICAL WORKS SPECIFICATION CONTAINED WITH THE REPORT REFERENCED ABOVE.
- GEOGRID TO BE PLACED LEVEL OR WITH A 1% FALL TO REAR OF THE WALL. GRID SHOULD BE FREE OF WRINKLES AND LIGHTLY TENSIONED/PULLED TAUT PRIOR TO AND DURING BACKFILLING.
- CONTRACTOR TO ENSURE GRIDS ARE ORIENTATED CORRECTLY. GRIDS SHOULD BE ROLLED OUT PERPENDICULAR TO THE WALL.
- GRID LAYERS ARE TO BE CONTINUOUS OVER THE DESIGN REINFORCEMENT DEPTH. NO JOINTS ARE PERMITTED PARALLEL TO THE FACE.
- UPPER GEOGRID LAYER TO INCLUDE LOCAL CUT TO ALLOW FOR SPIRAL TUBE FOR THE BARRIER POST. SPIRAL TUBE TO BE PLACED PRIOR TO BACKFILLING. EXCAVATION INTO THE SEGMENTAL BLOCK WALL BACKFILL TO RETROFIT THE SPIRAL TUBE IS NOT ACCEPTABLE.
- THE GEOGRID LAYER EXTENTS AND POSITION ARE TO BE SURVEYED. AS BUILT DATA SHOULD BE SUPPLIED TO COFFEY UPON WALL COMPLETION FOR COA.

**DRAINAGE**  
CONTRACTOR SHOULD ENSURE WALL OUTLET DRAINAGE IS MAINTAINED DURING CONSTRUCTION AND ABLE TO DISCHARGE FLOWS DURING CONSTRUCTION WORKS. UNDER NO CIRCUMSTANCES SHOULD DRAINAGE OUTLETS BE COVERED/BLOCKED DURING CONSTRUCTION. ALL DRAINAGE OUTLETS SHOULD BE CONNECTED TO THE DEVELOPMENT RETICULATED STORMWATER SYSTEMS (OR ENGINEER APPROVED STRUCTURE) UPON COMPLETION OF THE WALL. CONNECTION TO THE RETICULATION SHOULD BE OBSERVED BY THE GEOTECHNICAL ENGINEER PRIOR TO BACKFILL/COMPLETION.

**SETTING OUT**  
THE CONTRACTOR IS RESPONSIBLE FOR MAKING SURE THE RETAINING WALL IS SET OUT AT THE CORRECT LOCATION AND THAT THE MAXIMUM RETAINED HEIGHTS, TOE SLOPE ANGLES (BELOW THE WALL) AND SLOPE SURCHARGE ANGLES (ABOVE THE WALL) ARE IN ACCORDANCE WITH THOSE SHOWN ON THE DESIGN CALCULATIONS AND DRAWINGS. THE RETAINED HEIGHT SHALL BE MEASURED FROM THE FINISHED GROUND SURFACE IN FRONT OF THE WALL TO THE FINISHED GROUND SURFACE IMMEDIATELY BEHIND THE WALL. THE MAXIMUM RETAINED HEIGHT, SLOPE SURCHARGE AND TOE SLOPE SHALL BE AS SPECIFIED ON THE COFFEY SERVICES (NZ) LIMITED DRAWINGS AND MUST NOT BE EXCEEDED WITHOUT THE WRITTEN APPROVAL OF THE COFFEY DESIGN ENGINEER.

**BARRIER / FALL PREVENTION AND BARRIER POST FOUNDATION**  
WALLS OVER 1.0 METRE IN HEIGHT SHALL HAVE A HANDRAIL / FALL PREVENTION IN ACCORDANCE WITH THE NEW ZEALAND BUILDING CODE CLAUSE F4. BARRIER POST FOUNDATION TO BE EITHER MOWING STRIP DESIGNED BY OTHERS OR 400Ø BY 1.0M DEEP SPIRAL TUBE.

**WASTE MATERIAL**  
ALL WASTE MATERIALS MUST BE REMOVED FROM SITE ON COMPLETION OF THE WORKS. IT IS NOT ACCEPTABLE TO PLACE THESE MATERIALS BEHIND THE WALL WITHIN THE BACKFILL MATERIAL.

**MASS BLOCK RETAINING WALL INSPECTION**  
INSPECTION OF ALL ASPECTS OF MASS BLOCK RETAINING WALL ARE REQUIRED BY 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 INSPECTION AT THE FOLLOWING HOLD POINTS:

- MASS BLOCK WALL FOUNDATION EXCAVATIONS, STRENGTH AND BENCHING;
- FOUNDATION HARDFILL PLACEMENT (FOOTING AND SERVICE CROSSING);
- DRAINAGE AND GEOTEXTILE PLACED AT REAR OF WALL;
- HARDFILL, GEOGRID PLACEMENT AND COMPACTION TESTING;
- DRAINAGE OUTLET CONSTRUCTION;
- BARRIER POST FOUNDATION (SPIRAL SLEEVES), AND;
- REINFORCING BAR AND CONCRETE PLACEMENT FOR TOP THREE BLOCK COURSES.

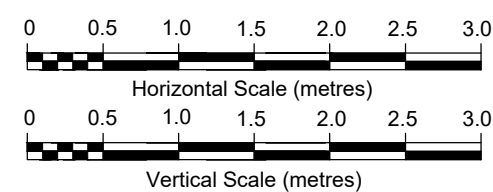
**REINFORCED EARTH SLOPES**


- FILL MATERIAL, GENERAL NOTES AND CONSTRUCTION OBSERVATION HOLD POINTS AS DETAILED IN FIGURES 01-03 IN COFFEY GEOTECHNICAL DESIGN REPORT FOR RE SLOPES REFERENCE 773-AKLGE206639-AL

**FOR CONSTRUCTION**

Chainage Interval (m)	Wall Detail #	Max Retained Height (m)	Total Wall Height Including Embedment (m) (Max.)	Max Surcharge Slope		Max Toe Slope Angle	Geogrid			Type	Additional Notes
				Angle (°)	Height (m)		Length	No. of Reinforcement layers (Max.)	Vertical Spacing of Geogrid layers (m)		
0 - 10 & 155-172	1	2.0	3.0	33	2.0	1 in 10	3.90	3	1.0	RE570	2m Deep Undercut Key at Toe
10 - 40 & 130-155	2	3.0	4.0	33	3.0	1 in 10	5.50	5	0.5/1.0	RE580	2m Deep Undercut Key at Toe
40 - 130	3	3.0	4.0	33	3.0	1 in 10	5.50	5	0.5/1.0	RE580	No Undercut Key Required

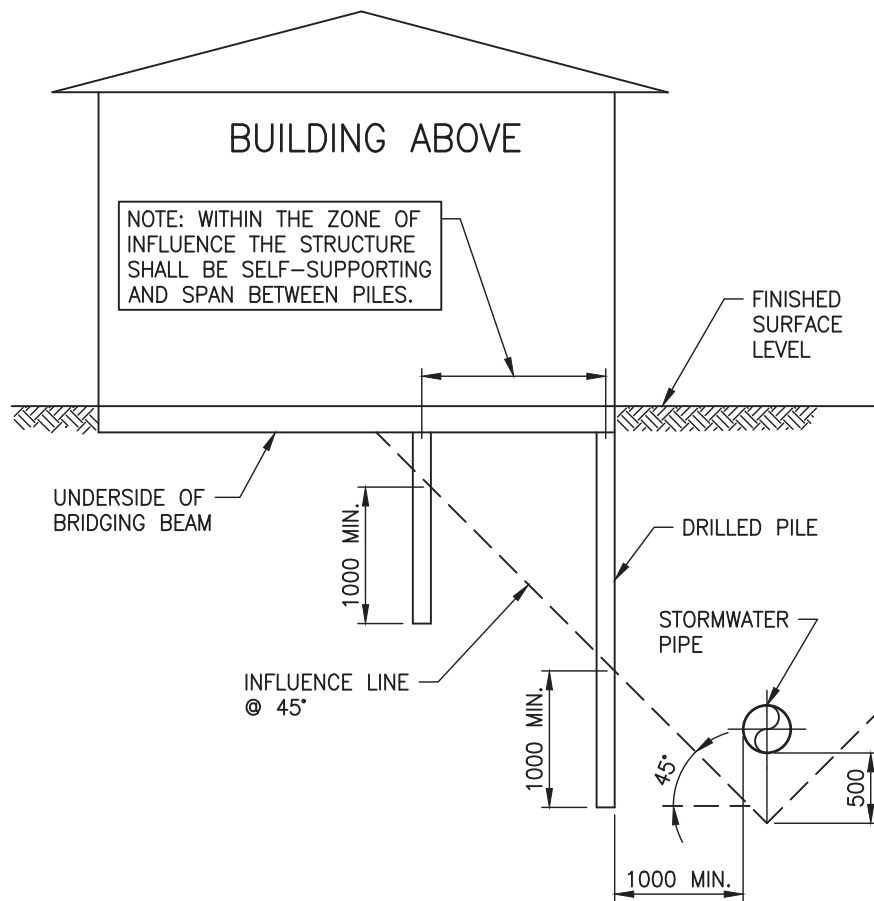
no.	description	drawn	approved	date
A	ORIGINAL ISSUE	RZ	AC	27/11/2019
B	UPDATE AFTER AMENDMENTS TO DESIGN	RZ	AC	26/02/2020
C	DRAINAGE DETAIL ADDED	RZ	AC	21/05/2020
D	WITH BARRIER DETAIL	RZ	SP	18/06/2020



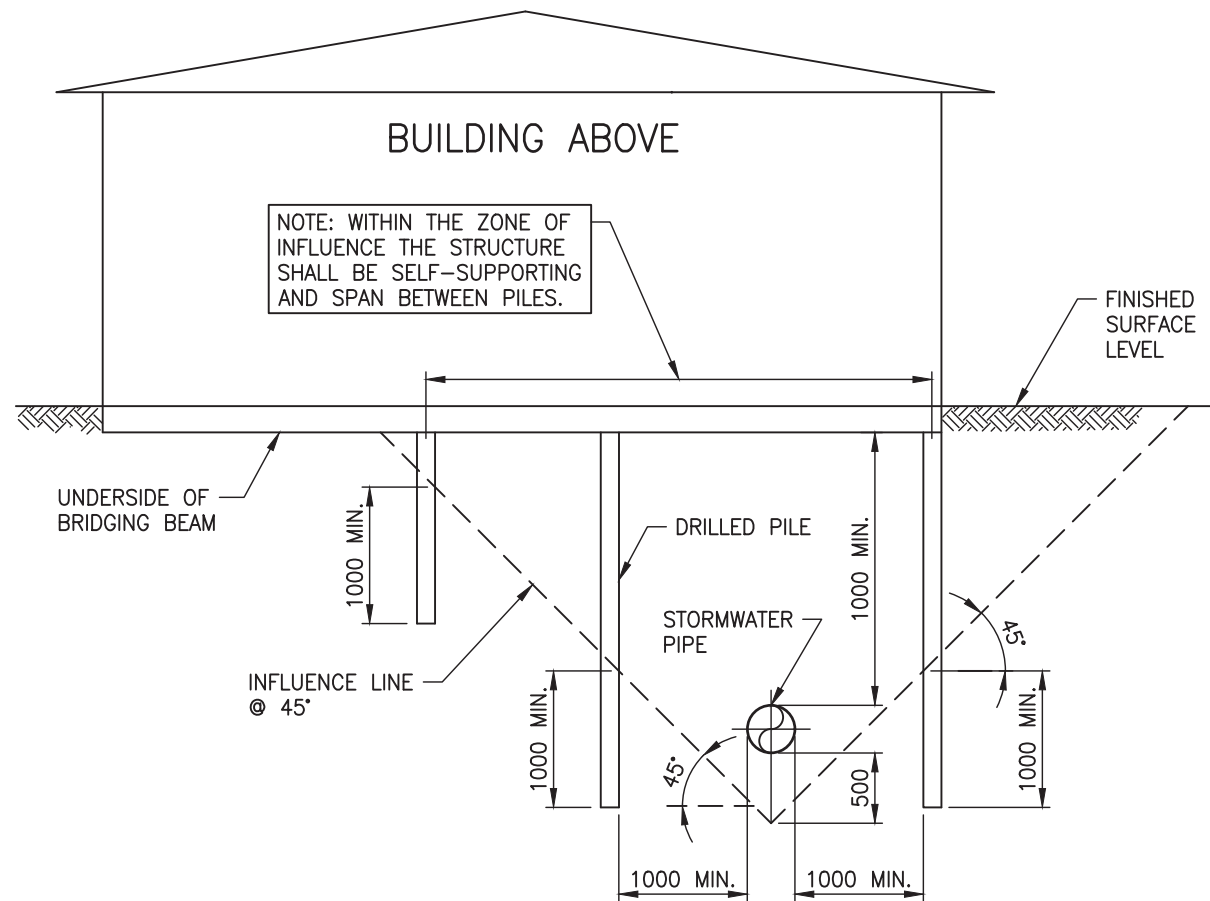
drawn	RZ	 A TETRA TECH COMPANY	client:	WFH PROPERTIES LTD	
approved	AC		project:	MILLWATER - OREWA WEST - PRECINCT 6	
date	18/06/2020		title:	WALL 312 / RE SLOPE 312 DESIGN DETAIL	
scale	NTS		project no:	773-AKLGE206639	figure no:
original size	A3			rev:	D



PLOT DATE 15/12/2021 9:09 am \\vokic.govt.nz\Shared\COO\ES\ETS\2. DTG\5. Standards\1. Codes of Practice\Chapter 4 - SWCoP\7. SWCoP v3.0\Drawings SWCoP V3\SWCoP Drawings - 20180612\AC-STD-SW22.dwg



**BUILD CLOSE**



**BUILD OVER**

**GENERAL NOTES:**

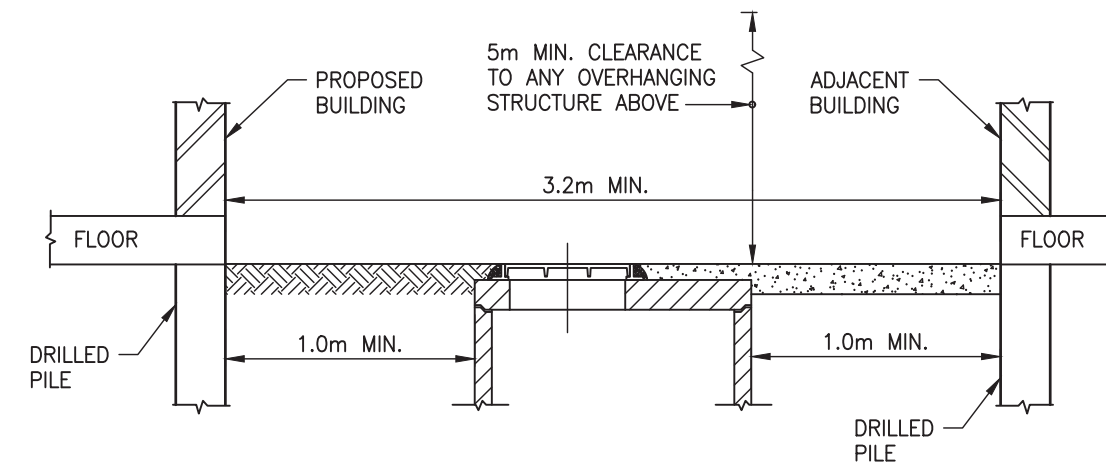
1. THE INFORMATION ON THIS PAGE IS INTENDED TO SHOW EXAMPLES OF TYPICAL SCENARIOS AND SHALL BE USED FOR GENERAL GUIDANCE PURPOSES ONLY. SIGNIFICANT VARIATIONS ON A SITE-BY-SITE BASIS ARE TO BE EXPECTED AND IT IS IN NO WAY IMPLIED THAT MEETING ANY OF THESE REQUIREMENTS WILL GUARANTEE APPROVAL.
2. WHERE 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.

**'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.

**'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.



**MANHOLE CONSTRUCTION CLEARANCE**


**AUCKLAND COUNCIL**

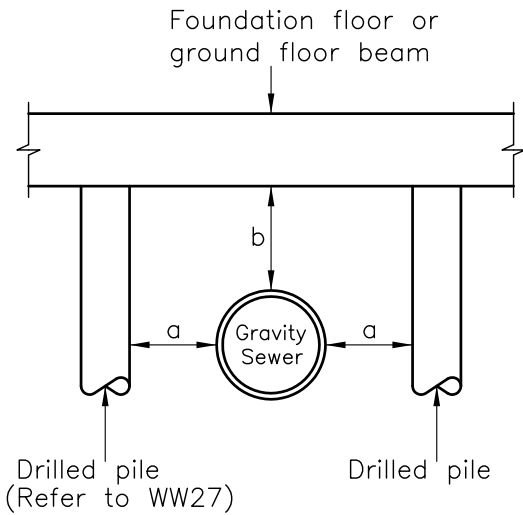
**STORMWATER PIPE AND MANHOLE CONSTRUCTION CLEARANCE REQUIREMENTS  
MANHOLES NEAR WORKS AND WORKS CLOSE TO, OR OVER, PIPES**

STORMWATER CODE OF PRACTICE  
STANDARD DETAILS

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

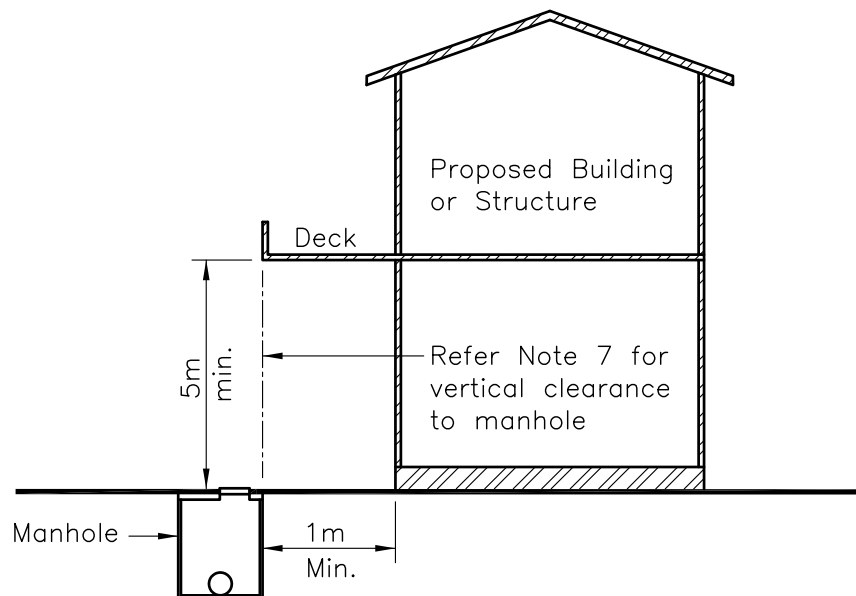
ENVIRONMENTAL-SW ORIGINAL SCALE A3  
SCALE: N.T.S.

	DRAWING SET	SHEET
	SWCoP	1 OF 1
DRAWING No.	REV	
SW22	3	



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.

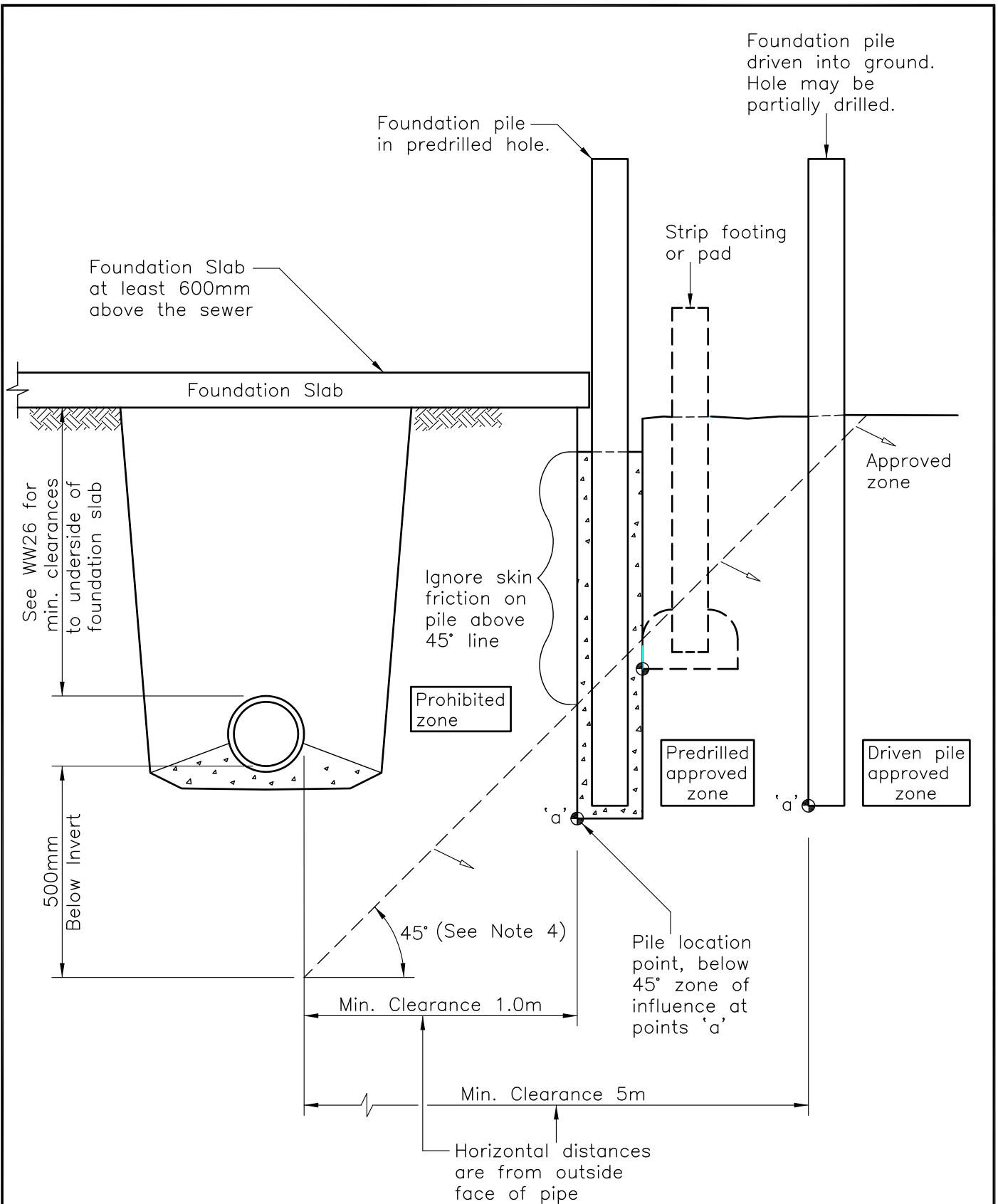
O:\---\EGCADFI \ 2017 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.044D .DWG



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**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.

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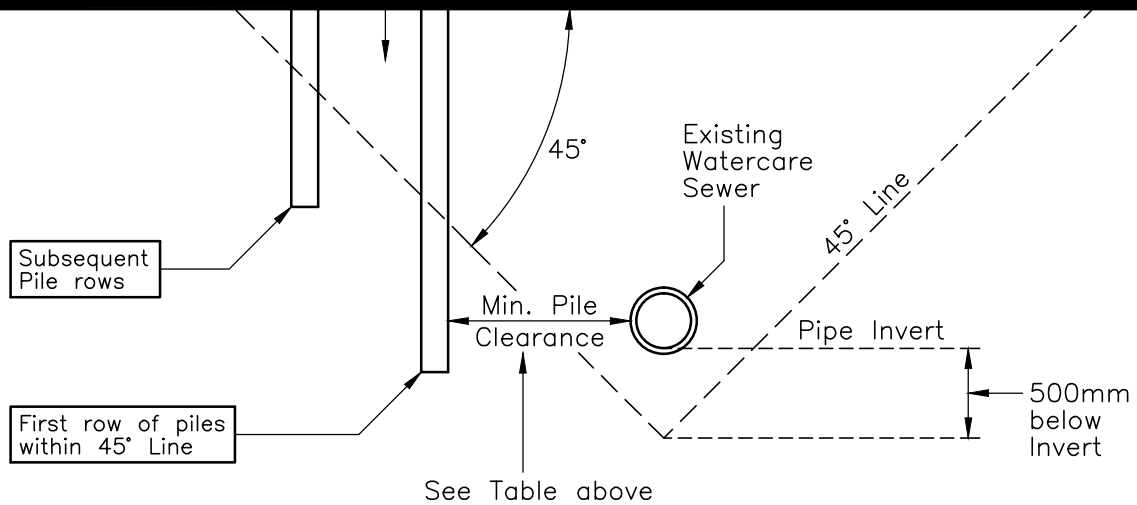
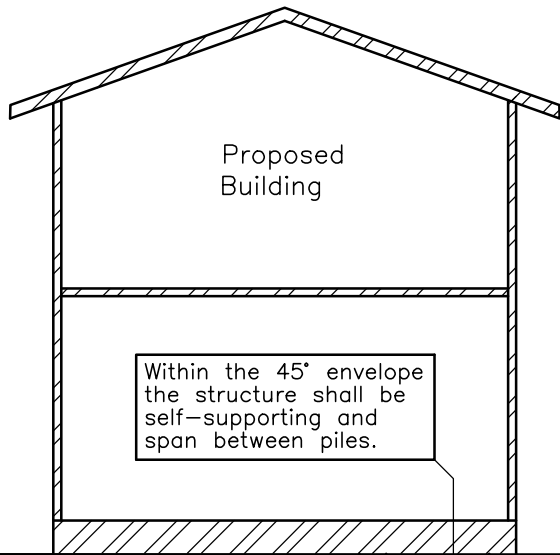
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**BUILDING CLOSE TO OR OVER LOCAL NETWORK WASTEWATER**

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° envelope, 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



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## GUIDELINE FOR BUILDING CLOSE TO OR OVER TRANSMISSION WASTEWATER

SCALE:	N.T.S.
ISSUE DATE:	13-07-2018
DWG No.	2010070.051C
REFERENCE No.	<b>WW 28</b>

## APPENDIX C: CLASSIFICATION TESTS

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## Shrink Swell Index Report

**Report No: SSI:ETAM23S-00553**

**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.}



*James McKelvey*

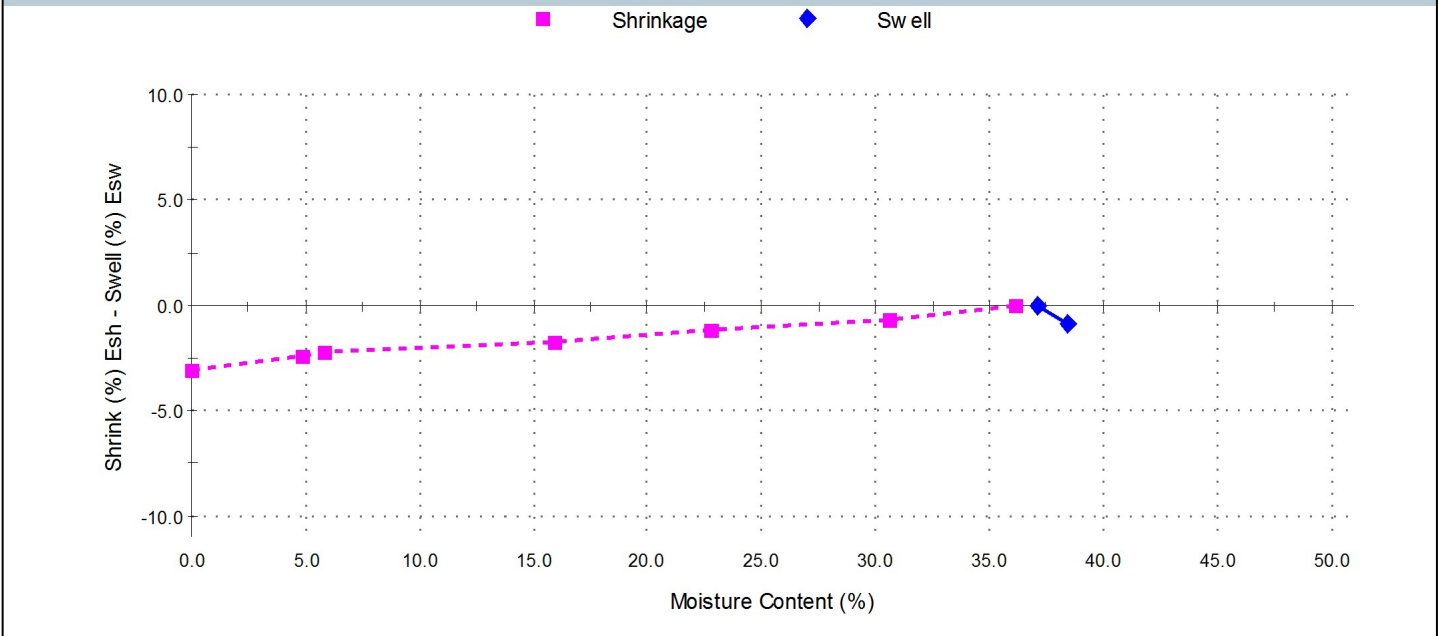
Approved Signatory: James McKelvey  
(Senior Technician)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 23/02/2023

### Sample Details

<b>Sample ID:</b>	ETAM23S-00553	<b>Sampling Method:</b>	Unknown (Not IANZ Endorsed)
<b>Date Sampled:</b>	9/02/2023	<b>Material:</b>	Undisturbed Soil
<b>Date Submitted:</b>	10/02/2023	<b>Source:</b>	Unknown (Sampled by Client)
<b>Date Tested:</b>	14/02/2023		
<b>Project Location:</b>	117 Kowhai Road, Orewa		
<b>Sample Location:</b>	PT04, 0.0 - 0.3 m		
<b>Borehole Number:</b>	PT04		
<b>Borehole Depth (m):</b>	0.0 - 0.3		

Swell Test		AS 1289.7.1.1	Shrink Test		AS 1289.7.1.1
<b>Swell on Saturation (%):</b>	-0.9		<b>Shrink on drying (%):</b>	3.1	
<b>Moisture Content before (%):</b>	37.1		<b>Shrinkage Moisture Content (%):</b>	36.2	
<b>Moisture Content after (%):</b>	38.5		<b>Est. inert material (%):</b>	1%	
<b>Est. Unc. Comp. Strength before (kPa):</b>	100		<b>Crumbling during shrinkage:</b>	2.5%	
<b>Est. Unc. Comp. Strength after (kPa):</b>	150		<b>Cracking during shrinkage:</b>	3%	

### Shrink Swell



**Shrink Swell Index - Iss (%): 1.7**

### Comments

# Not accredited  
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.  
Work Order No : ETAM23W00157  
Tested By: JM


## Shrink Swell Index Report

**Report No: SSI:ETAM23S-00554**

**Issue No: 1**

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

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.}



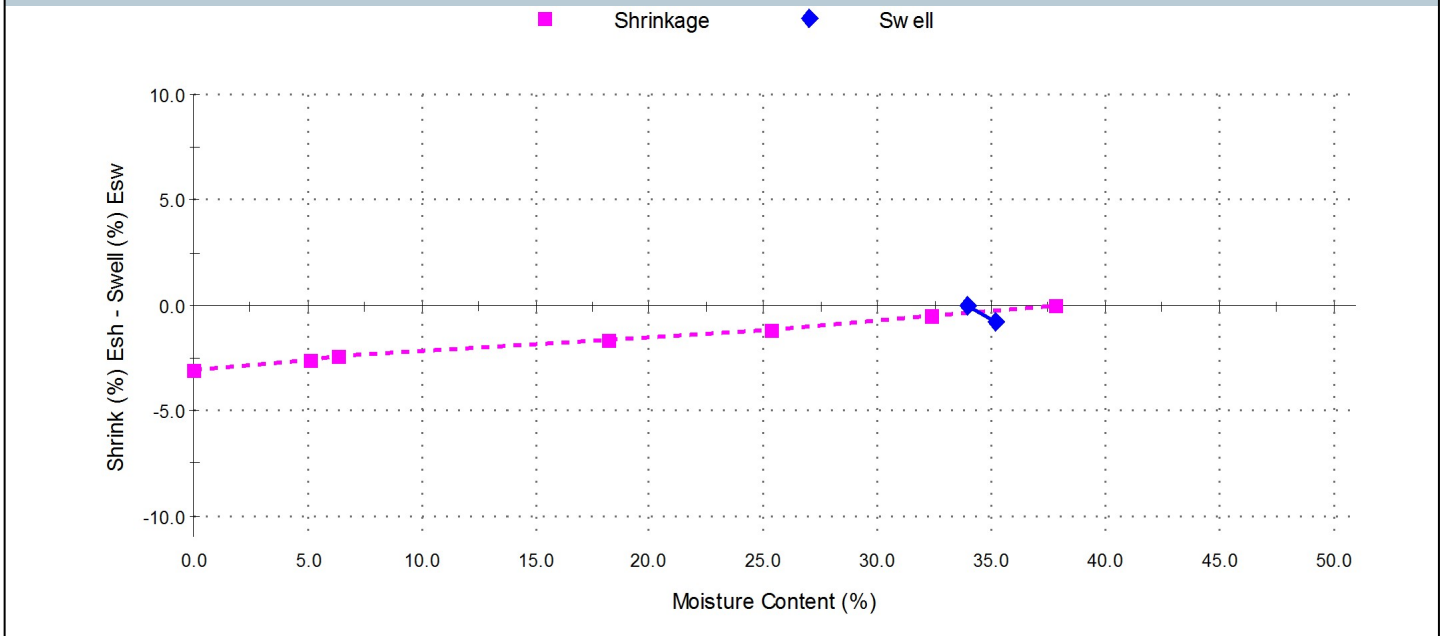
*James McKelvey*  
Approved Signatory: James McKelvey  
(Senior Technician)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 23/02/2023

### Sample Details

<b>Sample ID:</b>	ETAM23S-00554	<b>Sampling Method:</b>	Unknown (Not IANZ Endorsed)
<b>Date Sampled:</b>	9/02/2023	<b>Material:</b>	Undisturbed Soil
<b>Date Submitted:</b>	10/02/2023	<b>Source:</b>	Unknown (Sampled by Client)
<b>Date Tested:</b>	14/02/2023		
<b>Project Location:</b>	117 Kowhai Road, Orewa		
<b>Sample Location:</b>	PT05, 0.0 - 0.3 m		
<b>Borehole Number:</b>	PT05		
<b>Borehole Depth (m):</b>	0.0 - 0.3		

Swell Test		AS 1289.7.1.1	Shrink Test		AS 1289.7.1.1
<b>Swell on Saturation (%):</b>	-0.8		<b>Shrink on drying (%):</b>	3.1	
<b>Moisture Content before (%):</b>	33.9		<b>Shrinkage Moisture Content (%):</b>	37.8	
<b>Moisture Content after (%):</b>	35.1		<b>Est. inert material (%):</b>	1%	
<b>Est. Unc. Comp. Strength before (kPa):</b>	100		<b>Crumbling during shrinkage:</b>	0.5%	
<b>Est. Unc. Comp. Strength after (kPa):</b>	200		<b>Cracking during shrinkage:</b>	2%	

### Shrink Swell



**Shrink Swell Index - Iss (%): 1.7**

### Comments

# Not accredited  
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.  
Work Order No : ETAM23W00157  
Tested By: JM



## Shrink Swell Index Report

**Report No: SSI:ETAM23S-00555**

**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.}



*James McKelvey*

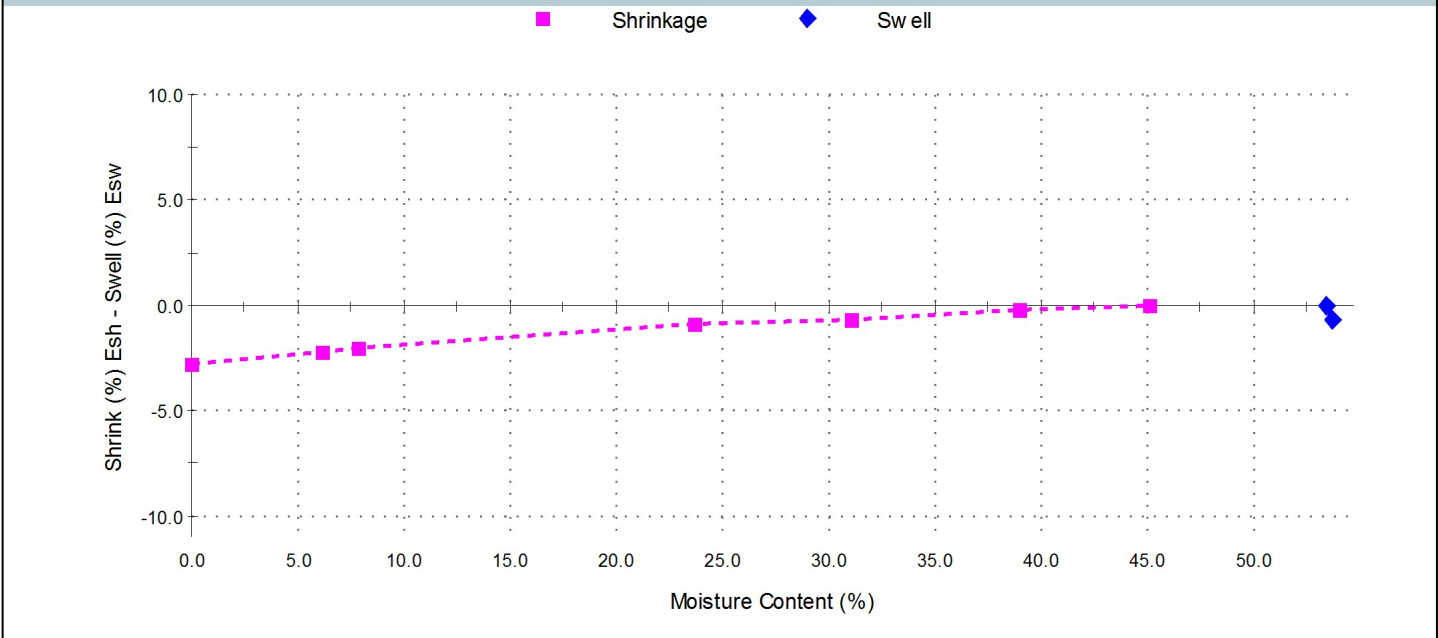
Approved Signatory: James McKelvey  
(Senior Technician)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 23/02/2023

### Sample Details

<b>Sample ID:</b>	ETAM23S-00555	<b>Sampling Method:</b>	Unknown (Not IANZ Endorsed)
<b>Date Sampled:</b>	9/02/2023	<b>Material:</b>	Undisturbed Soil
<b>Date Submitted:</b>	10/02/2023	<b>Source:</b>	Unknown (Sampled by Client)
<b>Date Tested:</b>	14/02/2023		
<b>Project Location:</b>	117 Kowhai Road, Orewa		
<b>Sample Location:</b>	PT06, 0.0 - 0.3 m		
<b>Borehole Number:</b>	PT06		
<b>Borehole Depth (m):</b>	0.0 - 0.3		

Swell Test		AS 1289.7.1.1	Shrink Test		AS 1289.7.1.1
<b>Swell on Saturation (%):</b>	-0.7		<b>Shrink on drying (%):</b>	2.8	
<b>Moisture Content before (%):</b>	53.4		<b>Shrinkage Moisture Content (%):</b>	45.1	
<b>Moisture Content after (%):</b>	53.7		<b>Est. inert material (%):</b>	1%	
<b>Est. Unc. Comp. Strength before (kPa):</b>	100		<b>Crumbling during shrinkage:</b>	1%	
<b>Est. Unc. Comp. Strength after (kPa):</b>	75		<b>Cracking during shrinkage:</b>	4%	

### 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 : ETAM23W00157  
Tested By: JM

## Shrink Swell Index Report

**Report No: SSI:ETAM23S-06219**

**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.}



*James McKelvey*

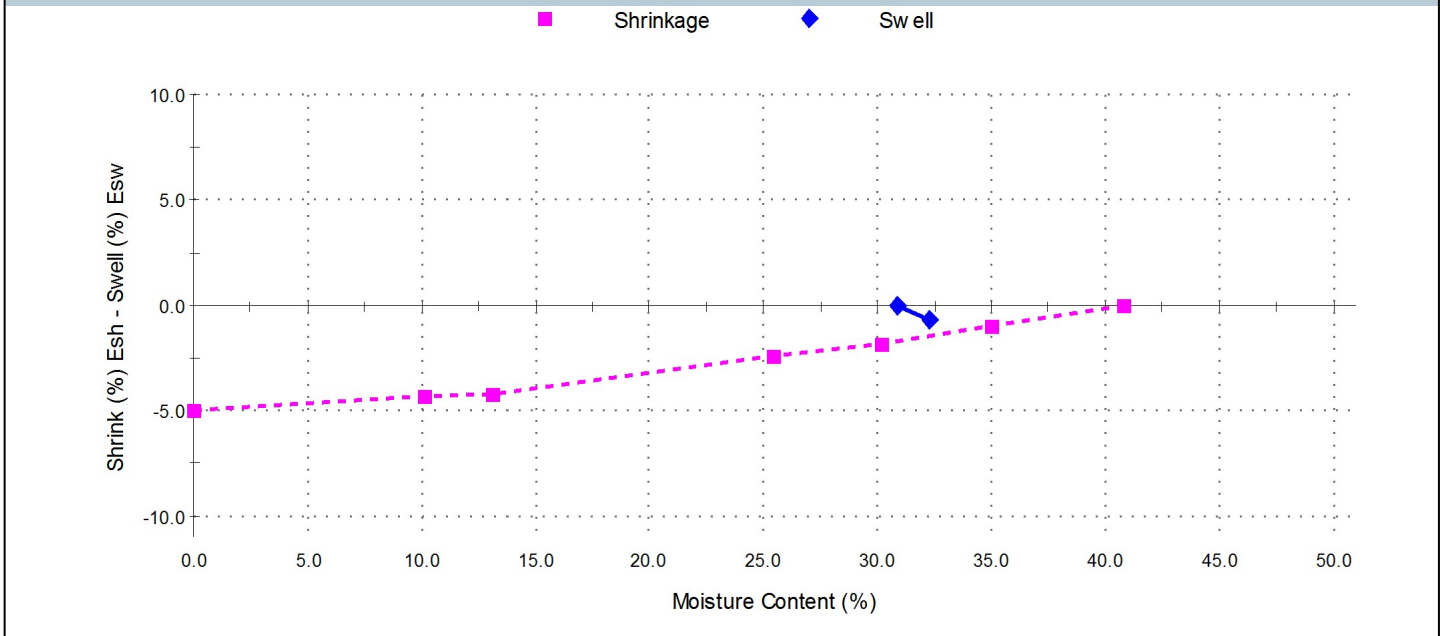
Approved Signatory: James McKelvey  
(Senior Technician)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 31/08/2023

### Sample Details

<b>Sample ID:</b>	ETAM23S-06219	<b>Sampling Method:</b>	Unknown (Not IANZ Endorsed)
<b>Date Sampled:</b>	18/08/2023	<b>Material:</b>	Undisturbed Soil
<b>Date Submitted:</b>	22/08/2023	<b>Source:</b>	Unknown (Sampled by Client)
<b>Date Tested:</b>	22/08/2023		
<b>Project Location:</b>	117 Kowhai Road, Orewa		
<b>Sample Location:</b>	PT01		
<b>Borehole Number:</b>	PT01		
<b>Borehole Depth (m):</b>	-		

Swell Test		AS 1289.7.1.1	Shrink Test		AS 1289.7.1.1
<b>Swell on Saturation (%):</b>	-0.7		<b>Shrink on drying (%):</b>	5.0	
<b>Moisture Content before (%):</b>	30.9		<b>Shrinkage Moisture Content (%):</b>	40.8	
<b>Moisture Content after (%):</b>	32.2		<b>Est. inert material (%):</b>	1%	
<b>Est. Unc. Comp. Strength before (kPa):</b>	250		<b>Crumbling during shrinkage:</b>	5%	
<b>Est. Unc. Comp. Strength after (kPa):</b>	225		<b>Cracking during shrinkage:</b>	5%	

### Shrink Swell



**Shrink Swell Index - Iss (%): 2.8**

### Comments

# Not accredited  
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.  
Work Order No : ETAM23W01496  
Tested By: JM


## Shrink Swell Index Report

**Report No: SSI:ETAM23S-06220**

**Issue No: 1**

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

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.}



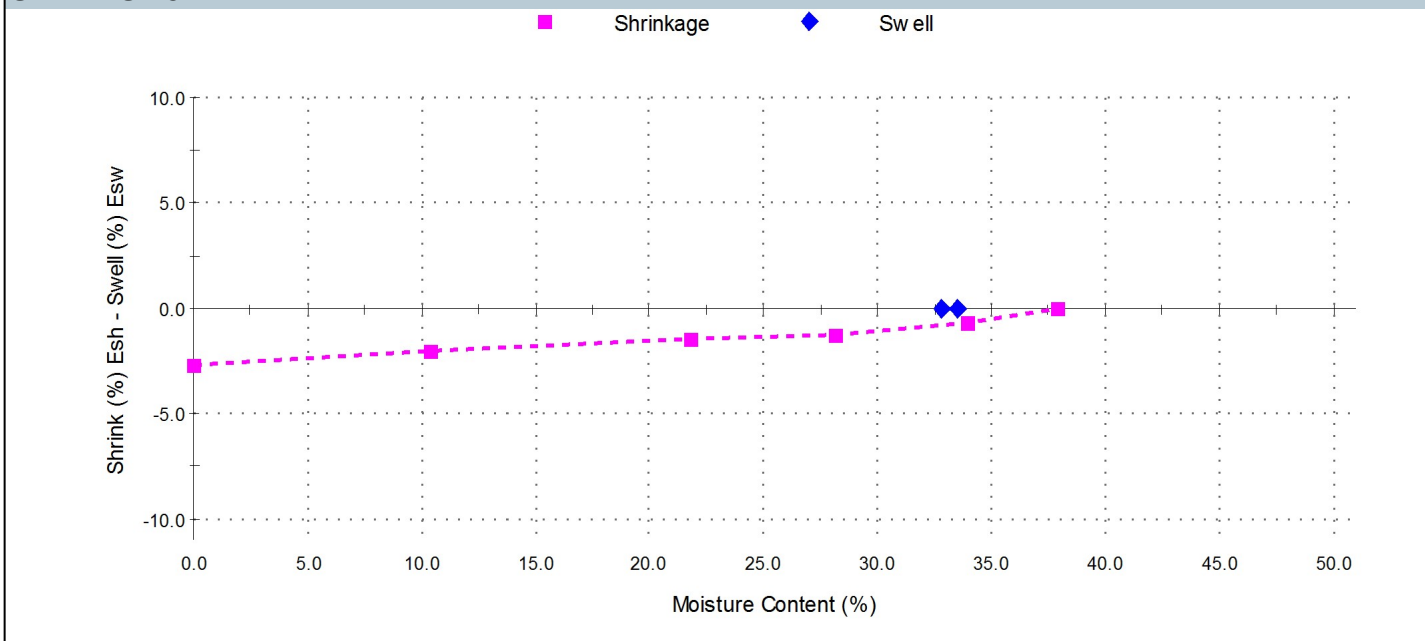
*James McKelvey*  
Approved Signatory: James McKelvey  
(Senior Technician)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 31/08/2023

### Sample Details

<b>Sample ID:</b>	ETAM23S-06220	<b>Sampling Method:</b>	Unknown (Not IANZ Endorsed)
<b>Date Sampled:</b>	18/08/2023	<b>Material:</b>	Undisturbed Soil
<b>Date Submitted:</b>	22/08/2023	<b>Source:</b>	Unknown (Sampled by Client)
<b>Date Tested:</b>	22/08/2023		
<b>Project Location:</b>	117 Kowhai Road, Orewa		
<b>Sample Location:</b>	PT02		
<b>Borehole Number:</b>	PT02		
<b>Borehole Depth (m):</b>	-		

Swell Test		AS 1289.7.1.1	Shrink Test		AS 1289.7.1.1
<b>Swell on Saturation (%):</b>	0.0		<b>Shrink on drying (%):</b>	2.7	
<b>Moisture Content before (%):</b>	32.8		<b>Shrinkage Moisture Content (%):</b>	37.9	
<b>Moisture Content after (%):</b>	33.5		<b>Est. inert material (%):</b>	2%	
<b>Est. Unc. Comp. Strength before (kPa):</b>	275		<b>Crumbling during shrinkage:</b>	0.5%	
<b>Est. Unc. Comp. Strength after (kPa):</b>	350		<b>Cracking during shrinkage:</b>	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 : ETAM23W01496  
Tested By: JM

## Shrink Swell Index Report

**Report No: SSI:ETAM23S-06221**

**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.}



*James McKelvey*

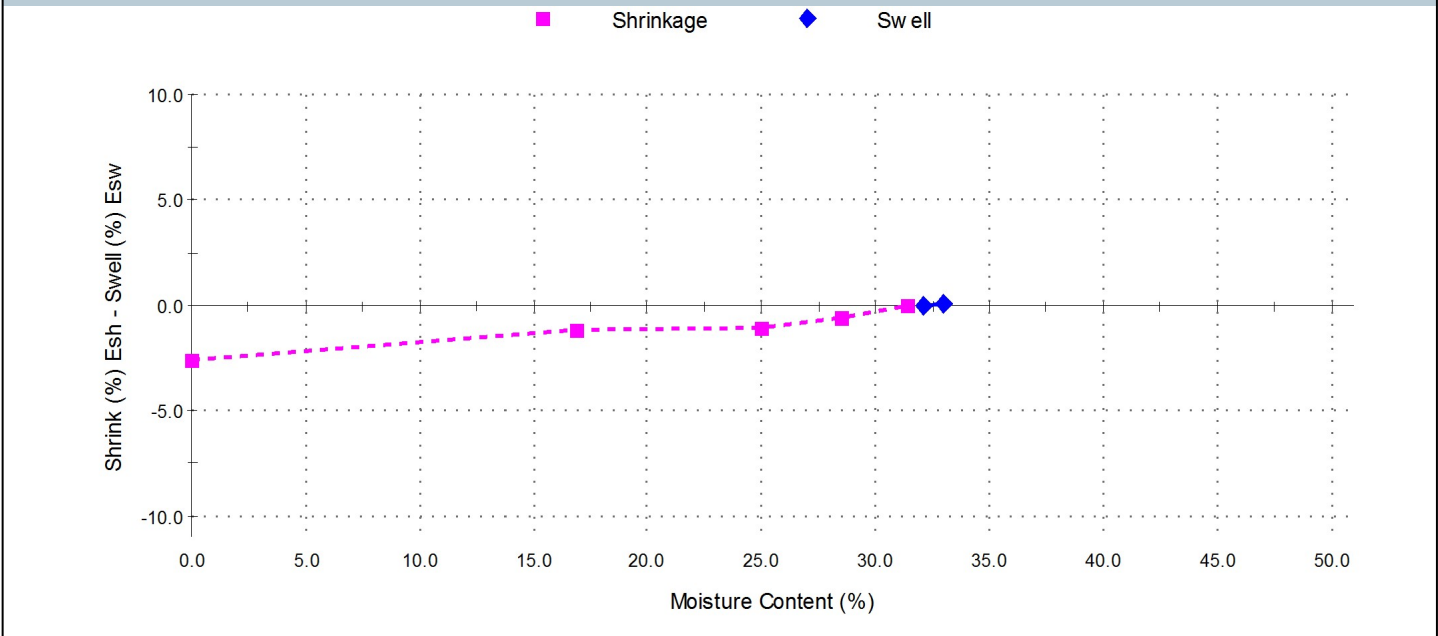
Approved Signatory: James McKelvey  
(Senior Technician)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 31/08/2023

### Sample Details

<b>Sample ID:</b>	ETAM23S-06221	<b>Sampling Method:</b>	Unknown (Not IANZ Endorsed)
<b>Date Sampled:</b>	18/08/2023	<b>Material:</b>	Undisturbed Soil
<b>Date Submitted:</b>	22/08/2023	<b>Source:</b>	Unknown (Sampled by Client)
<b>Date Tested:</b>	23/08/2023		
<b>Project Location:</b>	117 Kowhai Road, Orewa		
<b>Sample Location:</b>	PT03		
<b>Borehole Number:</b>	PT03		
<b>Borehole Depth (m):</b>	-		

Swell Test		AS 1289.7.1.1	Shrink Test		AS 1289.7.1.1
<b>Swell on Saturation (%):</b>	0.1		<b>Shrink on drying (%):</b>	2.6	
<b>Moisture Content before (%):</b>	32.1		<b>Shrinkage Moisture Content (%):</b>	31.4	
<b>Moisture Content after (%):</b>	33.0		<b>Est. inert material (%):</b>	3%	
<b>Est. Unc. Comp. Strength before (kPa):</b>	450+		<b>Crumbling during shrinkage:</b>	10%	
<b>Est. Unc. Comp. Strength after (kPa):</b>	450+		<b>Cracking during shrinkage:</b>	1.5%	

### Shrink Swell



**Shrink Swell Index - Iss (%): 1.4**

### Comments

# Not accredited  
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.  
Work Order No : ETAM23W01496  
Tested By: JM


## Shrink Swell Index Report

**Report No: SSI:ETAM23S-06222**

**Issue No: 1**

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

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.}



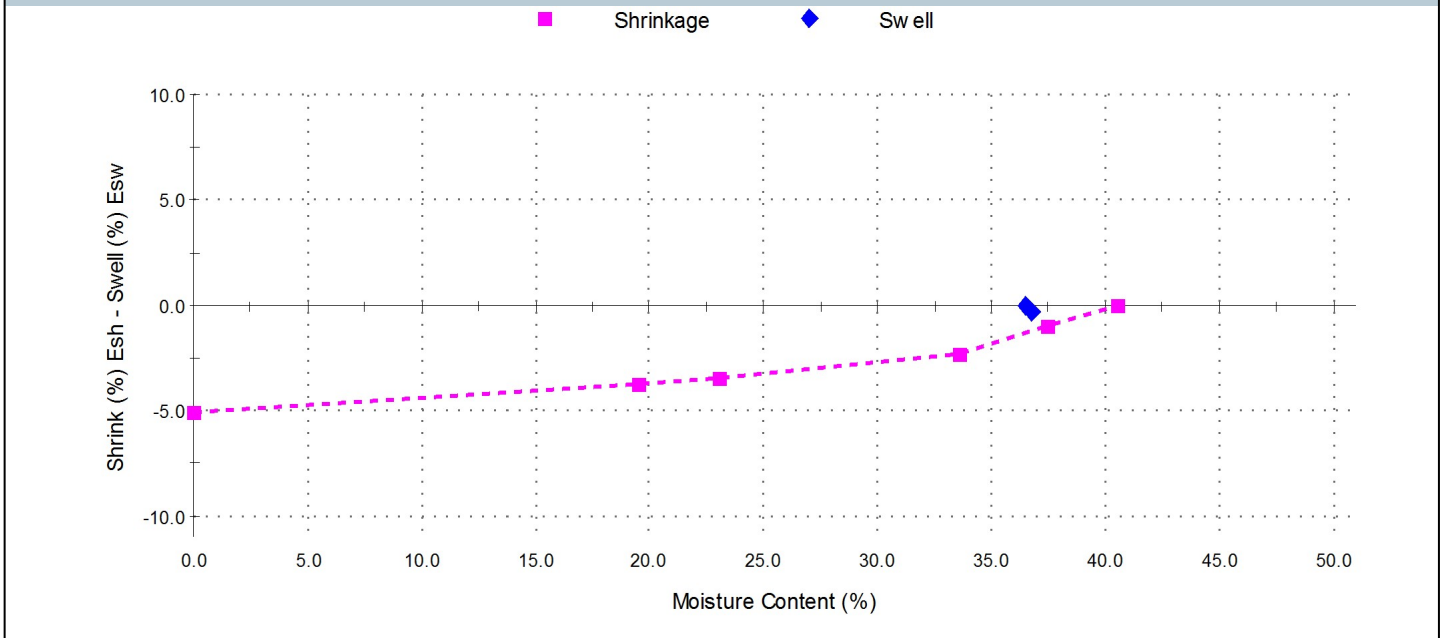
*James McKelvey*  
Approved Signatory: James McKelvey  
(Senior Technician)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 31/08/2023

### Sample Details

<b>Sample ID:</b>	ETAM23S-06222	<b>Sampling Method:</b>	Unknown (Not IANZ Endorsed)
<b>Date Sampled:</b>	18/08/2023	<b>Material:</b>	Undisturbed Soil
<b>Date Submitted:</b>	22/08/2023	<b>Source:</b>	Unknown (Sampled by Client)
<b>Date Tested:</b>	23/08/2023		
<b>Project Location:</b>	117 Kowhai Road, Orewa		
<b>Sample Location:</b>	PT04		
<b>Borehole Number:</b>	PT04		
<b>Borehole Depth (m):</b>	-		

Swell Test		AS 1289.7.1.1	Shrink Test		AS 1289.7.1.1
<b>Swell on Saturation (%):</b>	-0.3		<b>Shrink on drying (%):</b>	5.1	
<b>Moisture Content before (%):</b>	36.5		<b>Shrinkage Moisture Content (%):</b>	40.5	
<b>Moisture Content after (%):</b>	36.7		<b>Est. inert material (%):</b>	2%	
<b>Est. Unc. Comp. Strength before (kPa):</b>	175		<b>Crumbling during shrinkage:</b>	0.5%	
<b>Est. Unc. Comp. Strength after (kPa):</b>	300		<b>Cracking during shrinkage:</b>	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 : ETAM23W01496  
Tested By: JM


## Shrink Swell Index Report

**Report No: SSI:ETAM23S-06223**

**Issue No: 1**

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

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.}



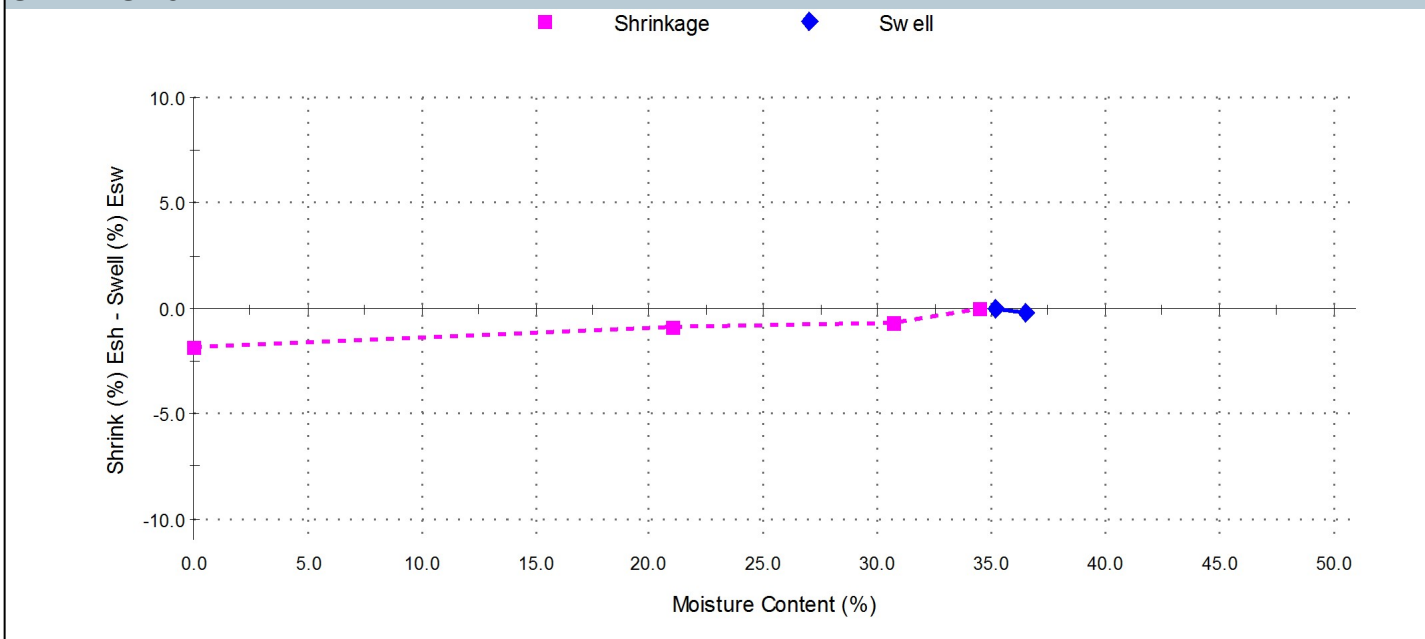
*James McKelvey*  
Approved Signatory: James McKelvey  
(Senior Technician)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 31/08/2023

### Sample Details

<b>Sample ID:</b>	ETAM23S-06223	<b>Sampling Method:</b>	Unknown (Not IANZ Endorsed)
<b>Date Sampled:</b>	18/08/2023	<b>Material:</b>	Undisturbed Soil
<b>Date Submitted:</b>	22/08/2023	<b>Source:</b>	Unknown (Sampled by Client)
<b>Date Tested:</b>	24/08/2023		
<b>Project Location:</b>	117 Kowhai Road, Orewa		
<b>Sample Location:</b>	PT05		
<b>Borehole Number:</b>	PT05		
<b>Borehole Depth (m):</b>	-		

Swell Test		AS 1289.7.1.1	Shrink Test		AS 1289.7.1.1
<b>Swell on Saturation (%):</b>	-0.2		<b>Shrink on drying (%):</b>	1.8	
<b>Moisture Content before (%):</b>	35.2		<b>Shrinkage Moisture Content (%):</b>	34.4	
<b>Moisture Content after (%):</b>	36.5		<b>Est. inert material (%):</b>	5%	
<b>Est. Unc. Comp. Strength before (kPa):</b>	450+		<b>Crumbling during shrinkage:</b>	0.5%	
<b>Est. Unc. Comp. Strength after (kPa):</b>	450+		<b>Cracking during shrinkage:</b>	1%	

### Shrink Swell



**Shrink Swell Index - Iss (%): 1.0**

### Comments

# Not accredited  
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.  
Work Order No : ETAM23W01496  
Tested By: JM


## Shrink Swell Index Report

**Report No: SSI:ETAM23S-06224**

**Issue No: 1**

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

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.}



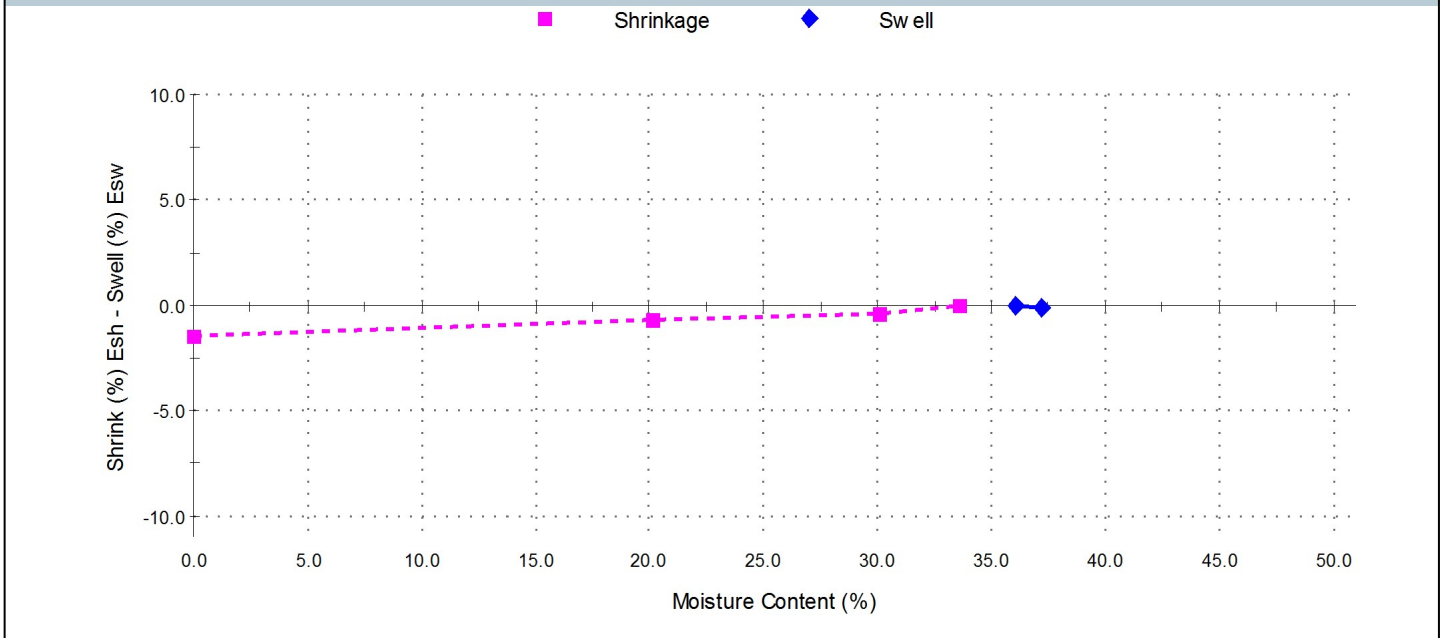
*James McKelvey*  
Approved Signatory: James McKelvey  
(Senior Technician)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 31/08/2023

### Sample Details

<b>Sample ID:</b>	ETAM23S-06224	<b>Sampling Method:</b>	Unknown (Not IANZ Endorsed)
<b>Date Sampled:</b>	18/08/2023	<b>Material:</b>	Undisturbed Soil
<b>Date Submitted:</b>	22/08/2023	<b>Source:</b>	Unknown (Sampled by Client)
<b>Date Tested:</b>	24/08/2023		
<b>Project Location:</b>	117 Kowhai Road, Orewa		
<b>Sample Location:</b>	PT06		
<b>Borehole Number:</b>	PT06		
<b>Borehole Depth (m):</b>	-		

Swell Test		AS 1289.7.1.1	Shrink Test		AS 1289.7.1.1
<b>Swell on Saturation (%):</b>	-0.1		<b>Shrink on drying (%):</b>	1.5	
<b>Moisture Content before (%):</b>	36.1		<b>Shrinkage Moisture Content (%):</b>	33.6	
<b>Moisture Content after (%):</b>	37.2		<b>Est. inert material (%):</b>	1%	
<b>Est. Unc. Comp. Strength before (kPa):</b>	450+		<b>Crumbling during shrinkage:</b>	0%	
<b>Est. Unc. Comp. Strength after (kPa):</b>	450		<b>Cracking during shrinkage:</b>	1%	

### Shrink Swell



**Shrink Swell Index - Iss (%): 0.8**

### Comments

# Not accredited  
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.  
Work Order No : ETAM23W01496  
Tested By: JM



## APPENDIX D: EARTHWORKS FIELD DENSITY SUMMARY SHEETS

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# Earthworks Fill Report

**Report No: EFIL:ETAM21W00471**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W00471*

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

**Principal:** Stephen Parkes



**cc to:** Ricky Thomson

**Project No.:** 773-ETAM00991AA

**Project Name.:** 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

**Project Location:** Access off Arran Drive, 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: 6/04/2021

## Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									179+	179+	179+	179+						
1/04/2021	ETAM21W00471	LW	467	1.92	33.6	1.44	2.70	0	179+	179+	179+	179+	Undercut Backfill Area	1749222	5948921	-	Silty CLAY	1.5m below finished level
1/04/2021	ETAM21W00471	LW	468	1.90	32.7	1.43	2.70	0	179+	179+	179+	179+	Undercut Backfill Area	1749256	5948908	-	Silty CLAY	1.0m below finished level
1/04/2021	ETAM21W00471	LW	469	1.90	34.9	1.41	2.70	0	179+	179+	179+	179+	Gully 2	1749079	5948966	-	Silty CLAY	1.0m below finished level
1/04/2021	ETAM21W00471	LW	470	1.91	33.4	1.43	2.70	0	179+	179+	179+	179+	Gully 2	1749069	5948960	-	Silty CLAY	1.0m below finished level

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

Form Number: K031N Issue Date: 20/09/2018

**SITE PLAN**

NOT TO SCALE

**Project No: 773-ETAM00991AA**

Work Order No: ETAM21W00471

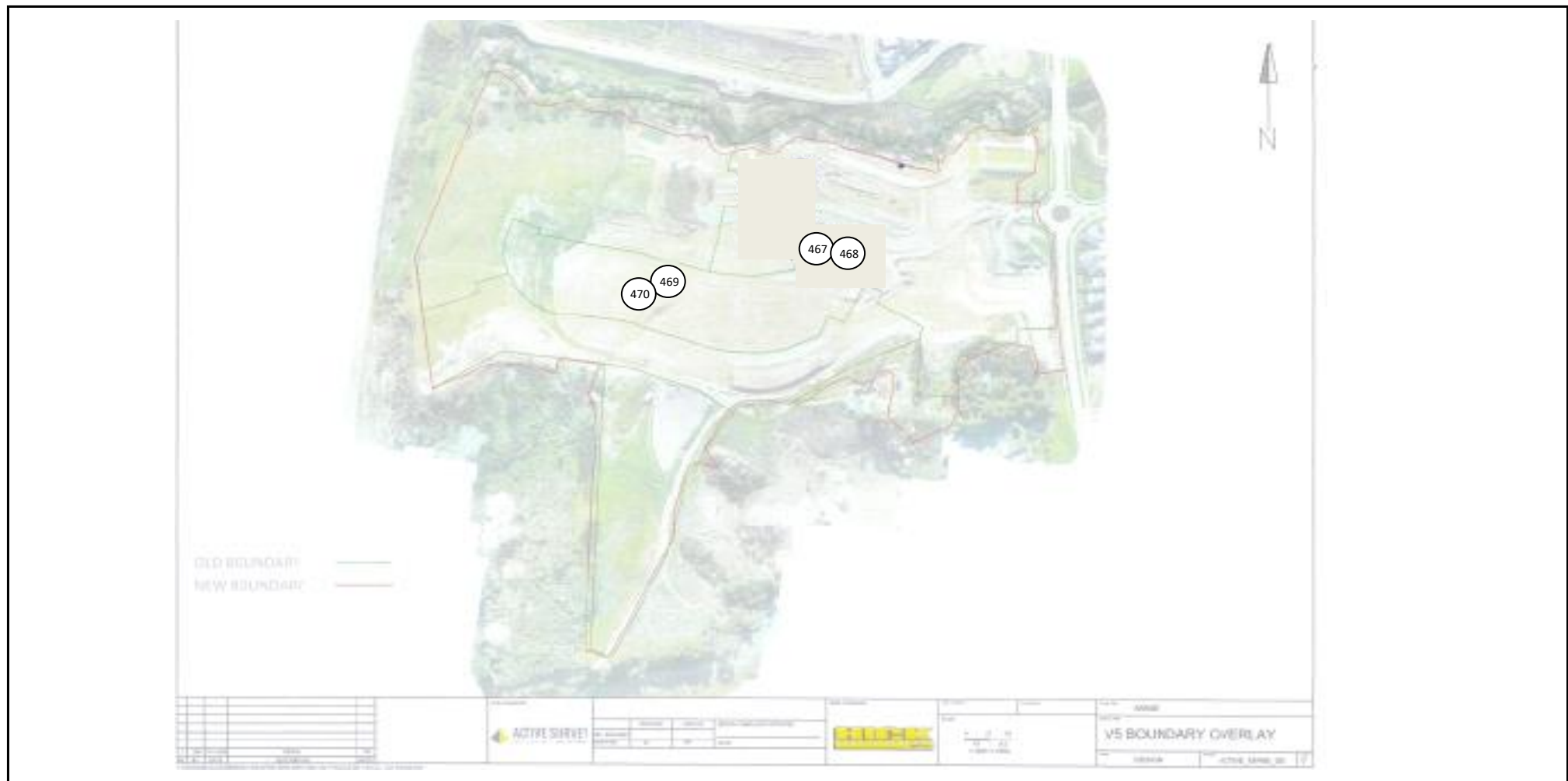
Page No: 2 of 2

**Project:** 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

**Location:** As below

**Tested by:** LW

**Date tested:** 1/04/2021



# Earthworks Fill Report

**Report No: EFIL:ETAM21W01259**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM21W01259*

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


**Principal:** Stephen Parkes

**cc to:** -


**Project No.:** 773-ETAM00991AA

**Project Name.:** 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

**Project Location:** Access off Arran Drive, 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: 18/10/2021

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									168	152	179+	179+						
15/10/2021	ETAM21W01259	LW	531	1.86	32.3	1.41	2.70	3	168	152	179+	179+	Gully	1749047	5948888	-	Silty CLAY	Layer 1
15/10/2021	ETAM21W01259	LW	532	1.94	28.1	1.52	2.70	1	179+	179+	179+	160	Gully	1749026	5948903	-	Silty CLAY	Layer 1
15/10/2021	ETAM21W01259	LW	533	1.89	30.5	1.45	2.70	2	179+	179+	179+	164	Gully	1749020	5948891	-	Silty CLAY	Layer 1


**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: K031N Issue Date: 20/09/2018

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01259**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01259*

<b>Client:</b>	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM00991AA
<b>Project Name.:</b>	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
<b>Project Location:</b>	Access off Arran Drive, 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: 18/10/2021



**SITE PLAN** (NOT TO SCALE)

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01291**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM21W01291*

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

**Principal:** Stephen Parkes

**cc to:** -

**Project No.:** 773-ETAM00991AA

**Project Name.:** 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

**Project Location:** Access off Arran Drive, 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: 22/10/2021

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									149	164	143	146						
21/10/2021	ETAM21W01291	LW	534	1.89	31.3	1.44	2.70	2	149	164	143	146	Gully	1749018	5948907	-	Silty CLAY	Layer 2
21/10/2021	ETAM21W01291	LW	535	1.87	33.6	1.40	2.70	1	175	146	137	168	Gully	1749043	5948893	-	Silty CLAY	Layer 2
21/10/2021	ETAM21W01291	LW	536	1.82	32.8	1.36	2.70	5	179	146	120	171	Gully	1748980	5948873	-	Silty CLAY	Layer 2

### Comments:


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




# Earthworks Fill Report

**Report No: EFIL:ETAM21W01291**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01291*

<b>Client:</b>	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM00991AA
<b>Project Name.:</b>	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
<b>Project Location:</b>	Access off Arran Drive, 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: 22/10/2021




# Earthworks Fill Report

**Report No: EFIL:ETAM21W01330**
**Issue No:1**
*This report replaces all previous issues of report no. EFIL:ETAM21W01330*

**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.:** 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: 9/11/2021

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									179+	179+	179+	164						
5/11/2021	ETAM21W01330	LW	537	1.93	31.5	1.47	2.70	0	179+	179+	179+	164	Gully	1749038	5948918	26.00	Clayey SILT	
5/11/2021	ETAM21W01330	LW	538	1.89	33.8	1.41	2.70	0	143	156	168	175	Gully	1749006	5948904	27.60	Clayey SILT	
5/11/2021	ETAM21W01330	LW	539	1.91	31.5	1.45	2.70	1	179+	179+	146	140	Gully	1748987	5948875	31.18	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)


# Earthworks Fill Report

**Report No: EFIL:ETAM21W01330**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01330*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	AKLGE206639 - Millwater Precinct 6k, Orewa
<b>Project Location:</b>	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: 9/11/2021



**SITE PLAN (NOT TO SCALE)**

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01344**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01344*

**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.:** 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: 11/11/2021

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									160	152	175	179+						
9/11/2021	ETAM21W01344	LW	540	1.90	28.2	1.49	2.70	3	160	152	175	179+	Gully	1748976	5948881	31.40	Clayey SILT	
9/11/2021	ETAM21W01344	LW	541	1.90	27.8	1.49	2.70	4	179+	179+	179+	171	Gully	1749005	5948893	27.90	Clayey SILT	
9/11/2021	ETAM21W01344	LW	542	1.91	27.5	1.50	2.70	3	175	146	156	164	Gully	1749039	5948930	26.20	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)

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01344**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01344*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	AKLGE206639 - Millwater Precinct 6k, Orewa
<b>Project Location:</b>	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: 11/11/2021





# Earthworks Fill Report

**Report No: EFIL:ETAM21W01351**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01351*

**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.:** 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: 12/11/2021

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									146	160	168	149						
10/11/2021	ETAM21W01351	LW	543	1.85	32.0	1.40	2.70	3	146	160	168	149	Gully	1748980	5948880	31.60	Silty CLAY	
10/11/2021	ETAM21W01351	LW	544	1.85	33.1	1.39	2.70	2	143	160	179	168	Gully	1749013	5948893	28.05	Silty CLAY	
10/11/2021	ETAM21W01351	LW	545	1.86	32.9	1.40	2.70	2	175	140	146	137	Gully	1749056	5948917	26.35	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)


# Earthworks Fill Report

**Report No: EFIL:ETAM21W01351**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01351*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	AKLGE206639 - Millwater Precinct 6k, Orewa
<b>Project Location:</b>	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: 12/11/2021



**SITE PLAN (NOT TO SCALE)**

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01358**
**Issue No:1**
*This report replaces all previous issues of report no. EFIL:ETAM21W01358*

**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.:** 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: 12/11/2021

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									UTP	UTP	UTP	UTP						
11/11/2021	ETAM21W01358	LW	546	1.92	29.2	1.49	2.70	2	UTP	UTP	UTP	UTP	RW 701	1749137	5949044	8.00	Clayey SILT	
11/11/2021	ETAM21W01358	LW	547	1.92	26.2	1.52	2.70	4	UTP	UTP	UTP	UTP	RW 701	1749148	5949049	8.05	Clayey SILT	
11/11/2021	ETAM21W01358	LW	548	1.87	34.1	1.40	2.70	1	175	143	149	145	Gully	1748972	5948879	31.75	Clayey SILT	
11/11/2021	ETAM21W01358	LW	549	1.87	35.4	1.38	2.70	0	168	164	140	149	Gully	1749003	5948873	31.65	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)

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01358**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01358*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	AKLGE206639 - Millwater Precinct 6k, Orewa
<b>Project Location:</b>	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: 12/11/2021



# Earthworks Fill Report

**Report No: EFIL:ETAM21W01400**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM21W01400*

**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: 23/11/2021

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									164	179+	179+	149						
17/11/2021	ETAM21W01400	LW	552	1.86	30.7	1.42	2.70	4	164	179+	179+	149	Gully	1749005	5948875	31.80	Silty CLAY	
17/11/2021	ETAM21W01400	LW	553	1.87	28.7	1.46	2.70	4	179+	179+	179+	160	Gully	1748994	5948898	29.10	Silty CLAY	
17/11/2021	ETAM21W01400	LW	554	1.85	31.5	1.41	2.70	4	156	146	143	168	Gully	1749008	5948918	28.20	Silty CLAY	
17/11/2021	ETAM21W01400	LW	555	1.88	31.0	1.43	2.70	2	179+	179+	160	149	Gully	1749036	5948928	26.65	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: K031N Issue Date: 20/09/2018




# Earthworks Fill Report

**Report No: EFIL:ETAM21W01400**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01400*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 23/11/2021



**SITE PLAN (NOT TO SCALE)**

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01415**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM21W01415*

**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: 24/11/2021

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									UTP	UTP	UTP	UTP						
22/11/2021	ETAM21W01415	LW	556	1.94	29.2	1.50	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749132	5949026	8.60	Clayey SILT	
22/11/2021	ETAM21W01415	LW	557	1.95	29.0	1.51	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 702	1749142	5949029	8.80	Clayey SILT	
22/11/2021	ETAM21W01415	LW	558	1.92	35.9	1.41	2.70	0	179+	179+	179+	164	Gully	1748968	5948880	32.40	Clayey SILT	
22/11/2021	ETAM21W01415	LW	559	1.93	35.5	1.42	2.70	0	179+	179+	156	168	Gully	1748986	5948894	29.60	Clayey SILT	
22/11/2021	ETAM21W01415	LW	560	1.91	36.6	1.40	2.70	0	164	149	140	179	Gully	1749006	5948904	28.50	Clayey SILT	
22/11/2021	ETAM21W01415	LW	561	1.94	34.7	1.44	2.70	0	179+	146	156	164	Gully	1749018	5948919	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

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01415**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01415*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 24/11/2021



**SITE PLAN** (NOT TO SCALE)

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01446**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01446*

**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: 29/11/2021

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									UTP	UTP	UTP	UTP						
26/11/2021	ETAM21W01446	LW	562	1.95	29.9	1.50	2.70	0	UTP	UTP	UTP	208	Gully	1748990	5948890	30.10	Silty CLAY	
26/11/2021	ETAM21W01446	LW	563	1.96	31.3	1.50	2.70	0	UTP	UTP	UTP	UTP	Gully	1749016	5948909	29.50	Silty CLAY	
26/11/2021	ETAM21W01446	LW	564	1.89	34.1	1.41	2.70	0	196	168	160	146	Gully	1749044	5948956	25.80	Silty CLAY	
26/11/2021	ETAM21W01446	LW	565	1.90	32.7	1.43	2.70	0	165	196	188	180	Gully	1749063	5948982	25.40	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


# Earthworks Fill Report

**Report No: EFIL:ETAM21W01446**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01446*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 29/11/2021





# 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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									UTP	UTP	UTP	UTP						
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)

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01456**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01456*

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

# 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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									1	2	3	4						
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)

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01476**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01476*

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

ACCREDITED  
  
 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)**

# 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



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: 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									149	164	175+	175+						
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)

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01492**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01492*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 8/12/2021



**SITE PLAN (NOT TO SCALE)**



# Earthworks Fill Report

**Report No: EFIL:ETAM21W01503**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM21W01503*

**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: 10/12/2021

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									175+	175+	175+	175+						
8/12/2021	ETAM21W01503	LW	587	1.93	31.0	1.47	2.70	0	175+	175+	175+	175+	Gully	1748979	5948874	32.50	Clayey SILT	
8/12/2021	ETAM21W01503	LW	588	1.89	30.7	1.45	2.70	2	168	153	146	172	Gully	1748972	5948918	31.90	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)

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01503**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01503*

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

ACCREDITED  
  
 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: 10/12/2021





**SITE PLAN (NOT TO SCALE)**

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01514**
**Issue No:1**
*This report replaces all previous issues of report no. EFIL:ETAM21W01514*

**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: 13/12/2021

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									UTP	UTP	UTP	UTP						
10/12/2021	ETAM21W01514	LW	589	1.96	31.8	1.49	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749114	5949038	8.60	Clayey SILT	
10/12/2021	ETAM21W01514	LW	590	1.93	33.8	1.44	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749129	5949037	8.50	Clayey SILT	
10/12/2021	ETAM21W01514	LW	591	1.90	31.1	1.45	2.70	1	UTP	UTP	175+	175+	Gully	1749063	5948926	29.00	Clayey SILT	
10/12/2021	ETAM21W01514	LW	592	1.94	31.2	1.48	2.70	0	UTP	UTP	175+	175+	Gully	1749080	5948964	27.60	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: K031N Issue Date: 20/09/2018


# Earthworks Fill Report

**Report No: EFIL:ETAM21W01514**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01514*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 13/12/2021





**SITE PLAN** (NOT TO SCALE)

# 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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									1	2	3	4						
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: K031 N Issue Date: 20/09/2018

# Earthworks Fill Report

**Report No: EFIL:ETAM21W01557**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM21W01557*

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



# 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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
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

# Earthworks Fill Report

**Report No: EFIL:ETAM22W00006**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00006*

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

# 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

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.)



*E. Paton*  
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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate)				Test Location	Easting	Northing	RL	Material Tested	Comments
									kPa									
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:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00013**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00013*

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



*E. Paton*

Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 14/01/2022









# 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.}



*E. Paton*  
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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
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:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00017**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00017*

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



*E. Paton*

Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 14/01/2022



**SITE PLAN (NOT TO SCALE)**





# Earthworks Fill Report

**Report No: EFIL:ETAM22W00023**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00023*

**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.)



*E. Paton*  
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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									135	UTP	UTP	175						
12/01/2022	ETAM22W00023	LW	617	1.88	27.1	1.48	2.70	5.1	135	UTP	UTP	175	Gully	1749067	5948951	-	Clayey SILT	-
12/01/2022	ETAM22W00023	LW	618	1.94	25.4	1.55	2.70	3.5	175	175	168	149	Gully	1749088	5948969	-	Clayey SILT	-
12/01/2022	ETAM22W00023	LW	619	1.88	32.4	1.42	2.70	1.3	137	172	175	175	Gully	1749045	5948899	-	Clayey SILT	-
12/01/2022	ETAM22W00023	LW	620	1.96	28.4	1.53	2.70	0.2	140	164	137	143	Gully	1478986	5948893	-	Clayey SILT	-

## Comments:


## Earthworks Fill Report

**Report No: EFIL:ETAM22W00023**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00023*

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



# 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



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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
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**


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

# Earthworks Fill Report

**Report No: EFIL:ETAM22W00032**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00032*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 18/01/2022



# 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



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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
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:

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

# Earthworks Fill Report

**Report No: EFIL:ETAM22W00039**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00039*

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

ACCREDITED  
  
 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.)

*E. Paton*  
 Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 18/01/2022



**SITE PLAN** (NOT TO SCALE)

# Earthworks Fill Report

**Report No: EFIL:ETAM22W00045**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00045*

**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.)



*E. Paton*

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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
17/01/2022	ETAM22W00045	LW	628	1.85	26.9	1.46	2.70	6.7	UTP	UTP	UTP	UTP	Gully	1748987	5948874	-	Clayey SILT	-
17/01/2022	ETAM22W00045	LW	629	1.97	23.4	1.59	2.70	3.6	UTP	UTP	UTP	UTP	Gully	1749019	5948877	-	Clayey SILT	-
17/01/2022	ETAM22W00045	LW	630	1.91	23.9	1.54	2.70	5.9	UTP	UTP	UTP	UTP	Gully	1748997	5948911	-	Clayey SILT	-
17/01/2022	ETAM22W00045	LW	631	1.88	26.8	1.48	2.70	5.3	UTP	UTP	UTP	UTP	Gully	1749045	5948908	-	Clayey SILT	-


**Comments:**


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

# Earthworks Fill Report

**Report No: EFIL:ETAM22W00045**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00045*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 18/01/2022



**SITE PLAN** (NOT TO SCALE)



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00062**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00062*

**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.)



*E. Paton*  
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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
18/01/2022	ETAM22W00062	IA	632	1.90	26.8	1.50	2.70	4.3	UTP	UTP	UTP	UTP	Ref to plan	1749120	5948916	27.5	Silty Clay	-
18/01/2022	ETAM22W00062	IA	633	1.89	24.1	1.52	2.70	6.8	UTP	UTP	UTP	UTP	Ref to plan	1749100	5948926	27.5	Silty Clay	-
18/01/2022	ETAM22W00062	IA	634	1.86	28.9	1.44	2.70	4.9	UTP	UTP	UTP	UTP	Ref to plan	1748961	5948916	28.7	Silty Clay	-
18/01/2022	ETAM22W00062	IA	635	1.89	29.6	1.46	2.70	2.9	184	150	134	UTP	Ref to plan	1749007	5948888	28.7	Silty Clay	-

## Comments:


Oven Moistures

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00062**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00062*

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



*E. Paton*  
 Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 26/01/2022



# 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

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.)



*E. Paton*  
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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate)				Test Location	Easting	Northing	RL	Material Tested	Comments
									kPa									
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:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00072**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00072*

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

E. Paton

Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 26/01/2022



# 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.)



*E. Paton*  
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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									175	175	149	160						
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:**


# Earthworks Fill Report

**Report No: EFIL:ETAM22W00113**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00113*

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



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00117**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00117*

**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.)



*E. Paton*  
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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									175	149	137	149						
21/01/2022	ETAM22W00117	LW	650	1.90	31.5	1.44	2.70	1.1	175	149	137	149	Gully	1748995	5948879	30.2	Silty Clay	-
21/01/2022	ETAM22W00117	LW	651	1.91	30.7	1.46	2.70	1.0	175	175	175	160	Gully	1749062	5948926	28	Silty Clay	-
21/01/2022	ETAM22W00117	LW	652	1.92	31.2	1.46	2.70	0.3	168	160	175	175	Gully	1749043	5948902	29.15	Silty Clay	-


**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00117**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00117*

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



*E. Paton*  
 Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 2/02/2022



**SITE PLAN (NOT TO SCALE)**

# Earthworks Fill Report

**Report No: EFIL:ETAM22W00123**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00123*

**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.)



*E. Paton*  
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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									149	175	175	175						
28/01/2022	ETAM22W00123	LW	653	1.94	30.4	1.49	2.70	0.0	149	175	175	175	Gully	1748886	5948860	30.78	Silty Clay	-
28/01/2022	ETAM22W00123	LW	654	1.90	36.5	1.39	2.70	0.0	175	175	172	153	Gully	1749007	5948874	29.52	Silty Clay	-
28/01/2022	ETAM22W00123	LW	655	1.86	40.0	1.33	2.70	0.0	175	175	175	175	Gully	1749009	5948909	28.95	Silty Clay	-
28/01/2022	ETAM22W00123	LW	656	1.87	34.8	1.39	2.70	0.3	175	175	175	163	Gully	1749029	5948916	28.78	Silty Clay	-

## Comments:


## Earthworks Fill Report

**Report No: EFIL:ETAM22W00123**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00123*

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

ACCREDITED  
  
 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: 2/02/2022



**SITE PLAN (NOT TO SCALE)**

# 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.  
{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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									175	175	175	UTP						
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:

# 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.  
 (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





# 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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									175	175	175	175						
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

# Earthworks Fill Report

**Report No: EFIL:ETAM22W00158**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00158*

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

# 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



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: 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate)			Test Location	Easting	Northing	RL	Material Tested	Comments	
									UTP	UTP	kPa							
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:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00168**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00168*

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



*E. Paton*  
 Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 7/02/2022



# 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

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.)



*E. Paton*  
 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									149	160	175	175						
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:**


# Earthworks Fill Report

**Report No: EFIL:ETAM22W00179**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00179*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 8/02/2022





# Earthworks Fill Report

**Report No: EFIL:ETAM22W00221**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00221*

**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.)



*E. Paton*

Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 17/02/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
15/02/2022	ETAM22W00221	SC	675	1.91	28.5	1.49	2.70	2.5	UTP	UTP	UTP	UTP	Gully	1749010	5948850	-	Silty Clay	-
15/02/2022	ETAM22W00221	SC	676	1.85	26.3	1.47	2.70	7.1	UTP	UTP	UTP	UTP	Gully	1748977	5948911	-	Silty Clay	-
15/02/2022	ETAM22W00221	SC	677	1.96	26.4	1.55	2.70	1.5	UTP	UTP	UTP	UTP	Gully	1749014	5948884	-	Silty Clay	-


**Comments:**

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


# Earthworks Fill Report

**Report No: EFIL:ETAM22W00221**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00221*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 17/02/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00233**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00233*

**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.)



*E. Paton*

Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 18/02/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									168	176	176	176						
16/02/2022	ETAM22W00233	SC	678	1.87	33.2	1.41	2.70	1.3	168	168	176	176	Gully	1748996	5748922	-	Silty Clay	-
16/02/2022	ETAM22W00233	SC	679	1.90	30.8	1.45	2.70	1.5	176	176	176	176	Gully	1749039	5948904	-	Silty Clay	-
16/02/2022	ETAM22W00233	SC	680	1.96	24.6	1.58	2.70	2.9	168	176	UTP	168	Gully	1749005	5948886	-	Silty Clay	-

**Comments:**

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

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00233**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00233*

**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.)

A handwritten signature in black ink, appearing to read "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 18/02/2022



# 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

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.)



*E. Paton*  
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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									1	2	3	4						
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:

# Earthworks Fill Report

**Report No: EFIL:ETAM22W00242**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00242*

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

E. Paton

Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 22/02/2022





# 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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									208	208	158	158						
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:

# Earthworks Fill Report

**Report No: EFIL:ETAM22W00255**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00255*

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



# 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

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.)



*E. Paton*

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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									188	188	168	168						
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

## 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

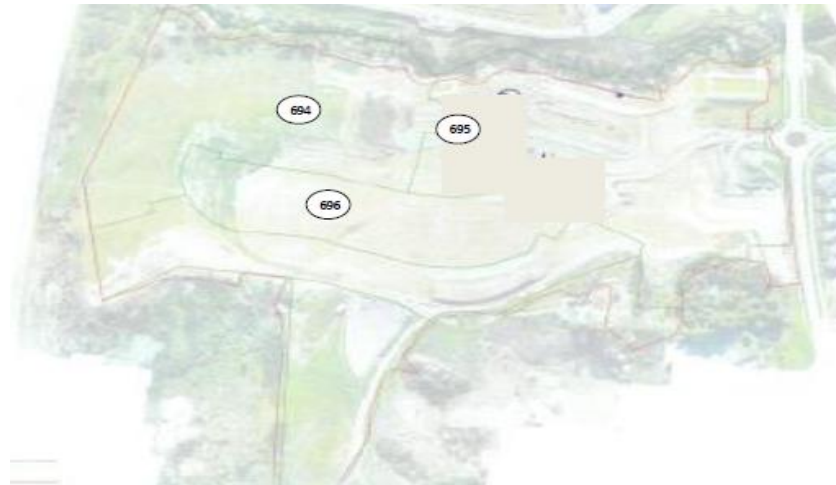
**Project Location:** 117 Kowhai Road, Orewa



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.)

A handwritten signature in black ink that reads "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 23/02/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00266**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00266*

**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.)



*Liam Walker*

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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									146	155	172	168						
23/02/2022	ETAM22W00266	SC	697	1.82	33.0	1.37	2.70	4.1	146	155	172	168	Silt Pond Fill	1749009	5948994	-	Silty CLAY	RL unavailable
23/02/2022	ETAM22W00266	SC	698	1.81	35.6	1.33	2.70	3.3	155	155	168	168	Silt Pond Fill	1749009	5948956	-	Silty CLAY	RL unavailable
23/02/2022	ETAM22W00266	SC	699	1.75	36.5	1.28	2.70	5.9	168	168	208	208	Stage 1 Undercut	1749331	5948753	-	Silty CLAY	At FL

## Comments:

## Earthworks Fill Report

<b>Report No: EFIL:ETAM22W00266</b>	
<b>Issue No:1</b>	
<i>This report replaces all previous issues of report no. EFIL:ETAM22W00266</i>	
	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: 25/02/2022

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





# 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

  
 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: 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	168	168						
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

## 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



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.)

A handwritten signature in blue ink, appearing to read "L Walker".

Approved Signatory: Liam Walker  
Assistant Manager  
IANZ Site Number: 105  
Date of Issue: 25/02/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00291**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00291*

**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: 28/02/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									155	155	168	172						
25/02/2022	ETAM22W00291	SC	705	1.88	29.5	1.45	2.70	3.5	155	155	168	172	Gully	1748973	5948893	-	Silty CLAY	RLs unavailable
25/02/2022	ETAM22W00291	SC	706	1.84	28.5	1.43	2.70	6.1	168	155	155	155	Gully	1749001	5948883	-	Silty CLAY	RLs unavailable

**Comments:**

Form Number: R031IN Issue Date: 20/09/2018

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00291**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00291*

**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

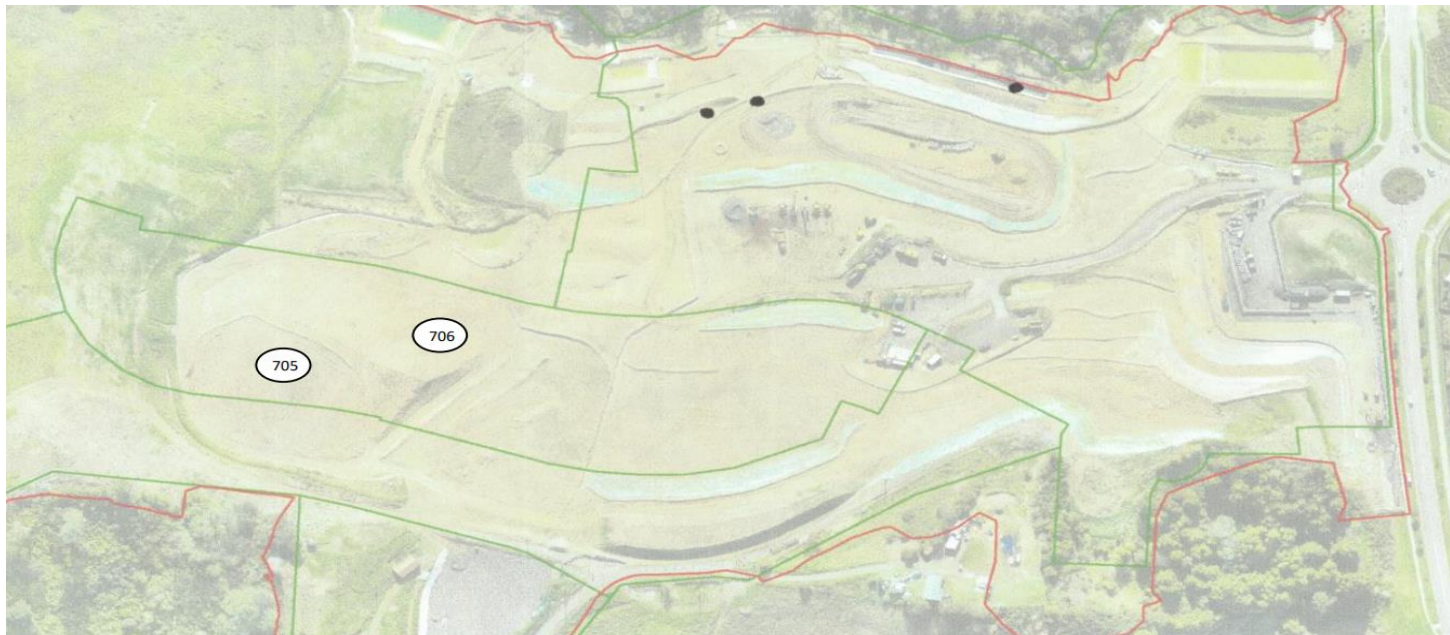
**Project Location:** 117 Kowhai Road, Orewa



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.)

A handwritten signature in blue ink, appearing to read "L Walker".

Approved Signatory: Liam Walker  
Assistant Manager  
IANZ Site Number: 105  
Date of Issue: 28/02/2022



# 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



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: 3/03/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									168	176	160	160						
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:



## 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



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.)

A handwritten signature in blue ink, appearing to read "L Walker".

Approved Signatory: Liam Walker  
Assistant Manager  
IANZ Site Number: 105  
Date of Issue: 3/03/2022



# 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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	168	168						
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:**



## 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

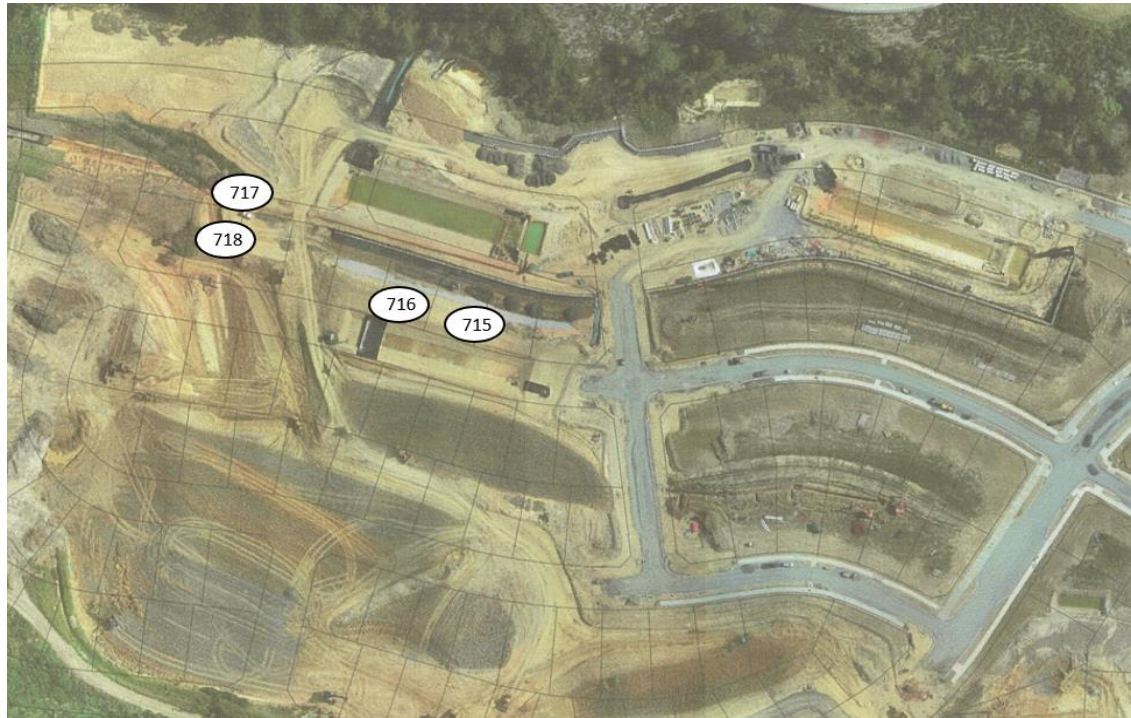
**Project Location:** 117 Kowhai Road, Orewa



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.}

A handwritten signature in blue ink, appearing to read "L Walker".

Approved Signatory: Liam Walker  
Assistant Manager  
IANZ Site Number: 105  
Date of Issue: 4/03/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00327**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00327*

**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: 7/03/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
4/03/2022	ETAM22W00327	SC	719	1.88	29.9	1.44	2.70	3.4	UTP	UTP	UTP	UTP	Gully 2	1749048	5948882	-	Silty CLAY	RLs unavailable
4/03/2022	ETAM22W00327	SC	720	1.85	30.1	1.42	2.70	4.7	208+	208+	188	188	Gully 2	1748994	5948895	-	Silty CLAY	RLs unavailable
4/03/2022	ETAM22W00327	SC	721	1.89	28.3	1.47	2.70	3.9	UTP	UTP	UTP	UTP	Gully 2	1749009	5948858	-	Silty CLAY	RLs unavailable
4/03/2022	ETAM22W00327	SC	722	1.90	30.0	1.46	2.70	2.0	UTP	UTP	UTP	UTP	Undercut 1	1749338	5948819	-	Silty CLAY	RLs unavailable

**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00327**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00327*

**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.}

A handwritten signature in blue ink, appearing to read 'L Walker'.

Approved Signatory: Liam Walker  
Assistant Manager  
IANZ Site Number: 105  
Date of Issue: 7/03/2022





# 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

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: 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									208+	208+	208+	UTP						
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:**

## 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



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.}

A handwritten signature in blue ink, appearing to read "L Walker".

Approved Signatory: Liam Walker  
Assistant Manager  
IANZ Site Number: 105  
Date of Issue: 9/03/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00351**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00351*

**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.)



*E. Paton*  
Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 11/03/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
9/03/2022	ETAM22W00351	SC	732	1.87	28.6	1.45	2.70	4.6	188	188	188	188	Main Gully Fill	1749017	5948885	-	Silty Clay	-
9/03/2022	ETAM22W00351	SC	733	1.95	25.2	1.56	2.70	3.2	UTP	UTP	UTP	UTP	Main Gully Fill	1749412	5948860	-	Silty Clay	-
9/03/2022	ETAM22W00351	SC	734	1.90	28.3	1.48	2.70	3.2	208	208	188	188	Main Gully Fill	1749120	5948777	-	Silty Clay	-
9/03/2022	ETAM22W00351	SC	735	1.87	28.0	1.46	2.70	4.9	UTP	UTP	UTP	UTP	Main Gully Fill	1749054	5948932	-	Silty Clay	-
9/03/2022	ETAM22W00351	SC	736	1.88	26.9	1.48	2.70	5.4	UTP	UTP	UTP	UTP	Silt Pond	1749012	5948989	-	Silty Clay	-

## Comments:



## Earthworks Fill Report

**Report No: EFIL:ETAM22W00351**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00351*

**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.)

A handwritten signature in black ink, appearing to read 'E. Paton'.

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 11/03/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00363**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00363*

**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: 14/03/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
10/03/2022	ETAM22W00363	SC	737	1.82	25.2	1.45	2.70	9.7	UTP	UTP	UTP	UTP	A 7 - A 15 Retest	1749168	5948985	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	738	1.84	24.8	1.47	2.70	9.0	UTP	UTP	UTP	UTP	15 A - 15 B	1749200	5948998	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	739	1.89	25.5	1.51	2.70	5.9	UTP	UTP	UTP	UTP	15 B - 15 C	1749220	5948996	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	740	1.93	26.3	1.53	2.70	3.1	UTP	UTP	UTP	UTP	15 C - 15 D	1749275	5948977	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	741	1.95	25.3	1.56	2.70	3.1	UTP	UTP	UTP	UTP	Main Gully Fill	1748979	5948877	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	742	1.89	29.3	1.46	2.70	2.9	UTP	UTP	UTP	UTP	Main Gully Fill	1748992	5948915	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	743	1.85	29.8	1.43	2.70	4.7	168	168	160	160	Main Gully Fill	1749052	5948941	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	744	1.84	33.0	1.38	2.70	3.3	146	146	160	160	Silt Pond	1749012	5948961	-	Silty Clay	Finished Level

## Comments:

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00363**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00363*

**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.)

*E. Paton*  
Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 14/03/2022



# 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

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.}



*E. Paton*

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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									208	208	200	200						
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



## 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



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.)

A handwritten signature in black ink, appearing to read "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 14/03/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00396**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00396*

**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:** Millwater Precinct K

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.)



*E. Paton*

Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 17/03/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									196	208	208	176						
14/03/2022	ETAM22W00396	SC	748	1.72	37.4	1.25	2.70	6.7	196	208	208	176	Undercut 10	1748969	5948955	-	Silty Clay	-
14/03/2022	ETAM22W00396	SC	749	1.86	30.4	1.43	2.70	3.6	176	208	208	176	Gully	1749055	5948941	-	Silty Clay	-
14/03/2022	ETAM22W00396	SC	750	1.81	34.9	1.34	2.70	3.4	184	184	184	184	Gully	1749016	5948905	-	Silty Clay	-
14/03/2022	ETAM22W00396	SC	751	1.92	26.4	1.52	2.70	3.7	188	208	208	208	Gully	1748990	5948876	-	Silty Clay	-

**Comments:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W00396**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00396*

**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:** Millwater Precinct K



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.)

A handwritten signature in black ink, appearing to read "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 17/03/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00405**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00405*

**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.)



*E. Paton*  
Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 17/03/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									145	188	UTP	139						
15/03/2022	ETAM22W00405	SC	752	1.79	27.4	1.40	2.70	9.6	145	188	UTP	139	Undercut 10	1748973	5948952	-	Silty Clay	-
15/03/2022	ETAM22W00405	SC	753	1.86	30.8	1.42	2.70	3.6	157	168	157	UTP	Gully	1749062	5948940	-	Silty Clay	-
15/03/2022	ETAM22W00405	SC	754	1.82	31.9	1.38	2.70	4.7	187	187	UTP	UTP	Gully	1749003	5948870	-	Silty Clay	-
15/03/2022	ETAM22W00405	SC	755	1.86	31.4	1.41	2.70	3.3	UTP	UTP	UTP	UTP	Gully	1749053	5948897	-	Silty Clay	-
15/03/2022	ETAM22W00405	SC	756	1.81	26.9	1.42	2.70	9.0	UTP	UTP	UTP	UTP	Lot 1004	1749395	5948931	-	Silty Clay	Finished Level
15/03/2022	ETAM22W00405	SC	757	1.85	28.3	1.44	2.70	5.6	UTP	UTP	UTP	UTP	Lot 1004	1749430	5948917	-	Silty Clay	Finished Level

**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00405**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00405*

**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.)

A handwritten signature in black ink that reads "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 17/03/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00436**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00436*

**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.)



*E. Paton*

Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 23/03/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									176	184	184	180						
17/03/2022	ETAM22W00436	SC	758	1.91	30.6	1.46	2.70	1.0	176	184	184	180	Gully	1749040	5948865	-	Silty Clay	-
17/03/2022	ETAM22W00436	SC	759	1.88	32.9	1.42	2.70	0.9	192	188	192	180	Gully	1748983	5948888	-	Silty Clay	-
17/03/2022	ETAM22W00436	SC	760	1.90	29.8	1.46	2.70	2.4	176	176	168	UTP	Gully	1749049	5948940	-	Silty Clay	-

**Comments:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W00436**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00436*

**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.)

A handwritten signature in black ink, appearing to read "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 23/03/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00450**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00450*

**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.)



*E. Paton*

Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 25/03/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
18/03/2022	ETAM22W00450	SC	761	1.79	29.2	1.39	2.70	8.1	UTP	UTP	UTP	UTP	Refer to map	1749161	5948803	-	Silty Clay	-
18/03/2022	ETAM22W00450	SC	762	1.92	28.1	1.50	2.70	2.4	UTP	UTP	UTP	UTP	Refer to map	1749217	5948823	-	Silty Clay	-
18/03/2022	ETAM22W00450	SC	763	1.94	28.9	1.51	2.70	0.6	UTP	UTP	UTP	UTP	Refer to map	1749031	5948867	-	Silty Clay	-
18/03/2022	ETAM22W00450	SC	764	1.81	31.4	1.38	2.70	5.8	142	UTP	UTP	UTP	Refer to map	1748977	5945905	-	Silty Clay	-
18/03/2022	ETAM22W00450	SC	765	1.88	31.5	1.43	2.70	1.9	176	UTP	UTP	UTP	Refer to map	1748970	5948958	-	Silty Clay	-

**Comments:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W00450**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00450*

**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.)

A handwritten signature in black ink that reads "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 25/03/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00509**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00509*

**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: 30/03/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	175	175						
29/03/2022	ETAM22W00509	LW	766	1.92	27.4	1.51	2.70	2.9	UTP	UTP	175	175	Gully 2	1749052	5948934	-	Silty Clay	-
29/03/2022	ETAM22W00509	LW	767	1.91	28.3	1.49	2.70	2.7	UTP	UTP	UTP	UTP	Gully 2	1748998	5948921	-	Silty Clay	-
29/03/2022	ETAM22W00509	LW	768	1.94	30.5	1.49	2.70	0.0	175	175	175	175	Gully 2	1748983	5948904	-	Silty Clay	-
29/03/2022	ETAM22W00509	LW	769	1.93	27.2	1.52	2.70	2.5	175	175	175	175	Gully 2	1748987	5948869	-	Silty Clay	-
29/03/2022	ETAM22W00509	LW	770	1.91	27.5	1.50	2.70	3.4	149	160	143	172	Gully 2	1749034	5948858	-	Silty Clay	-
29/03/2022	ETAM22W00509	LW	771	1.90	28.0	1.48	2.70	3.5	146	153	175	175	Gully 2	1749058	5948888	-	Silty Clay	-

**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00509**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00509*

**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.}

A handwritten signature in black ink that reads "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 30/03/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00530**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00530*

**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: 1/04/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									188	188	192	192						
30/03/2022	ETAM22W00530	SC	772	1.91	29.4	1.48	2.70	1.7	188	188	192	192	Gully	1749043	5948936	-	Silty Clay	-
30/03/2022	ETAM22W00530	SC	773	1.85	32.2	1.40	2.70	3.2	168	168	172	172	Gully	1749064	5948897	-	Silty Clay	-
30/03/2022	ETAM22W00530	SC	774	1.88	25.5	1.50	2.70	6.4	188	188	168	168	Gully	1749029	5948866	-	Silty Clay	-
30/03/2022	ETAM22W00530	SC	775	1.81	33.6	1.35	2.70	4.3	165	168	188	188	Gully	1749216	5948821	-	Silty Clay	-

**Comments:**



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



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00530**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00530*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 1/04/2022



**SITE PLAN** (NOT TO SCALE)

# Earthworks Fill Report

**Report No: EFIL:ETAM22W00541**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00541*

**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: 4/04/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate)			Test Location	Easting	Northing	RL	Material Tested	Comments	
									kPa	UTP	UTP							
31/03/2022	ETAM22W00541	LW	776	1.89	25.9	1.50	2.70	5.5	143	UTP	UTP	UTP	Gully 2	1748989	5948858	-	Silty Clay	-
31/03/2022	ETAM22W00541	LW	777	1.84	28.5	1.44	2.70	6.0	UTP	UTP	175	175	Gully 2	1749003	5948886	-	Silty Clay	-
31/03/2022	ETAM22W00541	LW	778	1.85	30.2	1.42	2.70	4.4	UTP	UTP	UTP	UTP	Gully 2	1749060	5948893	-	Silty Clay	-
31/03/2022	ETAM22W00541	LW	779	1.83	35.3	1.35	2.70	2.0	UTP	UTP	UTP	UTP	Gully 2	1749029	5948921	-	Silty Clay	-

**Comments:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W00541**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00541*

**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.}

A handwritten signature in black ink, appearing to read "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 4/04/2022




# Earthworks Fill Report

**Report No: EFIL:ETAM22W00560**  
**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00560*

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: *E. Paton*  
Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 5/04/2022

**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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									175	175	175	164						
1/04/2022	ETAM22W00560	LW	780	1.87	37.5	1.36	2.70	0.0	175	175	175	164	Gully 2	1749023	5948965	-	Silty Clay	-
1/04/2022	ETAM22W00560	LW	781	1.93	30.1	1.48	2.70	0.6	175	175	175	175	Gully 2	1749051	5948939	-	Silty Clay	-
1/04/2022	ETAM22W00560	LW	782	1.89	28.6	1.47	2.70	3.5	175	175	175	175	Gully 2	1749016	5948904	-	Silty Clay	-
1/04/2022	ETAM22W00560	LW	783	1.90	30.6	1.45	2.70	1.6	175	175	175	175	Gully 2	1749042	5948855	-	Silty Clay	-

**Comments:**

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

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00560**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00560*

**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.)

A handwritten signature in black ink, appearing to read "E. Paton".


Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 5/04/2022




# Earthworks Fill Report

**Report No: EFIL:ETAM22W00577**  
**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00577*



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: 5/04/2022

**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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									175	175	175	175						
4/04/2022	ETAM22W00577	LW	784	1.88	36.1	1.38	2.70	0.0	175	175	175	175	RW 312	1748989	5949022	-	Silty Clay	~6m to FL
4/04/2022	ETAM22W00577	LW	785	1.84	33.9	1.38	2.70	2.4	175	175	175	175	RW 312	1749014	5949016	-	Silty Clay	~6m to FL
4/04/2022	ETAM22W00577	LW	786	1.88	31.8	1.42	2.70	2.1	163	153	143	137	Gully 2	1749009	5948875	-	Silty Clay	-
4/04/2022	ETAM22W00577	LW	787	1.88	32.5	1.42	2.70	1.6	160	140	172	153	Gully 2	1749016	5948902	-	Silty Clay	-

**Comments:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W00577**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00577*

**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.)

A handwritten signature in black ink that reads "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 5/04/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00594**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00594*

**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: 7/04/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									168	164	175	175						
5/04/2022	ETAM22W00594	LW	788	1.86	32.6	1.40	2.70	2.6	168	164	175	175	Refer to plan	1749187	5948799	-	Silty Clay	1m to FL
5/04/2022	ETAM22W00594	LW	789	1.86	32.0	1.41	2.70	3.0	175	175	175	160	Refer to plan	1749164	5948816	-	Silty Clay	1m to FL
5/04/2022	ETAM22W00594	LW	790	1.88	32.8	1.41	2.70	1.4	175	175	175	175	Gully 2	1749013	5948869	-	Silty Clay	-
5/04/2022	ETAM22W00594	LW	791	1.88	33.3	1.41	2.70	0.8	175	175	175	175	Gully 2	1749025	5948887	-	Silty Clay	-

**Comments:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W00594**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00594*

**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.}

A handwritten signature in black ink that reads "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 7/04/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00635**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00635*

**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.)



*E. Paton*

Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 19/04/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									168	153	172	160						
7/04/2022	ETAM22W00635	LW	796	1.87	38.4	1.35	2.70	0.0	168	153	172	160	Gully 2	1749025	5948942	-	Silty Clay	-
7/04/2022	ETAM22W00635	LW	797	1.88	38.7	1.36	2.70	0.0	143	149	172	175	Gully 2	1749042	5948893	-	Silty Clay	-
7/04/2022	ETAM22W00635	LW	798	1.86	37.6	1.35	2.70	0.0	140	140	149	172	Gully 2	1748990	5948902	-	Silty Clay	-
7/04/2022	ETAM22W00635	LW	799	1.88	39.9	1.34	2.70	0.0	143	153	146	143	Gully 2	1749026	5948867	-	Silty Clay	-

**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W00635**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00635*

**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.)

A handwritten signature in black ink that reads "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 19/04/2022







# 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

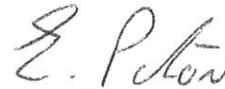
**cc to:** -

**Project No.:** 773-ETAM01553

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

**Project Location:** 117 Kowhai Road, Orewa

 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: 22/02/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									1	2	3	4						
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:**


## Earthworks Fill Report

**Report No: EFIL:ETAM22W00242**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00242*

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

E. Paton

Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 22/02/2022



**SITE PLAN (NOT TO SCALE)**



# 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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	168	168						
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:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W00316**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00316*

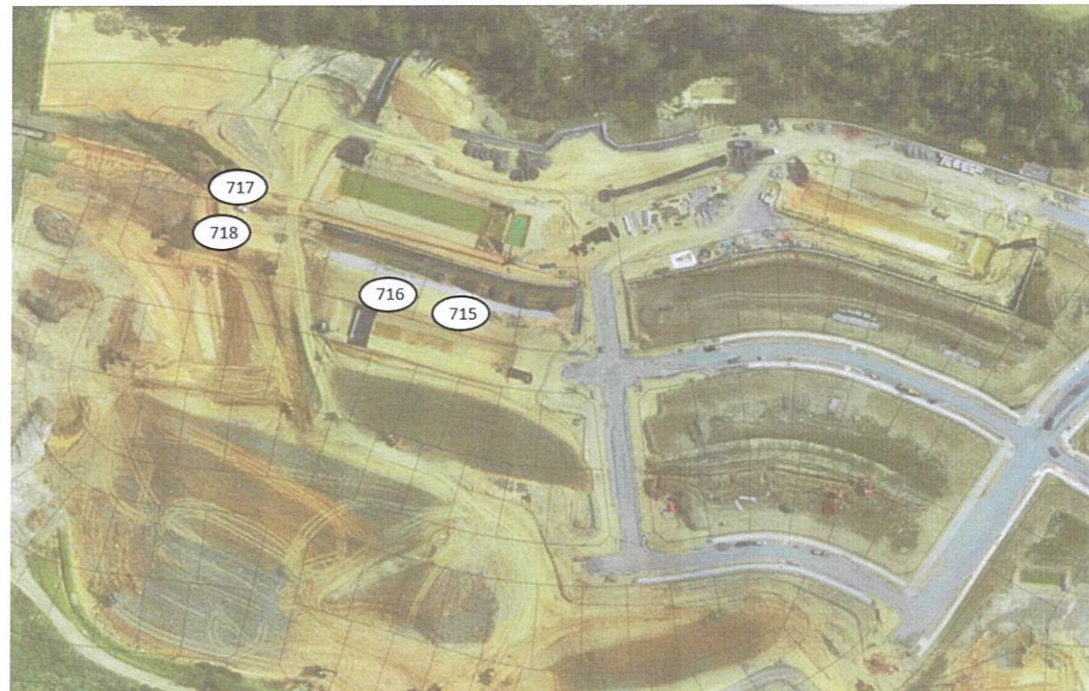
<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	117 Kowhai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

A handwritten signature in blue ink, appearing to read 'L Walker'.

Approved Signatory: Liam Walker  
Assistant Manager  
IANZ Site Number: 105  
Date of Issue: 4/03/2022





# Earthworks Fill Report

**Report No: EFIL:ETAM22W00577**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00577*

**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.)



*E. Paton*  
 Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 5/04/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									175	175	175	175						
4/04/2022	ETAM22W00577	LW	784	1.88	36.1	1.38	2.70	0.0	175	175	175	175	RW 312	1748989	5949022	-	Silty Clay	~6m to FL
4/04/2022	ETAM22W00577	LW	785	1.84	33.9	1.38	2.70	2.4	175	175	175	175	RW 312	1749014	5949016	-	Silty Clay	~6m to FL
4/04/2022	ETAM22W00577	LW	786	1.88	31.8	1.42	2.70	2.1	163	153	143	137	Gully 2	1749009	5948875	-	Silty Clay	-
4/04/2022	ETAM22W00577	LW	787	1.88	32.5	1.42	2.70	1.6	160	140	172	153	Gully 2	1749016	5948902	-	Silty Clay	-

**Comments:**

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




## Earthworks Fill Report

**Report No: EFIL:ETAM22W00577**

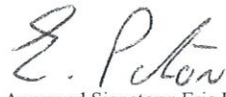
**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00577*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 5/04/2022





# Earthworks Fill Report

**Report No: EFIL:ETAM22W00619**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00619*

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


**Principal:** Stephen Parkes

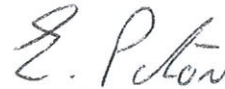
**cc to:** -

**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: 13/04/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									160	168	175	175						
6/04/2022	ETAM22W00619	LW	792	1.85	31.7	1.41	2.70	3.3	160	168	175	175	RW 312	1749002	5949020	-	Silty Clay	~5.5m to FL
6/04/2022	ETAM22W00619	LW	793	1.86	28.7	1.45	2.70	4.9	175	175	175	156	RW 312	1749038	5949013	-	Silty Clay	~5.5m to FL
6/04/2022	ETAM22W00619	LW	794	1.87	27.8	1.46	2.70	5.2	175	175	175	175	RW 312	1749064	5949002	-	Silty Clay	~5.5m to FL
6/04/2022	ETAM22W00619	LW	795	1.89	32.3	1.43	2.70	1.1	175	175	175	175	RW 312	1749110	5948988	-	Silty Clay	~5.5m to FL

**Comments:**



## Earthworks Fill Report

Report No: EFIL:ETAM22W00619

Issue No:1

*This report replaces all previous issues of report no. EFIL:ETAM22W00619*

**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.)

A handwritten signature in black ink that reads "E. Paton".

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 13/04/2022





# Nuclear Density Report

## Auckland Laboratory

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

Report No: ND:ETAM22W00071

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: 26/01/2022

### Testing Details

**Site Tested:** 117 Kowhai Road, Orewa-RW 312

**Tested By:** Eric Paton

**Date Tested:** 19/01/2022

**Time Tested:** 11:00

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

### Compaction Target Details

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.12 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.01

**Solid Density Type:** Assumed

### Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
170	0.5	Face of Wall	RL 16.4	8.0	2.20	2.04	96
155	0.5	Face of Wall	RL 16.4	7.7	2.24	2.08	98
140	0.5	Face of Wall	RL 16.4	7.9	2.28	2.11	100
125	0.5	Face of Wall	RL 16.4	10.1	2.34	2.12	100

### Comments

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures





## Nuclear Density Report

### Auckland Laboratory

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

Report No: ND:ETAM22W00124

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.)



*E. Paton*

Approved Signatory: Eric Paton  
(Director-Testing)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 1/02/2022

### Testing Details

**Site Tested:** 117 Kowhai Road, Orewa-RW 312

**Tested By:** Liam Walker

**Date Tested:** 28/01/2022

**Time Tested:** 14:00

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

### Compaction Target Details

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.12 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.01

**Solid Density Type:** Assumed

### Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
170	1	Face of Wall	2nd Layer	9.3	2.24	2.05	97
155	1	Face of Wall	2nd Layer	9.2	2.27	2.08	98
140	1	Face of Wall	2nd Layer	8.2	2.18	2.02	95
125	1	Face of Wall	2nd Layer	8.1	2.24	2.07	98

### Comments

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures



# Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00159

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.)



*E. Paton*

Approved Signatory: Eric Paton  
(Director-Testing)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 4/02/2022

**Testing Details**

**Site Tested:** 117 Kowhai Road, Orewa-RW 312

**Tested By:** Liam Walker

**Date Tested:** 2/02/2022

**Time Tested:** 09:30

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.12 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.01

**Solid Density Type:** Assumed

**Test Results**

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
125	1	Face of Wall	3rd Layer	9.3	2.23	2.04	96
140	1	Face of Wall	3rd Layer	9.7	2.29	2.09	98
155	1	Face of Wall	3rd Layer	7.5	2.24	2.08	98
170	1	Face of Wall	3rd Layer	7.2	2.23	2.08	98

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures



# Nuclear Density Report

## Auckland Laboratory

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

Report No: ND:ETAM22W00180

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.}



*E. Paton*

Approved Signatory: Eric Paton  
(Director-Testing)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 8/02/2022

**Testing Details**

**Site Tested:** 117 Kowhai Road, Orewa-RW 312

**Tested By:** Liam Walker

**Date Tested:** 4/02/2022

**Time Tested:** 13:30

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.12 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.04

**Solid Density Type:** Assumed

**Test Results**

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
90	1	Front of wall	Base	8.8	2.23	2.05	97
100	1	Front of wall	Base	7.7	2.22	2.07	97
110	1	Front of wall	Base	8.6	2.22	2.04	96
125	1	Front of wall	Layer 4	7.4	2.19	2.04	96
140	1	Front of wall	Layer 4	7.5	2.19	2.03	96
155	1	Front of wall	Layer 4	6.7	2.21	2.07	98
170	1	Front of wall	Layer 4	7.1	2.20	2.05	97

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures



**Auckland Laboratory**

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



**Nuclear Density Report**

**Report No: ND:ETAM22W00225**  
**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.)



*E. Paton*

Approved Signatory: Eric Paton  
 (Director-Testing)  
 IANZ Accredited Laboratory Number:105  
 Date of Issue: 17/02/2022

**Testing Details**

**Site Tested:** 117 Kowhai Road, Orewa-RW 312

**Tested By:** Salvindra Chandra

**Date Tested:** 16/02/2022

**Time Tested:** 14:00

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.12 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.01

**Solid Density Type:** Assumed

<b>Test Results</b>					
Chainage (m)	Offset (m)	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
110	2	9.7	2.33	2.13	100
100	2.5	9.2	2.24	2.05	97
90	2	8.6	2.22	2.04	96
80	2.5	9.9	2.25	2.05	97
70	2	9.3	2.29	2.09	99
120	2.5	10.2	2.30	2.08	98

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.  
 Field Moistures



# Nuclear Density Report

## Auckland Laboratory

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

Report No: ND:ETAM22W00243

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.}

*E. Paton*  
Approved Signatory: Eric Paton  
(Director-Testing)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 22/02/2022

### Testing Details

**Site Tested:** 117 Kowhai Road, Orewa-RW 312  
**Tested By:** Salvindra Chandra  
**Date Tested:** 18/02/2022  
**Time Tested:** 15:15  
**Material:** GAP 65  
**Start Route Position:**  
**Field Methods:** NZS 4407:2015 Test 4.3

### Compaction Target Details

**Material Sample ID:** External  
**MDD Method:** ~  
**Max. Dry Density:** 2.12 t/m<sup>3</sup> @ 5.5 %  
**Min. Dry Density (t/m<sup>3</sup>):** 2.01  
**Solid Density Type:** Assumed

### Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
120	2	Front of wall	8.4	2.33	2.15	101
110	2.5	Front of wall	9.6	2.31	2.10	99
100	2	Front of wall	8.9	2.18	2.00	95
90	2.5	Front of wall	8.2	2.21	2.05	97
80	2	Front of wall	8.9	2.29	2.10	99
70	2.5	Front of wall	10.3	2.22	2.01	95

### Comments

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures

**Auckland Laboratory**

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



**Nuclear Density Report**

**Report No: ND:ETAM22W00257**

**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.)



*E. Paton*

Approved Signatory: Eric Paton  
 (Director-Testing)  
 IANZ Accredited Laboratory Number:105  
 Date of Issue: 23/02/2022

**Testing Details**

**Site Tested:** 117 Kowhai Road, Orewa-RW 312

**Tested By:** Salvindra Chandra

**Date Tested:** 21/02/2022

**Time Tested:** 13:00

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.12 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.01

**Solid Density Type:** Assumed

**Test Results**

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
130	2.5	Face of Wall	Top of Block 2	6.2	2.13	2.00	94
140	2.5	Face of Wall	Top of Block 2	6.5	2.21	2.07	98
150	2	Face of Wall	Top of Block 2	8.1	2.24	2.07	98
160	1.5	Face of Wall	Top of Block 2	5.9	2.19	2.07	98
170	1.5	Face of Wall	Top of Block 2	7.2	2.18	2.03	96

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.  
 Field Moistures





# Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00268

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: 25/02/2022

## Testing Details

**Site Tested:** RW312, as per clients chainages

**Tested By:** Salvindra Chandra

**Date Tested:** 23/02/2022

**Time Tested:** 12:00

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

## Compaction Target Details

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.12 t/m<sup>3</sup> @ 8.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.01

**Solid Density Type:** Assumed

## Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
170	2.0	Wall face	Top of Block 2	7.2	2.18	2.03	96
160	1.5	Wall face	Top of Block 2	7.5	2.25	2.09	99
150	2.0	Wall face	Top of Block 2	6.4	2.27	2.13	101
140	1.5	Wall face	Top of Block 2	6.8	2.22	2.08	98
130	2.0	Wall face	Top of Block 2	7.6	2.22	2.07	97
120	1.5	Wall face	Top of Block 1	7.4	2.21	2.05	97
110	2.0	Wall face	Top of Block 1	6.5	2.23	2.09	99
100	1.5	Wall face	Top of Block 1	7.0	2.26	2.11	100
90	2.0	Wall face	Top of Block 1	7.8	2.26	2.10	99
80	1.5	Wall face	Top of Block 1	6.5	2.17	2.04	96
70	2.0	Wall face	Top of Block 1	7.5	2.19	2.03	96

## Comments

~ Test was conducted externally and is not accredited by this laboratory.



# Nuclear Density Report

## Auckland Laboratory

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

Report No: ND:ETAM22W00309

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.)

*Liam Walker*  
Approved Signatory: Liam Walker  
(Assistant Manager)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 3/03/2022

### Testing Details

**Site Tested:** RW312, as per clients chainages

**Tested By:** Salvindra Chandra

**Date Tested:** 1/03/2022

**Time Tested:** 13:45

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

### Compaction Target Details

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.1 t/m<sup>3</sup> @ 10.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 1.99

**Solid Density Type:** Assumed

### Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
70	2.0	Wall face	6.1	2.15	2.03	97
80	2.5	Wall face	6.7	2.19	2.05	98
90	2.0	Wall face	6.4	2.12	2.00	95
100	2.5	Wall face	5.5	2.17	2.06	98
110	2.0	Wall face	6.5	2.17	2.04	97
120	2.5	Wall face	6.9	2.23	2.09	99
130	2.0	Wall face	6.2	2.14	2.02	96
140	2.5	Wall face	7.6	2.22	2.07	98
150	2.0	Wall face	7.0	2.13	1.99	95
160	2.5	Wall face	6.5	2.23	2.09	100

### Comments

~ Test was conducted externally and is not accredited by this laboratory.



# Nuclear Density Report

## Auckland Laboratory

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

Report No: ND:ETAM22W00328

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.)



*Liam Walker*

Approved Signatory: Liam Walker  
(Assistant Manager)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 7/03/2022

**Testing Details**

**Site Tested:** RW312, as per clients chainages

**Tested By:** Salvindra Chandra

**Date Tested:** 4/03/2022

**Time Tested:** 13:55

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.1 t/m<sup>3</sup> @ 10.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 1.99

**Solid Density Type:** Assumed

**Test Results**

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
70	2.0	Wall face	Top of Block 2	7.6	2.22	2.07	98
80	2.0	Wall face	Top of Block 2	6.5	2.20	2.06	98
90	2.0	Wall face	Top of Block 2	6.8	2.13	2.00	95
100	2.0	Wall face	Top of Block 2	6.3	2.16	2.03	97
110	2.0	Wall face	Top of Block 2	7.3	2.17	2.02	96
120	2.0	Wall face	Top of Block 3	5.5	2.23	2.11	100
130	2.0	Wall face	Top of Block 3	6.7	2.22	2.08	99
140	2.0	Wall face	Top of Block 3	6.3	2.18	2.05	98

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.





## Nuclear Density Report

### Auckland Laboratory

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

Report No: ND:ETAM22W00364

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: 14/03/2022

### Testing Details

**Site Tested:** 117 Kowhai Road, Orewa-RW 312-Footing Foundation

**Tested By:** Salvindra Chandra

**Date Tested:** 10/03/2022

**Time Tested:** 09:10

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

### Compaction Target Details

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.1 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.00

**Solid Density Type:** Assumed

### Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
55	0.5	Face of Wall	8.4	2.19	2.02	96
60	0.5	Face of Wall	10.2	2.22	2.02	96
70	0.5	Face of Wall	9.9	2.27	2.07	98

### Comments

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures

**Auckland Laboratory**

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



**Nuclear Density Report**

**Report No: ND:ETAM22W00379**

**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.)



*E. Paton*

Approved Signatory: Eric Paton  
 (Director-Testing)  
 IANZ Accredited Laboratory Number:105  
 Date of Issue: 14/03/2022

**Testing Details**

**Site Tested:** 117 Kowhai Road, Orewa-RW 312

**Tested By:** Salvindra Chandra

**Date Tested:** 11/03/2022

**Time Tested:** 09:10

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.1 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.00

**Solid Density Type:** Assumed

<b>Test Results</b>							
Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
30	0.5	Front of wall	Footing	8.3	2.17	2.00	95
40	0.5	Front of wall	Footing	8.2	2.17	2.00	95
45	0.5	Front of wall	Footing	7.9	2.25	2.09	99
50	0.5	Front of wall	Footing	7.2	2.23	2.08	99
55	2.0	Front of wall	Footing	9.2	2.30	2.10	100
60	2.0	Front of wall	1st Layer	8.5	2.27	2.09	100
70	2.0	Front of wall	1st Layer	9.4	2.29	2.09	100

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.  
 Field Moisture





# Nuclear Density Report

## Auckland Laboratory

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

Report No: ND:ETAM22W00408

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.)

*E. Paton*  
Approved Signatory: Eric Paton  
(Director-Testing)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 17/03/2022

### Testing Details

**Site Tested:** RW 312  
**Tested By:** Salvindra Chandra  
**Date Tested:** 15/03/2022  
**Time Tested:** 13:40  
**Material:** GAP 65  
**Start Route Position:**  
**Field Methods:** NZS 4407:2015 Test 4.3

### Compaction Target Details

**Material Sample ID:** External  
**MDD Method:** ~  
**Max. Dry Density:** 2.1 t/m<sup>3</sup> @ 5.5 %  
**Min. Dry Density (t/m<sup>3</sup>):** 2.00  
**Solid Density Type:** Assumed

### Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
55	1	Face of Wall	7.5	2.18	2.03	97
65	1	Face of Wall	8.9	2.18	2.00	95

### Comments

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures



# Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00437

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.)



*E. Paton*

Approved Signatory: Eric Paton  
(Director-Testing)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 23/03/2022

**Testing Details**

**Site Tested:** 117 Kowhai Road, Orewa

**Tested By:** Salvindra Chandra

**Date Tested:** 17/03/2022

**Time Tested:** 15:50

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.1 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.00

**Solid Density Type:** Assumed

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
20	0.5	Face of R. Wall	8.8	2.28	2.10	100
5	0.5	Face of R. Wall	8.3	2.19	2.03	96

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures



# Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00451

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.)



*E. Paton*

Approved Signatory: Eric Paton  
(Director-Testing)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 25/03/2022

**Testing Details**

**Site Tested:** 117 Kowhai Road, Orewa

**Tested By:** Salvindra Chandra

**Date Tested:** 18/03/2022

**Time Tested:** 13:30

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.1 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.00

**Solid Density Type:** Assumed

Site No	Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
1	5	0.5	Face of R. Wall	9.6	1.59	1.45	69
2 (Retest of # 1)	5	0.5	Face of R. Wall	9.3	2.18	1.99	95
3	2	0.5	Face of R. Wall	8.8	2.23	2.05	98

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.  
Field moistures





# Nuclear Density Report

Report No: ND:ETAM22W00508

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.}



*E. Paton*

Approved Signatory: Eric Paton  
(Director-Testing)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 30/03/2022

**Testing Details**

**Site Tested:** RW 312 (APCC)

**Tested By:** Liam Walker

**Date Tested:** 29/03/2022

**Time Tested:** 13:00

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.1 t/m<sup>3</sup> @ 10.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.00

**Solid Density Type:** Assumed

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
5	1.5	Wall face	Level 1	9.2	2.23	2.04	97
20	1	Wall face	Level 1	8.6	2.22	2.04	97
35	1.5	Wall face	Level 1	9.3	2.24	2.05	98
50	1	Wall face	Level 1	8.7	2.21	2.04	97
65	1.5	Wall face	Level 1	8.8	2.19	2.01	96
80	1	Wall face	Level 1	7.9	2.21	2.05	98
95	1.5	Wall face	Level 3	8.3	2.17	2.01	96
110	1	Wall face	Level 3	8.8	2.24	2.06	98
125	1.5	Wall face	Level 3	7.8	2.20	2.04	97
140	1	Wall face	Level 3	8.2	2.22	2.05	98
155	1.5	Wall face	Level 3	12.7	2.28	2.02	96
170	1	Wall face	Level 3	10.5	2.23	2.02	96
185	1.5	Wall face	Level 3	9.3	2.18	2.00	95

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.



# Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00566

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.)



*E. Paton*

Approved Signatory: Eric Paton  
 (Director-Testing)  
 IANZ Accredited Laboratory Number:105  
 Date of Issue: 5/04/2022

**Testing Details**

**Site Tested:** 117 Kowhai Road, Orewa

**Tested By:** Ramon Powell

**Date Tested:** 2/04/2022

**Time Tested:** 08:30

**Material:** GAP65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.04 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 1.94

**Solid Density Type:** Assumed

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
0	1	Centre of Mass Block	7.9	2.12	1.97	96
10	1	Centre of Mass Block	11.4	2.18	1.96	96
20	1	Centre of Mass Block	8.6	2.19	2.02	99
30	1	Centre of Mass Block	9.3	2.27	2.08	102
40	1	Centre of Mass Block	9.4	2.17	1.98	97
50	1	Centre of Mass Block	9.4	2.17	1.98	97
60	1	Centre of Mass Block	9.1	2.12	1.95	95
70	1	Centre of Mass Block	9.6	2.14	1.95	96
80	1	Centre of Mass Block	8.4	2.21	2.04	100
90	1	Centre of Mass Block	7.4	2.15	2.00	98

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.  
 Field Moistures





# Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00620

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.)



*E. Paton*

Approved Signatory: Eric Paton  
(Director-Testing)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 13/04/2022

**Testing Details**

**Site Tested:** RW 312 (APCC)

**Tested By:** Liam Walker

**Date Tested:** 6/04/2022

**Time Tested:** 13:00

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.04 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 1.94

**Solid Density Type:** Assumed

**Test Results**

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
10	1	Wall face	Top of Block 1	7.1	2.21	2.07	101
20	1	Wall face	Top of Block 1	8.4	2.20	2.03	100
30	1	Wall face	Top of Block 1	8.4	2.12	1.95	96
40	1	Wall face	Top of Block 1	8.2	2.26	2.09	102
50	1	Wall face	Top of Block 1	8.5	2.24	2.06	101
60	1	Wall face	Top of Block 1	9.1	2.24	2.05	101

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures



# Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00687

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: 20/04/2022

## Testing Details

**Site Tested:** RW 312 (APCC)  
**Tested By:** Liam Walker  
**Date Tested:** 11/04/2022  
**Time Tested:** 09:00  
**Material:** GAP 65  
**Start Route Position:**  
**Field Methods:** NZS 4407:2015 Test 4.3

## Compaction Target Details

**Material Sample ID:** External  
**MDD Method:** ~  
**Max. Dry Density:** 2.04 t/m<sup>3</sup> @ 5.5 %  
**Min. Dry Density (t/m<sup>3</sup>):** 1.94  
**Solid Density Type:** Assumed

## Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
120	1.5	Wall face	7.4	2.14	1.99	98
110	1	Wall face	6.7	2.19	2.06	101
100	1.5	Wall face	7.0	2.20	2.06	101
90	1	Wall face	7.8	2.19	2.03	99
80	1.5	Wall face	7.8	2.13	1.97	97
70	1	Wall face	7.2	2.15	2.00	98
60	1.5	Wall face	8.4	2.18	2.01	99
50	1	Wall face	7.9	2.17	2.01	98

## Comments

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures



# Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00703

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: 20/04/2022

## Testing Details

**Site Tested:** RW 312 (APCC)  
**Tested By:** Liam Walker  
**Date Tested:** 12/04/2022  
**Time Tested:** 09:00  
**Material:** GAP 65  
**Start Route Position:**  
**Field Methods:** NZS 4407:2015 Test 4.3

## Compaction Target Details

**Material Sample ID:** External  
**MDD Method:** ~  
**Max. Dry Density:** 2.04 t/m<sup>3</sup> @ 5.5 %  
**Min. Dry Density (t/m<sup>3</sup>):** 1.94  
**Solid Density Type:** Assumed

## Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
50	1.5	Wall face	7.5	2.11	1.97	96
40	1.5	Wall face	8.1	2.18	2.01	99
30	1.5	Wall face	8.3	2.15	1.99	97
20	1.5	Wall face	7.8	2.17	2.02	99
10	1.5	Wall face	7.5	2.12	1.98	97

## Comments

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures





# Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00917

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.)



*E. Paton*

Approved Signatory: Eric Paton  
(Director-Testing)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 12/05/2022

**Testing Details**

**Site Tested:** 117 Kowhai Road, Orewa-RW 312

**Tested By:** Liam Walker

**Date Tested:** 11/05/2022

**Time Tested:** 11:30

**Material:** GAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.1 t/m<sup>3</sup> @ 8.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.00

**Solid Density Type:** Assumed

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
10	1	Face of Wall	11.1	2.28	2.05	98
20	1.5	Face of Wall	11.0	2.27	2.05	97
30	1	Face of Wall	10.9	2.32	2.09	99
40	1.5	Face of Wall	10.5	2.22	2.01	96
50	1	Face of Wall	10.8	2.34	2.11	100
60	1.5	Face of Wall	10.7	2.32	2.09	100
70	1	Face of Wall	10.9	2.32	2.09	100
80	1.5	Face of Wall	12.0	2.30	2.05	98
90	1	Face of Wall	11.3	2.28	2.05	98
100	1.5	Face of Wall	11.8	2.33	2.08	99
110	1	Face of Wall	12.5	2.29	2.03	97
120	1.5	Face of Wall	11.7	2.26	2.03	97
130	1	Face of Wall	10.7	2.31	2.09	99
140	1.5	Face of Wall	10.2	2.34	2.13	101
150	1	Face of Wall	11.2	2.25	2.03	96
160	1.5	Face of Wall	10.2	2.33	2.11	101
170	1	Face of Wall	10.0	2.25	2.04	97

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures



# Nuclear Density Report

## Auckland Laboratory

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

Report No: ND:ETAM22W01048

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.)



*E. Paton*

Approved Signatory: Eric Paton  
(Director-Testing)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 1/06/2022

**Testing Details**

**Site Tested:** Retaining Wall 312 (4th Layer)

**Tested By:** Mohammed Azam

**Date Tested:** 27/05/2022

**Time Tested:** 09:00

**Material:** GAP 65

**Start Route Position:** -

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.1 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.00

**Solid Density Type:** Assumed

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
10	2	Edge of *RW	10.6	2.22	2.01	96
20	2	Edge of *RW	10.5	2.21	2.00	95
30	2	Edge of *RW	9.7	2.22	2.03	97
40	2	Edge of *RW	10.2	2.21	2.01	96
50	2.5	Edge of *RW	9.2	2.18	2.00	95
60	2.5	Edge of *RW	9.9	2.21	2.01	96
70	2.5	Edge of *RW	10.7	2.21	2.00	95
80	2	Edge of *RW	10.0	2.21	2.01	95
90	2	Edge of *RW	9.5	2.20	2.01	96
100	2	Edge of *RW	9.4	2.18	1.99	95
110	2	Edge of *RW	12.2	2.30	2.05	98
120	2.2	Edge of *RW	10.9	2.31	2.08	99
130	2.2	Edge of *RW	9.7	2.33	2.13	101
140	2	Edge of *RW	10.1	2.32	2.11	100

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures.





# Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM23W00936

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: 22/05/2023

## Testing Details

**Site Tested:** Road 2  
**Tested By:** Salvindra Chandra  
**Date Tested:** 18/05/2023  
**Time Tested:** 11:00  
**Material:** ATAP 65  
**Start Route Position:**  
**Field Methods:** NZS 4407:2015 Test 4.3

## Compaction Target Details

**Material Sample ID:** External  
**MDD Method:** ~  
**Max. Dry Density:** 2.34 t/m<sup>3</sup> @ 5.5 %  
**Min. Dry Density (t/m<sup>3</sup>):** 2.22  
**Solid Density Type:** Assumed

## Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Lane	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
1	130	1.5	Centre Line	LHS	5.8	2.23	2.11	90
2	140	1.5	Centre Line	RHS	8.3	2.21	2.04	87
3	150	1.5	Centre Line	LHS	5.9	2.35	2.22	95
4	160	1.5	Centre Line	RHS	6.3	2.20	2.07	88
5	170	2	Centre Line	LHS	5.0	2.36	2.25	96
6	180	2	Centre Line	RHS	7.3	2.46	2.29	98
7	190	1.5	Centre Line	LHS	7.4	2.41	2.24	96
8	200	1.5	Centre Line	RHS	5.9	2.42	2.28	97
9	210	1.5	Centre Line	LHS	4.8	2.41	2.30	98
10	220	1.5	Centre Line	RHS	5.8	2.45	2.31	99
11	230	1.5	Centre Line	LHS	6.9	2.40	2.25	96
12	240	1.5	Centre Line	RHS	5.2	2.34	2.22	95
13	250	1.5	Centre Line	LHS	6.5	2.36	2.22	95
14	260	1.5	Centre Line	RHS	5.8	2.09	1.98	85
15	270	1.5	Centre Line	LHS	6.6	2.29	2.15	92
16	280	1.5	Centre Line	RHS	5.5	2.18	2.06	88
17	290	1.5	Centre Line	LHS	5.8	2.36	2.23	95
18	300	1.5	Centre Line	RHS	7.0	2.39	2.24	96
19	310	1.5	Centre Line	LHS	7.4	2.02	1.88	80
20	320	1.5	Centre Line	RHS	6.3	2.09	1.97	84
21	330	1.5	Centre Line	LHS	7.0	2.13	1.99	85
22	340	2	Centre Line	RHS	6.0	2.14	2.02	86
23	350	2	Centre Line	LHS	6.0	2.21	2.09	89
24	360	2	Centre Line	RHS	6.5	2.22	2.08	89
25	370	2	Centre Line	LHS	7.1	2.16	2.02	86

## Comments

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures  
MDD-Supplied by the Client  
Random Locations Chosen by the Technician

## Nuclear Density Report

Report No: ND:ETAM23W00937

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.}



*E. Paton*

Approved Signatory: Eric Paton  
(Director-Testing)

IANZ Accredited Laboratory Number:105  
Date of Issue: 22/05/2023

### Testing Details

**Site Tested:** Road 3

**Tested By:** Salvindra Chandra

**Date Tested:** 18/05/2023

**Time Tested:** 11:00

**Material:** ATAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

### Compaction Target Details

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.34 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.22

**Solid Density Type:** Assumed

### Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Lane	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
26	190	1	Centre Line	LHS	6.7	2.05	1.92	82
27	200	1	Centre Line	RHS	6.1	2.15	2.03	87
28	210	1	Centre Line	LHS	6.9	2.09	1.96	84
29	220	1	Centre Line	RHS	7.0	2.37	2.22	95
30	230	1	Centre Line	LHS	6.8	2.38	2.23	95
31	240	2	Centre Line	RHS	7.2	2.46	2.30	98
32	250	1	Centre Line	LHS	6.6	2.46	2.31	99
33	260	1	Centre Line	RHS	6.3	2.44	2.30	98
34	270	1	Centre Line	LHS	7.1	2.44	2.28	97
35	280	2	Centre Line	RHS	6.6	2.44	2.29	98
36	290	2	Centre Line	LHS	5.9	2.36	2.23	95
37	300	2	Centre Line	RHS	6.7	2.40	2.25	96
38	310	1	Centre Line	LHS	6.1	2.38	2.24	96
39	320	1	Centre Line	RHS	6.2	2.25	2.12	90
40	330	2	Centre Line	LHS	6.7	2.32	2.17	93
41	340	2	Centre Line	RHS	6.0	2.33	2.20	94
42	350	2	Centre Line	LHS	6.1	2.40	2.27	97
43	360	1	Centre Line	RHS	6.8	2.30	2.16	92
44	330	2	Centre Line	RHS-Retest	6.3	2.46	2.31	99
45	320	1	Centre Line	RHS-Retest	6.5	2.45	2.30	98
46	340	2	Centre Line	LHS-Retest	6.7	2.41	2.26	97

### Comments

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures  
MDD-Supplied by the Client  
Random Locations Chosen by the Technician



# Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM23W00978

Issue No: 2

This report replaces all previous issues of report no 'ND:ETAM23W00978'.

**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.}



*E. Paton*

Approved Signatory: Eric Paton  
(Director-Testing)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 24/05/2023

## Testing Details

**Site Tested:** Road 2

**Tested By:** Salvindra Chandra

**Date Tested:** 24/05/2023

**Time Tested:** 15:30

**Material:** ATAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

## Compaction Target Details

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.34 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.22

**Solid Density Type:** Assumed

## Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Lane	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
1-Retest	130	1.5	Centreline	LHS	6.0	2.38	2.25	96
2-Retest	140	1.5	Centreline	RHS	6.3	2.40	2.26	97
3-Retest	160	1.5	Centreline	RHS	6.0	2.41	2.27	97
4-Retest	260	1.5	Centreline	RHS	5.5	2.37	2.25	96
5-Retest	270	1.5	Centreline	LHS	5.1	2.38	2.27	97
6-Retest	280	1.5	Centreline	RHS	5.9	2.36	2.22	95
7-Retest	310	1.5	Centreline	LHS	6.4	2.36	2.22	95
8-Retest	320	2	Centreline	RHS	7.4	2.40	2.24	96
9-Retest	330	2	Centreline	LHS	6.2	2.46	2.31	99
10-Retest	340	2	Centreline	RHS	6.6	2.38	2.23	95
11-Retest	350	2	Centreline	LHS	6.8	2.39	2.24	96
12-Retest	360	2	Centreline	RHS	7.0	2.39	2.23	95
13-Retest	370	2	Centreline	LHS	6.5	2.36	2.22	95
14	380	2	Centreline	RHS	6.4	2.37	2.23	95
15	390	1	Centreline	LHS	6.3	2.45	2.30	98
16	400	1.5	Centreline	RHS	5.5	2.43	2.30	98
17	410	1.5	Centreline	LHS	6.1	2.42	2.28	98
18	420	1.5	Centreline	RHS	5.3	2.35	2.23	95
19	430	1.5	Centreline	LHS	5.6	2.36	2.24	96
20	440	1.5	Centreline	RHS	5.5	2.34	2.22	95

## Comments

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures  
MDD-Supplied by the Client  
Random Locations Selected by the Technician



# Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM23W00979

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.}



*E. Paton*

Approved Signatory: Eric Paton  
(Director-Testing)  
IANZ Accredited Laboratory Number:105  
Date of Issue: 24/05/2023

**Testing Details**

**Site Tested:** Road 3

**Tested By:** Salvindra Chandra

**Date Tested:** 24/05/2023

**Time Tested:** 16:10

**Material:** ATAP 65

**Start Route Position:**

**Field Methods:** NZS 4407:2015 Test 4.3

**Compaction Target Details**

**Material Sample ID:** External

**MDD Method:** ~

**Max. Dry Density:** 2.34 t/m<sup>3</sup> @ 5.5 %

**Min. Dry Density (t/m<sup>3</sup>):** 2.22

**Solid Density Type:** Assumed

Site No	Chainage (m)	Offset (m)	Offset From	Lane	Moisture (%)	Wet Density (t/m <sup>3</sup> )	Dry Density (t/m <sup>3</sup> )	Relative Compaction (%)
21	190	1	Centreline	Left	6.1	2.40	2.27	97
22	200	1	Centreline	Right	6.9	2.40	2.25	96
23	210	1	Centreline	Left	5.0	2.36	2.25	96
24	360	1	Centreline	Right	5.9	2.36	2.23	95

**Comments**

~ Test was conducted externally and is not accredited by this laboratory.  
Field Moistures  
MDD-Supplied by the Client  
Random Locations Selected by the Technician

# Earthworks Fill Report

**Report No: EFIL:ETAM22W00904**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00904*

**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.}



*E. Paton*  
 Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 12/05/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
9/05/2022	ETAM22W00904	LW	828	1.93	30.3	1.48	2.65	0.0	175	175	175	175	Gully 2	1749090	5948911	33.12	Silty Clay	-
9/05/2022	ETAM22W00904	LW	829	1.93	28.9	1.50	2.65	0.2	175	175	175	175	Gully 2	1749052	5948927	34.53	Silty Clay	-
9/05/2022	ETAM22W00904	LW	830	1.94	27.8	1.52	2.65	0.3	175	175	175	175	RE Wall 601	1749114	5948919	27.00	Silty Clay	-
9/05/2022	ETAM22W00904	LW	831	1.91	27.9	1.50	2.65	1.8	175	175	175	175	RE Wall 601	1749136	5948916	27.00	Silty Clay	-

**Comments:**

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



## Earthworks Fill Report

**Report No: EFIL:ETAM22W00904**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00904*

**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.}

A handwritten signature in black ink, appearing to read "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 12/05/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01007**
**Issue No:1**
*This report replaces all previous issues of report no. EFIL:ETAM22W01007*

**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: 26/05/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									137	143	160	153						
24/05/2022	ETAM22W01007	LW	847	1.81	37.0	1.32	2.65	1.6	137	143	160	153	RE Wall 601	1749110	5948910	31.20	Lime Stab. Silty Clay	-
24/05/2022	ETAM22W01007	LW	848	1.82	39.8	1.30	2.65	0.0	172	140	146	160	RE Wall 601	1749087	5948919	31.40	Lime Stab. Silty Clay	-
24/05/2022	ETAM22W01007	LW	849	1.81	38.1	1.31	2.65	0.9	156	172	146	149	RE Wall 601	1749072	5948928	31.60	Lime Stab. Silty Clay	-
24/05/2022	ETAM22W01007	LW	850	1.81	38.8	1.30	2.65	0.3	168	137	140	168	RE Wall 601	1749011	5948945	32.00	Lime Stab. Silty Clay	-
24/05/2022	ETAM22W01007	LW	851	1.82	37.8	1.32	2.65	0.0	175	175	175	164	RE Wall 601	1748991	5948949	31.90	Lime Stab. Silty Clay	-
24/05/2022	ETAM22W01007	LW	852	1.81	38.6	1.31	2.65	0.1	175	175	149	168	RE Wall 601	1748964	5948950	31.80	Lime Stab. Silty Clay	-

**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W01007**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01007*

**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.}

A handwritten signature in black ink, appearing to read "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 26/05/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01013**
**Issue No:1**
*This report replaces all previous issues of report no. EFIL:ETAM22W01013*

**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: 26/05/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									168	172	168	165						
25/05/2022	ETAM22W01013	SC	853	1.82	34.9	1.35	2.65	2.1	168	172	168	165	Gully	1749011	5948916	33.2	Lime Stab. Silty Clay	-
25/05/2022	ETAM22W01013	SC	854	1.83	30.7	1.40	2.65	4.4	168	168	180	180	Gully	1749067	5948901	33.2	Lime Stab. Silty Clay	-
25/05/2022	ETAM22W01013	SC	855	1.83	34.4	1.36	2.65	1.9	180	180	188	188	Gully	1749103	5948896	33.2	Lime Stab. Silty Clay	-
25/05/2022	ETAM22W01013	SC	856	1.82	35.9	1.34	2.65	1.5	146	141	146	141	Re Wall 601	1749094	5948912	32.58	Lime Stab. Silty Clay	-
25/05/2022	ETAM22W01013	SC	857	1.79	38.9	1.29	2.65	1.4	141	141	146	146	Re Wall 601	1749069	5948934	32.58	Lime Stab. Silty Clay	-

**Comments:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W01013**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01013*

**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.}

A handwritten signature in black ink that reads "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 26/05/2022





# Earthworks Fill Report

**Report No: EFIL:ETAM22W01047**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01047*

**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: 1/06/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate)				Test Location	Easting	Northing	RL	Material Tested	Comments
									kPa									
27/05/2022	ETAM22W01047	MA	862	1.78	39.9	1.27	2.65	1.2	124	128	131	134	RW 601	1748976	5948946	33.150	Clay/Silty	-
27/05/2022	ETAM22W01047	MA	863	1.80	37.4	1.31	2.65	1.6	115	121	128	118	RW 601	1749041	5948937	33.30	Clay/Silty	-
27/05/2022	ETAM22W01047	MA	864	1.80	36.6	1.32	2.65	1.9	109	100	106	100	RW 601	1749085	5948916	33.30	Clay/Silty	-
27/05/2022	ETAM22W01047	MA	865	1.79	35.0	1.33	2.65	3.5	188	176	180	184	Gully (2)	1749058	5948903	35.9	Clay/Silty	-

**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W01047**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01047*

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

A handwritten signature in black ink that reads "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 1/06/2022



**Report No: EFIL:ETAM22W01060**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01060*

# Earthworks Fill Report

**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: 1/06/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate)				Test Location	Easting	Northing	RL	Material Tested	Comments
									kPa									
28/05/2022	ETAM22W01060	RP	866	1.79	38.3	1.29	2.65	1.7	78	146	139	114	Re Wall	1748976	5948951	119.47	Silty Clay	-
28/05/2022	ETAM22W01060	RP	867	1.77	34.6	1.32	2.65	4.7	161	141	180	146	Re Wall	1749026	5948947	157.02	Silty Clay	-
28/05/2022	ETAM22W01060	RP	868	1.80	36.4	1.32	2.65	2.3	206	115	98	209	Re Wall	1749060	5948934	157.05	Silty Clay	-
28/05/2022	ETAM22W01060	RP	869	1.77	36.6	1.29	2.65	3.8	120	141	129	144	Re Wall	1749089	5948919	133.37	Silty Clay	-

**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W01060**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01060*

**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.}

A handwritten signature in black ink, appearing to read "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 1/06/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01158**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01158*

**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: 27/06/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									162	222	213	187						
20/06/2022	ETAM22W01158	LW	870	1.84	35.6	1.36	2.65	0.5	162	222	213	187	RE Wall 601	1749092	5948918	34.00	Lime Stab. Silty Clay	0
20/06/2022	ETAM22W01158	LW	871	1.81	35.5	1.33	2.65	2.3	222	192	209	200	RE Wall 601	1749073	5948928	34.00	Lime Stab. Silty Clay	0
20/06/2022	ETAM22W01158	LW	872	1.83	35.1	1.35	2.65	1.5	192	213	222	222	RE Wall 601	1749025	5948942	34.00	Lime Stab. Silty Clay	0
20/06/2022	ETAM22W01158	LW	873	1.85	35.4	1.36	2.65	0.4	222	222	222	222	RE Wall 601	1748979	5948948	34.00	Lime Stab. Silty Clay	0



**Comments:**

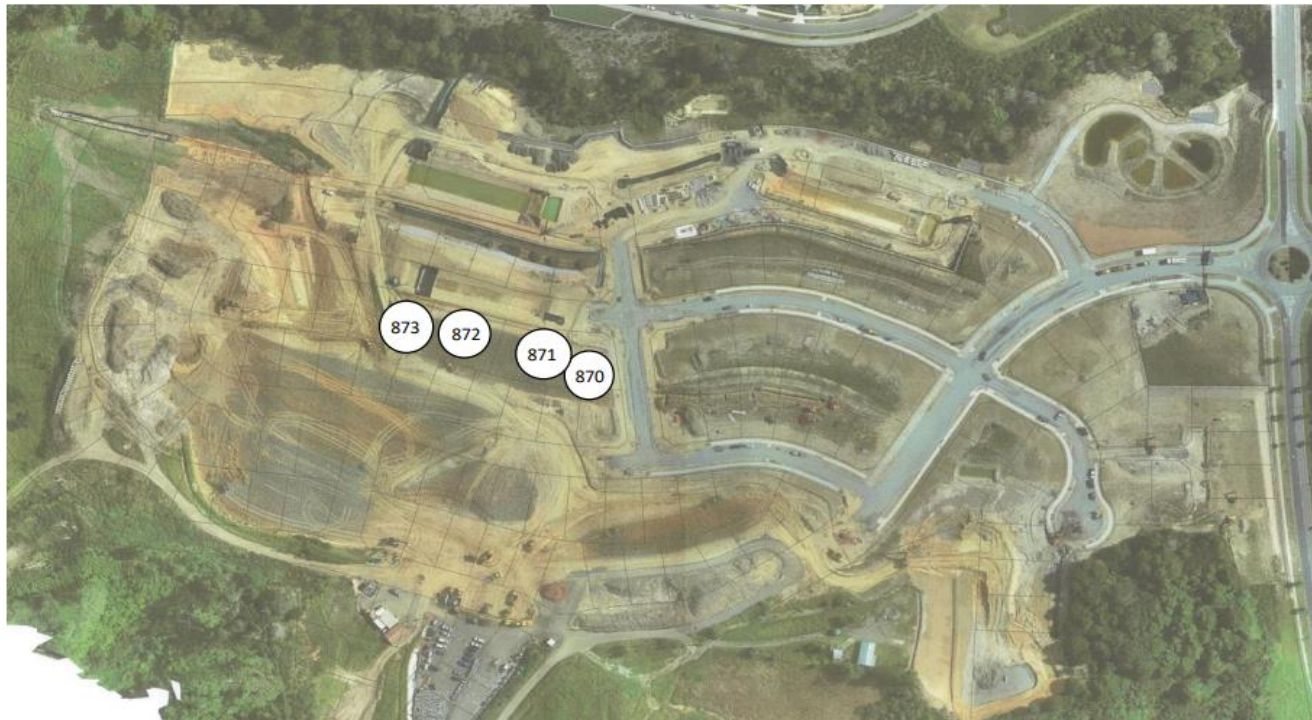


# Earthworks Fill Report

**Report No: EFIL:ETAM22W01158**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01158*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 27/06/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01516**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01516*

**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: 21/08/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									162	187	170	174						
16/08/2022	ETAM22W01516	LW	888	1.74	40.3	1.24	2.65	3.2	162	187	170	174	RE Wall 312	1749086	5948995	21.50	Lime Stab. Silty Clay	-
16/08/2022	ETAM22W01516	LW	889	1.75	39.8	1.25	2.65	2.9	196	170	154	146	RE Wall 312	1749102	5948992	21.50	Lime Stab. Silty Clay	-
16/08/2022	ETAM22W01516	LW	890	1.76	40.0	1.26	2.65	2.0	150	170	154	178	RE Wall 312	1749065	5949002	21.50	Lime Stab. Silty Clay	-

**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W01516**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01516*

**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.}

A handwritten signature in black ink, appearing to read "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 21/08/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01591**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01591*

**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: 31/08/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	170	182						
29/08/2022	ETAM22W01591	SC	891	1.78	35.0	1.32	2.65	4.2	UTP	UTP	170	182	RE Wall, See plan	1749032	5949014	-	Lime/Cmnt Stab Silty Cla	-
29/08/2022	ETAM22W01591	SC	892	1.78	39.7	1.28	2.65	1.2	UTP	UTP	170	170	RE Wall, See plan	1749056	5949002	-	Lime/Cmnt Stab Silty Cla	-
29/08/2022	ETAM22W01591	SC	893	1.75	39.7	1.25	2.65	3.2	182	182	170	170	RE Wall, See plan	1749079	5948997	-	Lime/Cmnt Stab Silty Cla	-
29/08/2022	ETAM22W01591	SC	894	1.71	41.2	1.21	2.65	4.7	182	182	170	170	RE Wall, See plan	1749102	5948989	-	Lime/Cmnt Stab Silty Cla	-

**Comments:**

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



## Earthworks Fill Report

**Report No: EFIL:ETAM22W01591**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01591*

**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.)

A handwritten signature in blue ink, appearing to read "L Walker".

Approved Signatory: Liam Walker  
Assistant Manager  
IANZ Site Number: 105  
Date of Issue: 31/08/2022





# Earthworks Fill Report

**Report No: EFIL:ETAM22W01609**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01609*

**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: 5/09/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
31/08/2022	ETAM22W01609	MA	895	1.72	39.3	1.23	2.65	4.9	178	159	182	191	RE Wall 312	1749052	5949000	22.1	lime/Cmnt Stab. Silty Cla	-
31/08/2022	ETAM22W01609	MA	896	1.72	37.9	1.25	2.65	5.8	199	191	206	206	RE Wall 312	1749084	5948988	21.85	lime/Cmnt Stab. Silty Cla	-
31/08/2022	ETAM22W01609	MA	897	1.80	37.2	1.31	2.65	1.9	155	169	159	173	RE Wall 312	1749115	5948978	22.0	lime/Cmnt Stab. Silty Cla	-
31/08/2022	ETAM22W01609	MA	898	1.83	36.7	1.34	2.65	0.5	UTP	UTP	UTP	UTP	Main Fill Area	1749023	5948915	36.5	lime/Cmnt Stab. Silty Cla	-
31/08/2022	ETAM22W01609	MA	899	1.80	39.6	1.29	2.65	0.3	187	159	173	191	Main Fill Area	1749047	5948896	37.9	lime/Cmnt Stab. Silty Cla	-
31/08/2022	ETAM22W01609	MA	900	1.80	37.8	1.31	2.65	1.2	150	164	169	178	Main Fill Area	1749053	5948876	35.7	lime/Cmnt Stab. Silty Cla	-


**Comments:**

# Earthworks Fill Report

**Report No: EFIL:ETAM22W01609**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01609*

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

ACCREDITED  
  
 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: 5/09/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01627**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01627*

**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: 6/09/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									170	170	182	182						
1/09/2022	ETAM22W01627	SC	901	1.84	36.5	1.35	2.65	0.1	170	170	182	182	Main fill	1749052	5948897	37.8	lime/Cmnt Stab. Silty Cla	-
1/09/2022	ETAM22W01627	SC	902	1.71	38.8	1.23	2.65	5.5	182	182	182	182	Main fill	1749054	5948880	37.3	lime/Cmnt Stab. Silty Cla	-
1/09/2022	ETAM22W01627	SC	903	1.72	35.0	1.27	2.65	7.4	150	155	155	152	RE Wall	1749103	5948984	22.22	lime/Cmnt Stab. Silty Cla	-
1/09/2022	ETAM22W01627	SC	904	1.74	35.9	1.28	2.65	5.6	155	155	161	161	RE Wall	1749056	5949006	22.90	lime/Cmnt Stab. Silty Cla	-
1/09/2022	ETAM22W01627	SC	905	1.75	39.8	1.25	2.65	2.7	155	155	155	155	RE Wall	1749013	5949013	23.00	lime/Cmnt Stab. Silty Cla	-

**Comments:**

# Earthworks Fill Report

**Report No: EFIL:ETAM22W01627**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01627*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 6/09/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01649**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01649*

**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: 12/09/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									155	170	170	170						
2/09/2022	ETAM22W01649	SC	906	1.79	35.6	1.32	2.65	3.5	155	170	170	170	RE Wall	1749022	5949014	-	Lime/Cmnt Stb. Silty Clay	-
2/09/2022	ETAM22W01649	SC	907	1.72	43.5	1.20	2.65	2.5	170	170	170	170	RE Wall	1749056	5949033	-	Lime/Cmnt Stb. Silty Clay	-
2/09/2022	ETAM22W01649	SC	908	1.74	39.3	1.25	2.65	3.8	155	161	170	170	RE Wall	1749088	5948990	-	Lime/Cmnt Stb. Silty Clay	-

## Comments:



## Earthworks Fill Report

**Report No: EFIL:ETAM22W01649**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01649*

**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.)

A handwritten signature in blue ink, appearing to read 'L Walker'.

Approved Signatory: Liam Walker  
Assistant Manager  
IANZ Site Number: 105  
Date of Issue: 12/09/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01701**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01701*

**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: James McKelvey  
Senior Technician  
IANZ Site Number: 105  
Date of Issue: 16/09/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									192+	192+	192+	192+						
9/09/2022	ETAM22W01701	LW	909	1.86	39.1	1.33	2.65	0.0	192+	192+	192+	192+	RE Wall 312	1749090	5949003	23.70	Lime Stab.Silty Clay	0
9/09/2022	ETAM22W01701	LW	910	1.83	38.9	1.32	2.65	0.0	192+	192+	192+	192+	RE Wall 312	1749071	5949007	23.70	Lime Stab.Silty Clay	0
9/09/2022	ETAM22W01701	LW	911	1.80	40.4	1.28	2.65	0.0	192+	192+	192+	192+	RE Wall 312	1749043	5948996	23.75	Lime Stab.Silty Clay	0
9/09/2022	ETAM22W01701	LW	912	1.81	40.6	1.29	2.65	0.0	192+	192+	192+	192+	RE Wall 312	1749020	5948998	23.65	Lime Stab.Silty Clay	0

**Comments:**

# Earthworks Fill Report

**Report No: EFIL:ETAM22W01701**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01701*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: James McKelvey  
 Senior Technician  
 IANZ Site Number: 105  
 Date of Issue: 16/09/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01727**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01727*

**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: 28/09/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									191	206+	206+	206+						
16/09/2022	ETAM22W01727	LW	913	1.78	34.0	1.33	2.65	4.6	191	206+	206+	206+	RE Wall 312	1749071	5948999	24.5	Lime Stab. Silty Clay	-
16/09/2022	ETAM22W01727	LW	914	1.82	34.2	1.35	2.65	2.7	187	178	206+	206+	RE Wall 312	1749055	5949001	24.5	Lime Stab. Silty Clay	-
16/09/2022	ETAM22W01727	LW	915	1.78	33.7	1.33	2.65	4.9	206+	206+	206+	206+	RE Wall 312	1749037	5949006	24.5	Lime Stab. Silty Clay	-
16/09/2022	ETAM22W01727	LW	916	1.80	34.5	1.34	2.65	3.3	206+	206+	206+	206+	RE Wall 312	1749019	5949008	24.5	Lime Stab. Silty Clay	-

**Comments:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W01727**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01727*

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

A handwritten signature in blue ink, appearing to read 'L Walker'.

Approved Signatory: Liam Walker  
Assistant Manager  
IANZ Site Number: 105  
Date of Issue: 28/09/2022





# Earthworks Fill Report

**Report No: EFIL:ETAM22W01743**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01743*

**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: 28/09/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
21/09/2022	ETAM22W01743	RP	917	1.78	36.3	1.31	2.65	3.3	UTP	UTP	UTP	UTP	RE Wall	1749120	5948985	25.0	Lime Stab. Silty Clay	-
21/09/2022	ETAM22W01743	RP	918	1.75	37.7	1.27	2.65	4.2	UTP	UTP	UTP	UTP	RE Wall	1749048	5949003	25.0	Lime Stab. Silty Clay	-
21/09/2022	ETAM22W01743	RP	919	1.77	36.5	1.29	2.65	3.9	UTP	UTP	UTP	UTP	RE Wall	1749007	5949015	25.45	Lime Stab. Silty Clay	-
21/09/2022	ETAM22W01743	RP	920	1.90	25.3	1.51	2.65	4.5	UTP	UTP	UTP	UTP	Gully	1748971	5948910	34.5	Lime Stab. Silty Clay	-
21/09/2022	ETAM22W01743	RP	921	1.83	30.3	1.40	2.65	4.7	UTP	UTP	UTP	UTP	Gully	1748995	5948908	35.5	Lime Stab. Silty Clay	-
21/09/2022	ETAM22W01743	RP	922	1.76	37.4	1.28	2.65	3.7	155	161	192	137	Gully	1749018	5948900	37.0	Lime Stab. Silty Clay	-

**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W01743**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01743*

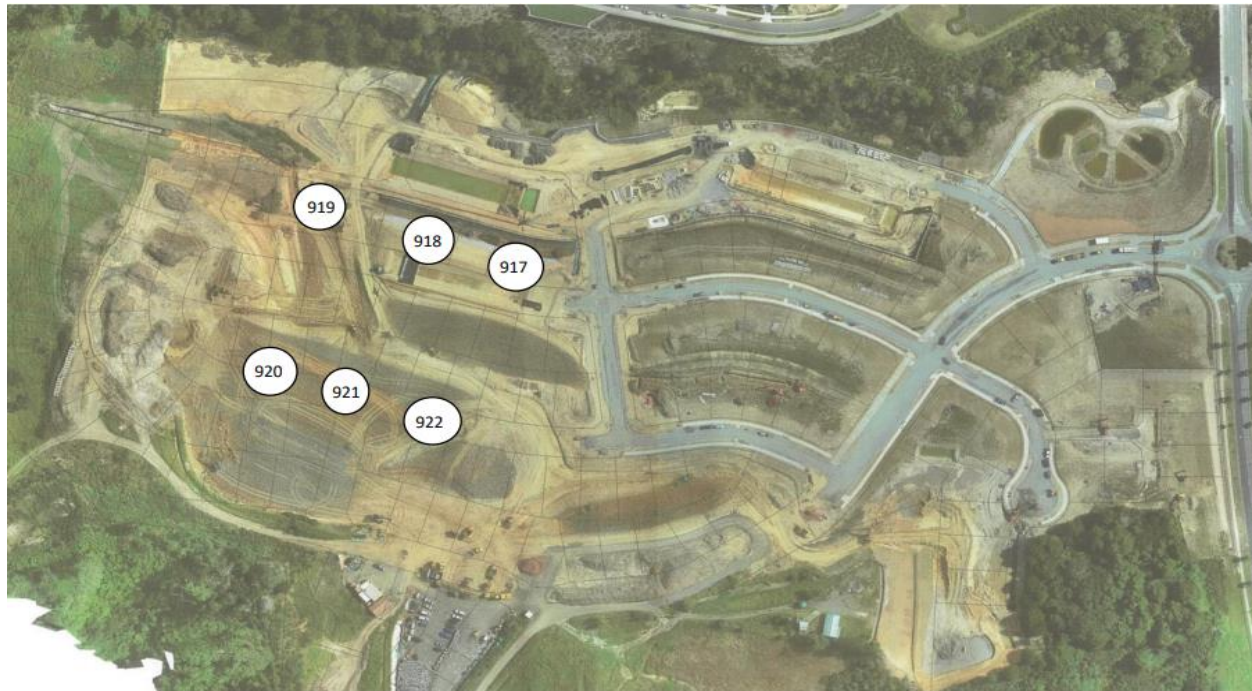
<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	117 Kowhai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

A handwritten signature in blue ink, appearing to read "L Walker".

Approved Signatory: Liam Walker  
Assistant Manager  
IANZ Site Number: 105  
Date of Issue: 28/09/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01780**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01780*

**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: 4/10/2022



## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									164	182	206	206						
28/09/2022	ETAM22W01780	RP	923	1.75	39.3	1.26	2.65	3.1	164	182	206	206	RE Wall (MSE)	1749106	5948977	24.1	Silty Clay	-
28/09/2022	ETAM22W01780	RP	924	1.79	43.1	1.25	2.65	-1.1	206	176	206	206	RE Wall (MSE)	1749073	5948991	24.8	Silty Clay	-
28/09/2022	ETAM22W01780	RP	925	1.81	36.1	1.33	2.65	1.8	UTP	UTP	206	206	RE Wall (MSE)	1749052	5948998	25.2	Silty Clay	-

## Comments:

## Earthworks Fill Report

<b>Report No: EFIL:ETAM22W01780</b>	
<b>Issue No:1</b>	
<i>This report replaces all previous issues of report no. EFIL:ETAM22W01780</i>	
	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: 4/10/2022

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



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01868**
**Issue No:1**
*This report replaces all previous issues of report no. EFIL:ETAM22W01868*

**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: James McKelvey  
 Senior Technician  
 IANZ Site Number: 105  
 Date of Issue: 26/10/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									143	166	136	150						
13/10/2022	ETAM22W01868	LW	939	1.82	39.5	1.31	2.65	0.0	143	166	136	150	Behind RW	1749295	5949048	-	Lime Stab. Silty Clay	At FL
13/10/2022	ETAM22W01868	LW	940	1.76	40.8	1.25	2.65	2.0	150	158	178	174	Behind RW	1749296	5949040	-	Lime Stab. Silty Clay	At FL
13/10/2022	ETAM22W01868	LW	941	1.84	34.8	1.36	2.65	1.0	UTP	UTP	UTP	UTP	Gully 2	1749020	5948924	38.20	Lime Stab. Silty Clay	-
13/10/2022	ETAM22W01868	LW	942	1.83	32.8	1.38	2.65	3.0	UTP	UTP	UTP	UTP	Gully 2	1749004	5948927	37.70	Lime Stab. Silty Clay	-
13/10/2022	ETAM22W01868	LW	943	1.77	37.7	1.29	2.65	2.9	162	150	196	183	Undercut 8	1749067	5948847	35.8	Lime Stab. Silty Clay	-
13/10/2022	ETAM22W01868	LW	944	1.73	41.5	1.22	2.65	3.0	222+	222+	222+	222+	Undercut 8	1749100	5948840	34.5	Lime Stab. Silty Clay	-
13/10/2022	ETAM22W01868	LW	945	1.83	38.6	1.32	2.65	0.0	222+	222+	222+	222+	Undercut 8	1749131	5948835	33.1	Lime Stab. Silty Clay	-

**Comments:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W01868**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01868*

**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

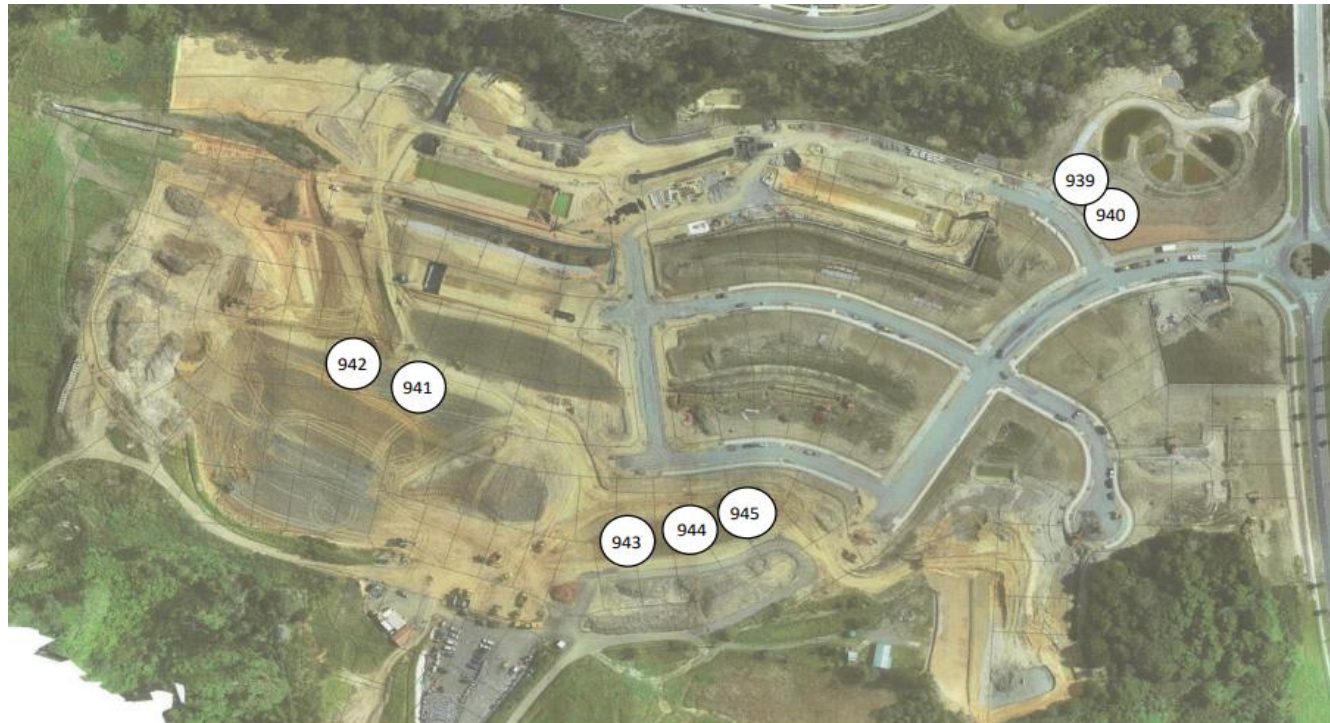
**Project Location:** 117 Kowhai Road, Orewa



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.}

A handwritten signature in black ink, appearing to read 'James McKelvey'.

Approved Signatory: James McKelvey  
Senior Technician  
IANZ Site Number: 105  
Date of Issue: 26/10/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01895**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01895*

**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: James McKelvey  
Senior Technician  
IANZ Site Number: 105  
Date of Issue: 28/10/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
17/10/2022	ETAM22W01895	LW	946	1.82	32.6	1.37	2.65	3.4	222+	222+	222+	222+	Undercut 8	1749141	5948833	34.60	Silty Clay	0
17/10/2022	ETAM22W01895	LW	947	1.82	32.4	1.38	2.65	3.5	222+	222+	222+	222+	Undercut 8	1749102	5948839	35.95	Silty Clay	0
17/10/2022	ETAM22W01895	LW	948	1.83	31.5	1.39	2.65	3.9	222+	222+	222+	222+	Silt Pond Backfill	1749102	5948962	23.20	Lime Stab. Silty Clay	0
17/10/2022	ETAM22W01895	LW	949	1.77	33.6	1.32	2.65	5.7	222+	222+	222+	222+	Silt Pond Backfill	1749075	5948972	24.80	Lime Stab. Silty Clay	0
17/10/2022	ETAM22W01895	LW	950	1.77	33.5	1.33	2.65	5.4	174	150	178	154	Silt Pond Backfill	1749054	5948978	25.90	Lime Stab. Silty Clay	0

**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W01895**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01895*

**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.}

A handwritten signature in black ink, appearing to read 'James McKelvey'.

Approved Signatory: James McKelvey  
Senior Technician  
IANZ Site Number: 105  
Date of Issue: 28/10/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01914**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01914*

**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: James McKelvey  
Senior Technician  
IANZ Site Number: 105  
Date of Issue: 28/10/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									182	173	170	186						
19/10/2022	ETAM22W01914	MA	951	1.89	31.3	1.44	2.65	0.9	182	173	170	186	SRP-8	1749055	5948958	-	Silty CLAY	0
19/10/2022	ETAM22W01914	MA	952	1.73	44.7	1.20	2.65	1.4	133	137	140	124	SRP-8	1749067	5948979	-	Silty CLAY	0
19/10/2022	ETAM22W01914	MA	953	1.80	32.7	1.36	2.65	4.4	140	152	147	155	SRP-8	1749099	5948964	-	Silty CLAY	0


**Comments:**




# Earthworks Fill Report

**Report No: EFIL:ETAM22W01914**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01914*

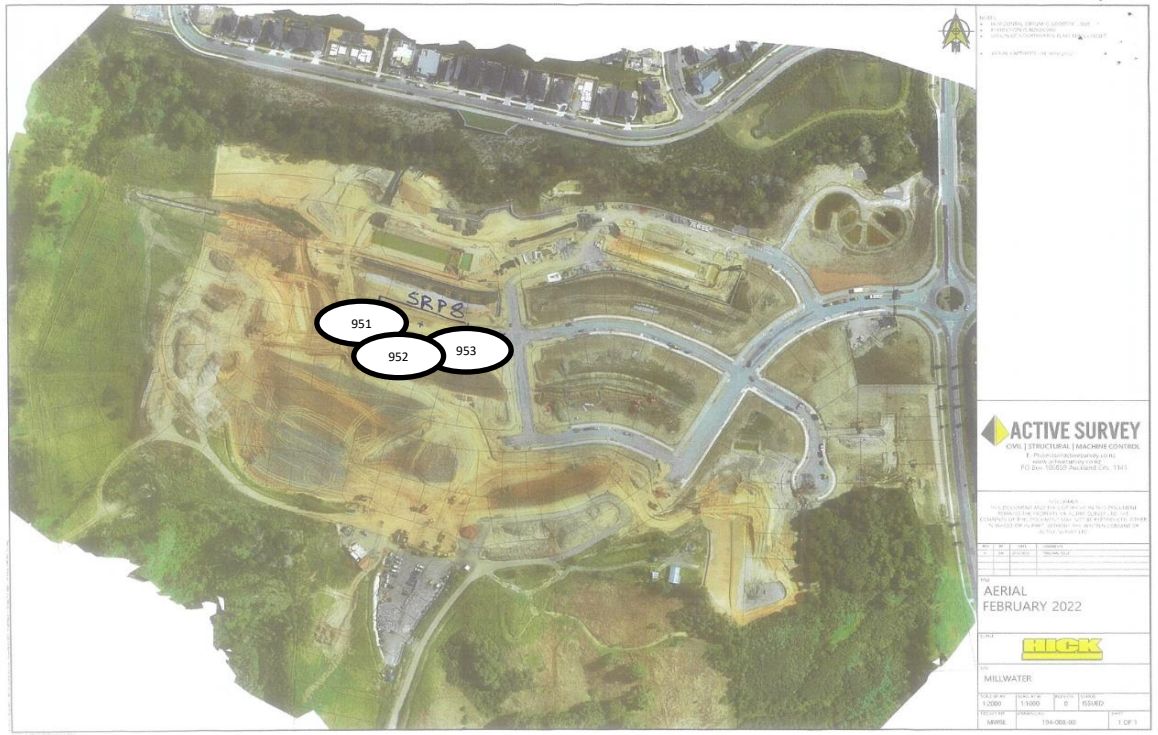
<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	117 Kowhai 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: James McKelvey**  
 Senior Technician  
 IANZ Site Number: 105  
 Date of Issue: 28/10/2022





# Earthworks Fill Report

**Report No: EFIL:ETAM22W01916**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01916*

**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: James McKelvey  
Senior Technician  
IANZ Site Number: 105  
Date of Issue: 28/10/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									162	146	196	150						
20/10/2022	ETAM22W01916	LW	00736	1.89	30.3	1.45	2.65	1.6	162	146	196	150	Silt pond backfill	1749101	5948962	Layer 3	lime stabilized Silty CLA	0
20/10/2022	ETAM22W01916	LW	00737	1.78	39.3	1.28	2.65	1.4	222+	222+	187	166	Silt pond backfill	1749070	5948972	Layer 3	lime stabilized Silty CLA	0
20/10/2022	ETAM22W01916	LW	00738	1.87	30.4	1.44	2.65	2.1	183	158	222+	222+	Silt pond backfill	1749033	5948973	Layer 3	lime stabilized Silty CLA	0
20/10/2022	ETAM22W01916	LW	00739	1.80	39.5	1.29	2.65	0.4	222+	222+	222+	174	Silt pond backfill	1749051	5948962	Layer 3	lime stabilized Silty CLA	0


**Comments:**

# Earthworks Fill Report

**Report No: EFIL:ETAM22W01916**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01916*

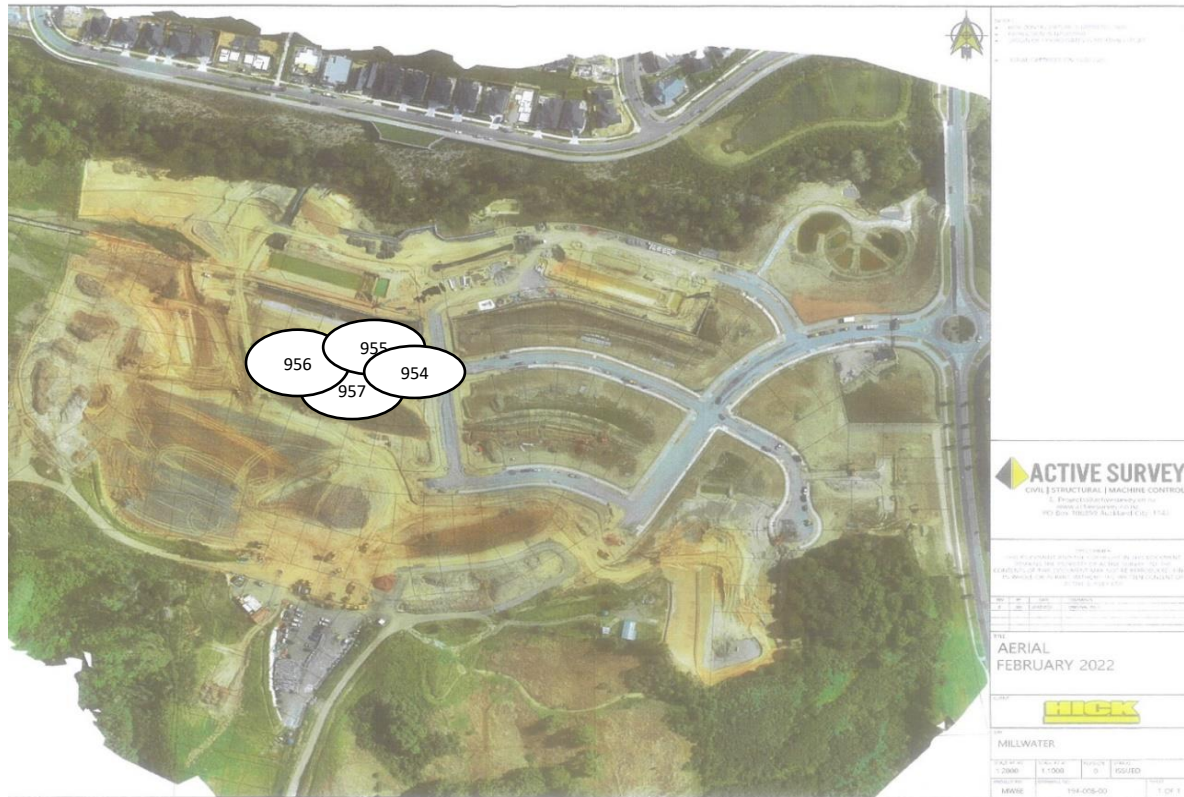
<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	117 Kowhai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



*James McKelvey*

Approved Signatory: James McKelvey  
 Senior Technician  
 IANZ Site Number: 105  
 Date of Issue: 28/10/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00948**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00948*

**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: 18/05/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate)				Test Location	Easting	Northing	RL	Material Tested	Comments
									kPa									
16/05/2022	ETAM22W00948	LW	834	1.85	34.6	1.38	2.65	0.5	175	175	175	175	RE Wall 601	1749103	5948922	27.80	Lime silty CLAY	-
16/05/2022	ETAM22W00948	LW	835	1.84	34.5	1.37	2.65	1.3	175	175	175	175	RE Wall 601	1749088	5948921	28.30	Lime silty CLAY	-
16/05/2022	ETAM22W00948	LW	836	1.87	34.7	1.39	2.65	0.0	168	175	175	175	RE Wall 601	1749080	4948933	28.80	Lime silty CLAY	-
16/05/2022	ETAM22W00948	LW	837	1.85	34.9	1.37	2.65	0.5	175	175	149	153	RE Wall 601	1748992	4948953	29.00	Lime silty CLAY	-
16/05/2022	ETAM22W00948	LW	838	1.80	34.1	1.34	2.65	3.8	160	137	172	156	RE Wall 601	1748973	5948955	29.35	Lime silty CLAY	-
16/05/2022	ETAM22W00948	LW	839	1.77	34.3	1.32	2.65	5.0	164	172	143	149	RE Wall 601	1748947	5948958	29.50	Lime silty CLAY	-


**Comments:**

# Earthworks Fill Report

**Report No: EFIL:ETAM22W00948**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00948*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 18/05/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00949**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00949*

**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: 18/05/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									143	137	160	156						
17/05/2022	ETAM22W00949	LW	840	1.82	42.4	1.28	2.65	0.0	143	137	160	156	RE Wall 601	1748958	5948953	31.50	Lime Silty Clay	-
17/05/2022	ETAM22W00949	LW	841	1.83	42.3	1.29	2.65	0.0	168	153	146	140	RE Wall 601	1748984	5948952	31.00	Lime Silty Clay	-
17/05/2022	ETAM22W00949	LW	842	1.80	34.1	1.34	2.65	3.8	137	143	160	153	RE Wall 601	1749010	5948951	30.50	Lime Silty Clay	-
17/05/2022	ETAM22W00949	LW	843	1.84	40.9	1.30	2.65	0.0	160	168	149	140	RE Wall 601	1749103	5948913	29.80	Lime Silty Clay	-

**Comments:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W00949**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00949*

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

A handwritten signature in black ink that reads "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 18/05/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W00980**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W00980*

**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: 19/05/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate)				Test Location	Easting	Northing	RL	Material Tested	Comments
									kPa									
18/05/2022	ETAM22W00980	SC	844	1.84	34.6	1.37	2.70	1.8	188	172	168	168	RW 601	1749102	5948916	51.8	Lime Clayey Silt	-
18/05/2022	ETAM22W00980	SC	845	1.86	33.6	1.39	2.70	1.6	160	146	168	168	RW 601	1749069	5948931	51.8	Lime Clayey Silt	-
18/05/2022	ETAM22W00980	SC	846	1.81	40.0	1.29	2.70	0.4	168	137	128	150	RW 601	1748990	5948958	31.0	Lime Clayey Silt	-


**Comments:**

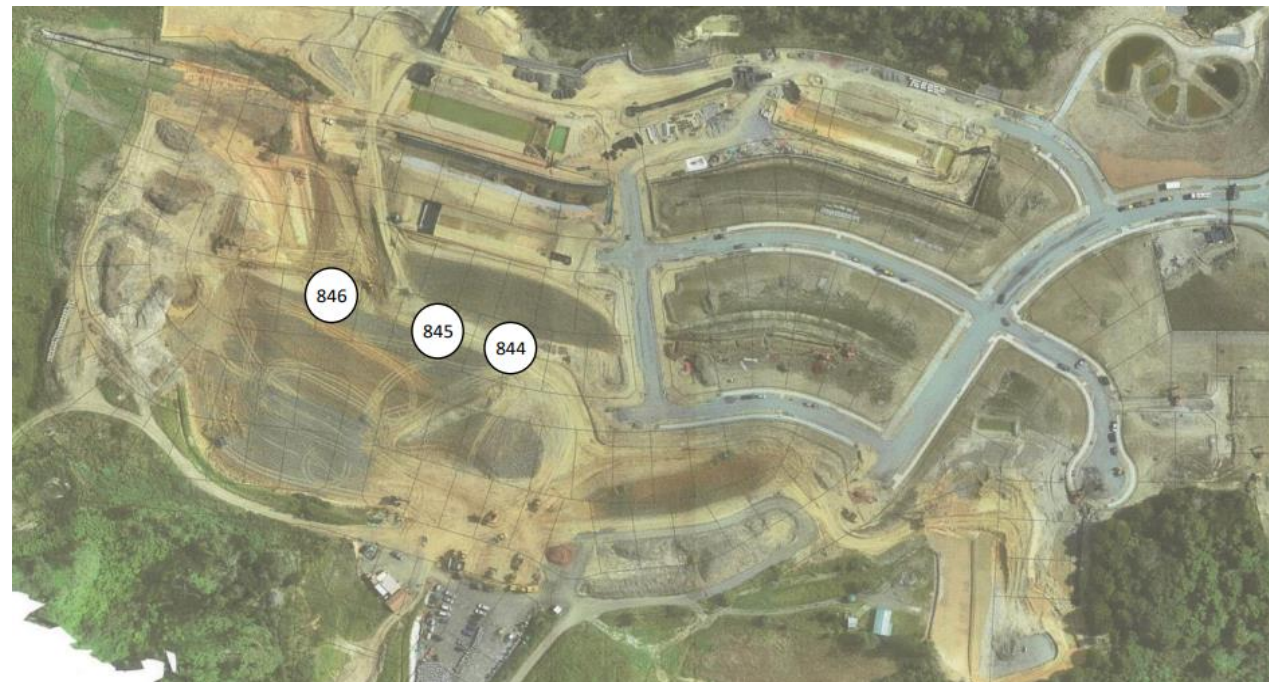
# Earthworks Fill Report

**Report No: EFIL:ETAM22W00980**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W00980*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 19/05/2022



**Report No: EFIL:ETAM22W01032**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01032*

# Earthworks Fill Report

**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: 30/05/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate)				Test Location	Easting	Northing	RL	Material Tested	Comments
									kPa									
26/05/2022	ETAM22W01032	MA	858	1.80	36.3	1.32	2.65	2.3	163	209	183	161	Re Wall 601	1748958	5948945	32.8	Silty Clay	-
26/05/2022	ETAM22W01032	MA	859	1.77	35.4	1.30	2.65	4.6	192	201	207	207	Re Wall 601	1748996	5948948	32.8	Silty Clay	-
26/05/2022	ETAM22W01032	MA	860	1.85	35.2	1.37	2.65	0.3	141	181	177	166	Gully 2	1749052	5948901	34.0	Silty Clay	-
26/05/2022	ETAM22W01032	MA	861	1.78	35.1	1.32	2.65	4.0	166	161	183	201	Gully 2	1749049	5948902	34.9	Silty Clay	-

**Comments:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W01032**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01032*

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

A handwritten signature in black ink, appearing to read 'E. Paton'.

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 30/05/2022





# Earthworks Fill Report

**Report No: EFIL:ETAM22W01176**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01176*

**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.}



*E. Paton*

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 28/06/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate)				Test Location	Easting	Northing	RL	Material Tested	Comments
									kPa									
22/06/2022	ETAM22W01176	LW	874	1.82	34.7	1.35	2.65	2.1	150	166	136	174	RE Wall 601	1749088	5948921	34.50	Lime Stab. Silty CLAY	-
22/06/2022	ETAM22W01176	LW	875	1.81	34.9	1.34	2.65	2.8	178	196	146	162	RE Wall 601	1749058	5948933	35.00	Lime Stab. Silty CLAY	-
22/06/2022	ETAM22W01176	LW	876	1.81	35.0	1.34	2.65	2.5	170	158	178	146	RE Wall 601	1749020	5948940	34.50	Lime Stab. Silty CLAY	-
22/06/2022	ETAM22W01176	LW	877	1.85	34.6	1.37	2.65	0.7	143	200	170	178	RE Wall 601	1748983	5948953	35.00	Lime Stab. Silty CLAY	-

**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W01176**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01176*

**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

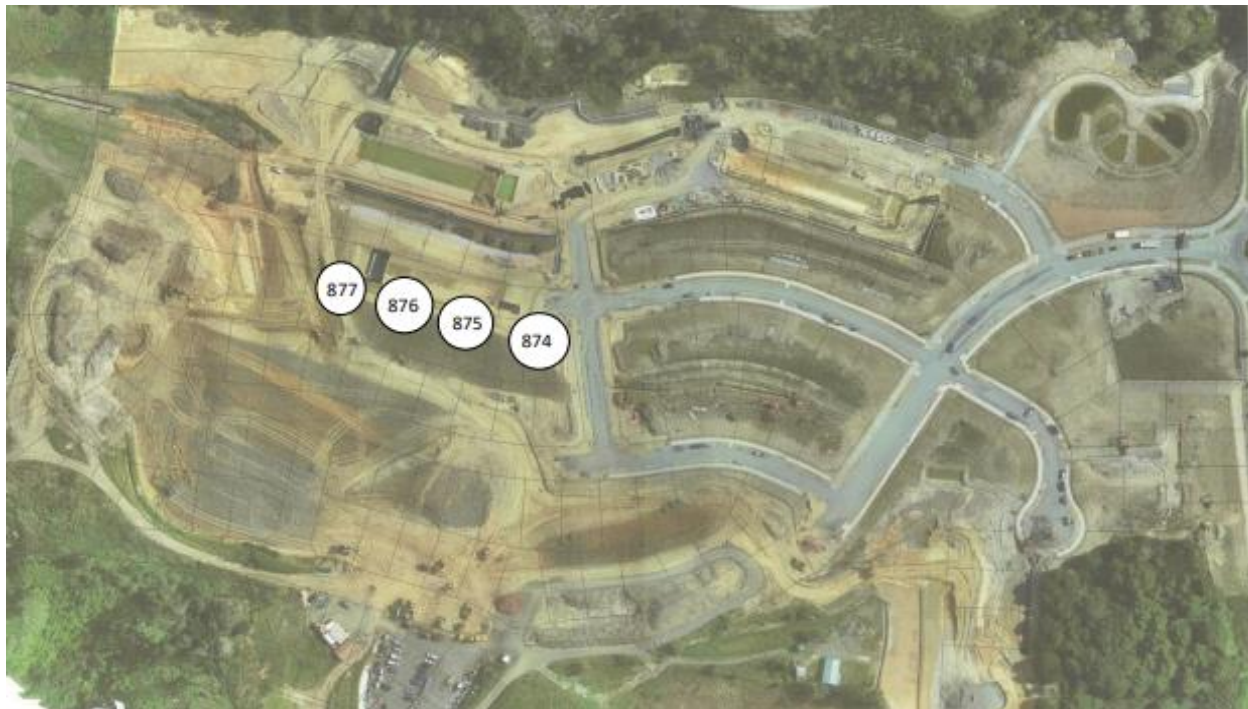
**Project Location:** 117 Kowhai Road, Orewa



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.}

A handwritten signature in black ink that reads "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 28/06/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01189**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01189*

**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.}



*E. Paton*

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 28/06/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									154	162	146	178						
23/06/2022	ETAM22W01189	LW	878	1.82	37.2	1.32	2.65	0.8	154	162	146	178	RE Wall 601	1749067	5948925	35.50	Lime Stab. Silty CLAY	-
23/06/2022	ETAM22W01189	LW	879	1.79	37.3	1.30	2.65	2.2	150	178	162	166	RE Wall 601	1749026	5948939	35.50	Lime Stab. Silty CLAY	-
23/06/2022	ETAM22W01189	LW	880	1.79	36.8	1.30	2.65	2.7	174	162	170	154	RE Wall 601	1749005	5948941	35.50	Lime Stab. Silty CLAY	-
23/06/2022	ETAM22W01189	LW	881	1.79	36.5	1.31	2.65	2.5	146	178	158	170	RE Wall 601	1748980	5948946	35.50	Lime Stab. Silty CLAY	-
23/06/2022	ETAM22W01189	LW	882	1.84	36.5	1.35	2.65	0.0	162	170	187	196	RE Wall 601	1748913	5948913	32.80	Lime Stab. Silty CLAY	-
23/06/2022	ETAM22W01189	LW	883	1.85	35.6	1.36	2.65	0.2	154	136	166	183	RE Wall 601	1749000	5948905	33.00	Lime Stab. Silty CLAY	-
23/06/2022	ETAM22W01189	LW	884	1.83	37.1	1.33	2.65	0.3	170	158	154	154	RE Wall 601	1749020	5948911	33.10	Lime Stab. Silty CLAY	-
23/06/2022	ETAM22W01189	LW	885	1.82	36.2	1.33	2.65	1.4	146	140	170	183	RE Wall 601	1749060	5948895	33.50	Lime Stab. Silty CLAY	-


**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W01189**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01189*

<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	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: 28/06/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01442**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01442*

**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: 17/08/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate)				Test Location	Easting	Northing	RL	Material Tested	Comments
									kPa									
4/08/2022	ETAM22W01442	SC	886	1.83	37.6	1.33	2.65	0.0	153	153	162	166	Gully 2, see plan	1749035	5948903	-	Clayey Silt	-
4/08/2022	ETAM22W01442	SC	887	1.82	37.5	1.33	2.65	0.3	153	153	166	166	Gully 2, see plan	1749035	5948882	-	Clayey Silt	-

**Comments:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W01442**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01442*

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

A handwritten signature in black ink, appearing to read "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 17/08/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01845**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01845*

**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: 18/10/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
10/10/2022	ETAM22W01845	MA	926	1.72	27.5	1.35	2.65	12.1	UTP	UTP	UTP	UTP	Gully 2	1749026	5948903	38.4	Silty Clay	-
10/10/2022	ETAM22W01845	MA	927	1.86	30.7	1.42	2.65	2.9	UTP	UTP	UTP	UTP	Gully 2	1748989	5948904	35.1	Silty Clay	-
10/10/2022	ETAM22W01845	MA	928	1.87	30.5	1.43	2.65	2.5	111	140	163	124	P6 1C Deb	1749194	5949062	7.7	Clay	-

**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W01845**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01845*

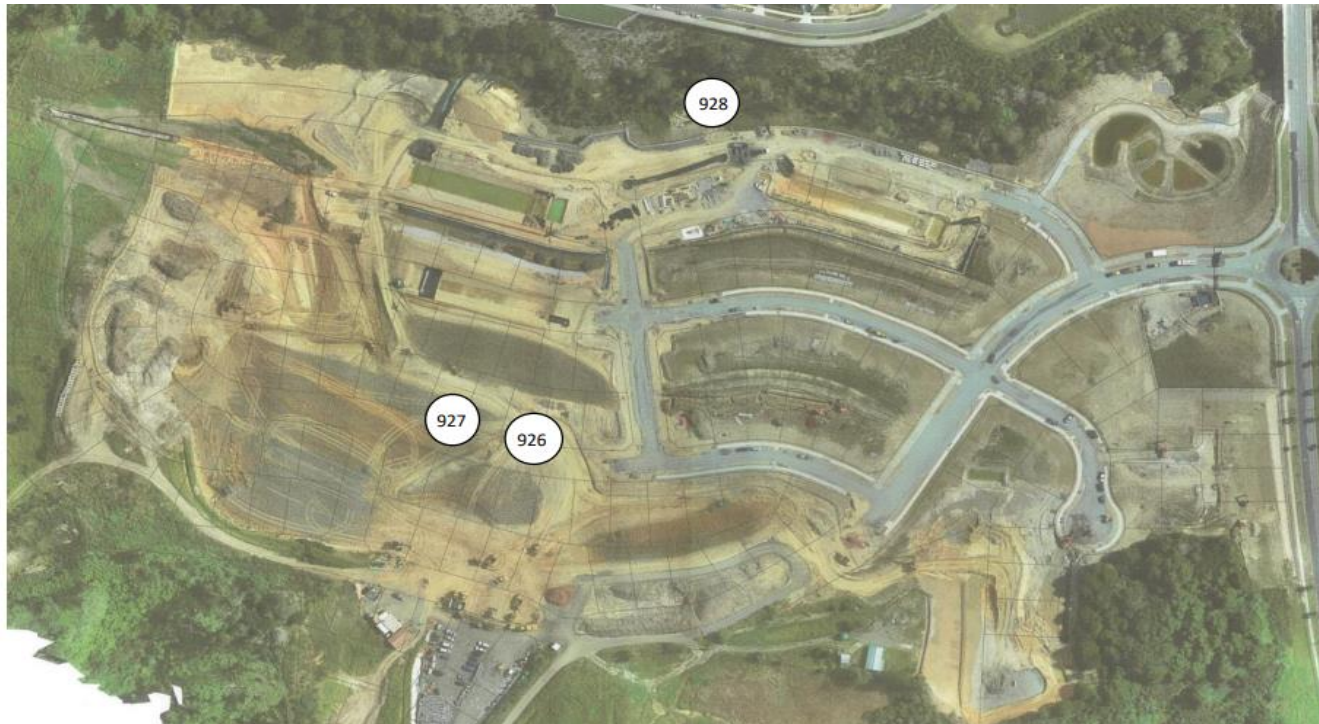
<b>Client:</b>	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
<b>Principal:</b>	Stephen Parkes
<b>cc to:</b>	-
<b>Project No.:</b>	773-ETAM01553
<b>Project Name.:</b>	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
<b>Project Location:</b>	117 Kowhai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

A handwritten signature in black ink that reads "E. Paton".

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 18/10/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01856**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01856*

**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: 18/10/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									124	137	133	130						
12/10/2022	ETAM22W01856	MA	932	1.71	43.1	1.19	2.65	3.5	124	137	133	130	Undercut 8	1749067	5948849	35.8	Clay	-
12/10/2022	ETAM22W01856	MA	933	1.77	37.5	1.28	2.65	3.3	167	188	180	171	Undercut 8	1749100	5948844	34.9	Clay	-
12/10/2022	ETAM22W01856	MA	934	1.73	42.0	1.22	2.65	2.9	158	163	175	167	Undercut 8	1749114	5948834	33.3	Clay	-
12/10/2022	ETAM22W01856	MA	935	1.78	37.1	1.30	2.65	2.8	175	167	191	180	Undercut 8	1749136	5948833	32.1	Clay	-
12/10/2022	ETAM22W01856	MA	936	1.81	35.1	1.34	2.65	2.5	UTP	UTP	UTP	UTP	Gully Fill Area	1749012	5948910	37.9	Silty Clay	-
12/10/2022	ETAM22W01856	MA	937	1.74	39.1	1.25	2.65	4.1	UTP	UTP	UTP	UTP	Gully Fill Area	1749008	5948925	37.6	Silty Clay	-
12/10/2022	ETAM22W01856	MA	938	1.76	39.9	1.26	2.65	2.3	163	175	167	171	Gully Fill Area	1748982	5948922	36.1	Silty Clay	-

**Comments:**



## Earthworks Fill Report

**Report No: EFIL:ETAM22W01856**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01856*

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

A handwritten signature in black ink that reads 'E. Paton'.

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 18/10/2022





# Earthworks Fill Report

**Report No: EFIL:ETAM22W01929**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01929*

**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: 31/10/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									192	186	186	192						
25/10/2022	ETAM22W01929	SC	961	1.83	33.3	1.37	2.65	2.5	192	186	186	192	Gully Main Fill	1749158	5948840	-	Silty Clay	-
25/10/2022	ETAM22W01929	SC	962	1.82	36.1	1.34	2.65	1.2	192	192	170	155	Gully Main Fill	1749107	5948843	-	Silty Clay	-
25/10/2022	ETAM22W01929	SC	963	1.80	35.0	1.33	2.65	2.9	170	170	155	164	Gully Main Fill	1749037	5948867	-	Silty Clay	-
25/10/2022	ETAM22W01929	SC	964	1.81	36.8	1.32	2.65	1.5	155	164	155	158	Gully Main Fill	1748990	5948881	-	Silty Clay	-

**Comments:**

## Earthworks Fill Report

**Report No: EFIL:ETAM22W01929**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM22W01929*

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

A handwritten signature in black ink, appearing to read 'E. Paton'.

Approved Signatory: Eric Paton  
Director-Testing  
IANZ Site Number: 105  
Date of Issue: 31/10/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM22W01938**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01938*

**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: 31/10/2022

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate)				Test Location	Easting	Northing	RL	Material Tested	Comments
									kPa									
26/10/2022	ETAM22W01938	SC	965	1.83	36.6	1.34	2.65	0.7	155	158	150	152	Gully Main Fill	1749135	5948834	-	Silty Clay	-
26/10/2022	ETAM22W01938	SC	966	1.81	32.3	1.37	2.65	4.2	UTP	UTP	186	170	Gully Main Fill	1749078	5948846	-	Silty Clay	-
26/10/2022	ETAM22W01938	SC	967	1.81	38.6	1.30	2.65	0.5	161	155	152	150	Gully Main Fill	1749042	5948866	-	Silty Clay	-
26/10/2022	ETAM22W01938	SC	968	1.83	35.6	1.35	2.65	0.8	155	176	158	170	Gully Main Fill	1748986	5948880	-	Silty Clay	-

**Comments:**

# Earthworks Fill Report

**Report No: EFIL:ETAM22W01938**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM22W01938*

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

*E. Paton*

Approved Signatory: Eric Paton  
 Director-Testing  
 IANZ Site Number: 105  
 Date of Issue: 31/10/2022



# Earthworks Fill Report

**Report No: EFIL:ETAM23W00236**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM23W00236*

**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: 28/02/2023

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									192+	192+	192+	192+						
23/02/2023	ETAM23W00236	SC	1047	1.74	35.9	1.28	2.65	5.6	192+	192+	192+	192+	SW Line 18/2-18/3	1749103	5948985	-	Clayey SILT	At FL
23/02/2023	ETAM23W00236	SC	1048	1.74	34.8	1.29	2.65	6.5	192+	192+	192+	192+	SW Line 18/2-18/3	1749065	5948997	-	Clayey SILT	At FL
23/02/2023	ETAM23W00236	SC	1049	1.59	34.0	1.18	2.65	15.0	170	UTP	UTP	UTP	SW Line 18/3-18/4	1749026	5949009	-	Clayey SILT	At FL
23/02/2023	ETAM23W00236	SC	1050	1.90	31.9	1.44	2.65	0.0	192+	192+	192+	192+	RE Wall 604	1749046	5949072	-	Clayey SILT	-
23/02/2023	ETAM23W00236	SC	1051	1.79	35.8	1.32	2.65	3.1	186	170	155	167	Gully 2	1749017	5948844	-	Clayey SILT	-
23/02/2023	ETAM23W00236	SC	1052	1.79	34.1	1.33	2.65	4.1	155	155	152	152	Gully 2	1748977	5948843	-	Clayey SILT	-
23/02/2023	ETAM23W00236	SC	1053	1.80	34.4	1.34	2.65	3.3	158	158	155	155	Gully 2	1749003	5948868	-	Clayey SILT	-

**Comments:**

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



# Earthworks Fill Report

**Report No: EFIL:ETAM23W00236**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM23W00236*

**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

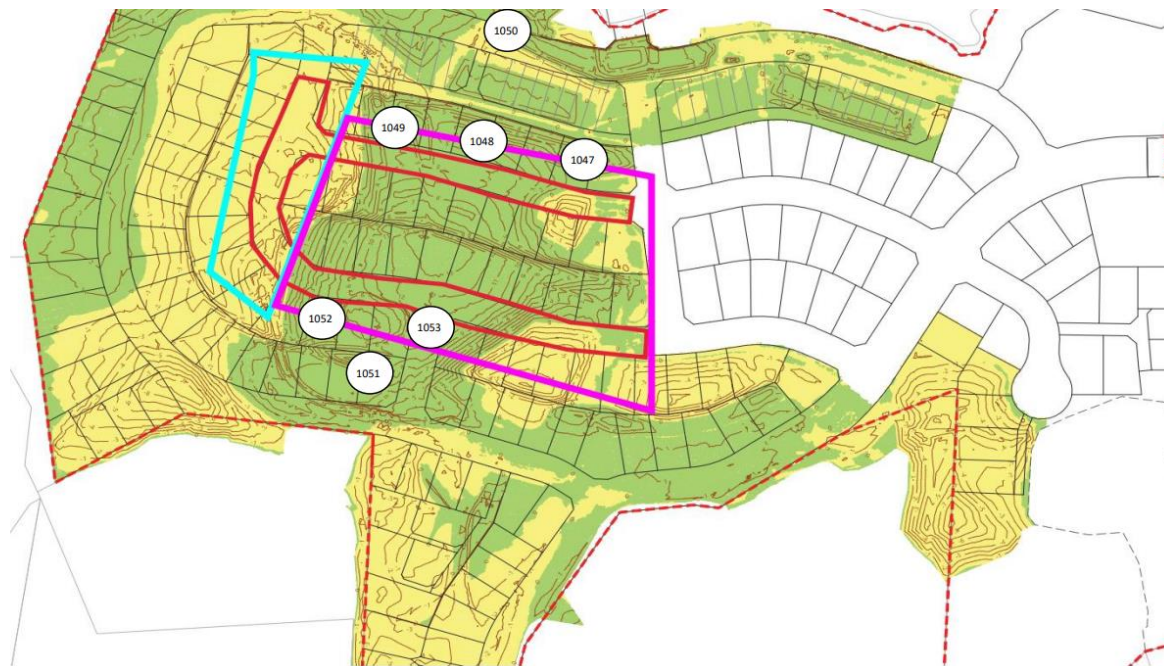
**Project Location:** 117 Kowhai Road, Orewa

ACCREDITED  
  
 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 Site Number: 105  
 Date of Issue: 28/02/2023



# Earthworks Fill Report

**Report No: EFIL:ETAM23W00260**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM23W00260*

**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: 6/03/2023

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									150	133	115	140						
28/02/2023	ETAM23W00260	RP	1054	1.72	39.6	1.23	2.65	4.6	150	133	115	140	SW Line, refer to plan	1749118	5948984	22.8	Silty CLAY	-
28/02/2023	ETAM23W00260	RP	1055	1.79	35.9	1.31	2.65	3.3	192	192	UTP	UTP	SW Line, refer to plan	1749019	5949010	25.6	Silty CLAY	-
28/02/2023	ETAM23W00260	RP	1056	1.76	35.8	1.30	2.65	4.5	124	112	155	126	SW Line, refer to plan	1749122	5948979	24.6	Silty CLAY	-


**Comments:**

# Earthworks Fill Report

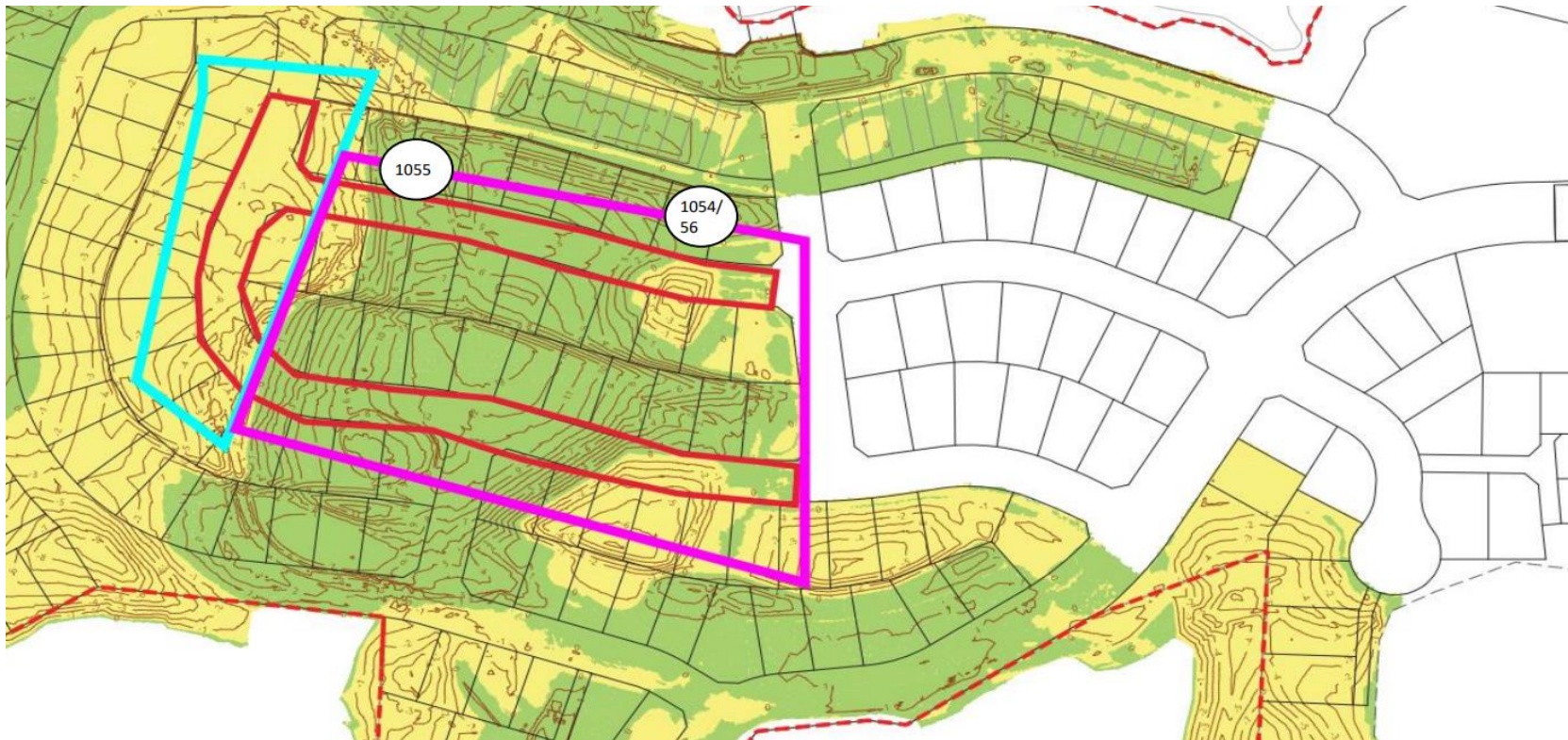
**Report No: EFIL:ETAM23W00260**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM23W00260*

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

ACCREDITED  
  
 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: 6/03/2023



# Earthworks Fill Report

**Report No: EFIL:ETAM23W00292**

**Issue No:1**

*This report replaces all previous issues of report no. EFIL:ETAM23W00292*

**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: 9/03/2023

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									144	188	188	158						
4/03/2023	ETAM23W00292	LW	1062	1.86	30.6	1.42	2.65	2.8	144	188	188	158	16/1-16/2	1749128	5948912	-	Silty CLAY	At FL
4/03/2023	ETAM23W00292	LW	1063	1.86	31.0	1.42	2.65	2.2	154	184	167	175	16/2-16/3	1749101	5948906	-	Silty CLAY	At FL
4/03/2023	ETAM23W00292	LW	1064	1.86	31.4	1.41	2.65	2.3	127	137	175	149	16/3-16/4	1749074	5948919	-	Silty CLAY	At FL
4/03/2023	ETAM23W00292	LW	1065	1.84	32.4	1.39	2.65	2.4	207	154	191	167	10/1-10/2	1748961	5948949	-	Silty CLAY	At FL
4/03/2023	ETAM23W00292	LW	1066	1.86	30.1	1.43	2.65	3.2	207	195	207+	207+	10/1-10/2	1749004	5948941	-	Silty CLAY	At FL
4/03/2023	ETAM23W00292	LW	1067	1.84	27.8	1.44	2.65	5.6	207+	207+	207+	207+	18/1-18/2	1749122	5948979	-	Silty CLAY	Retest of 28/02/23

**Comments:**



# Earthworks Fill Report

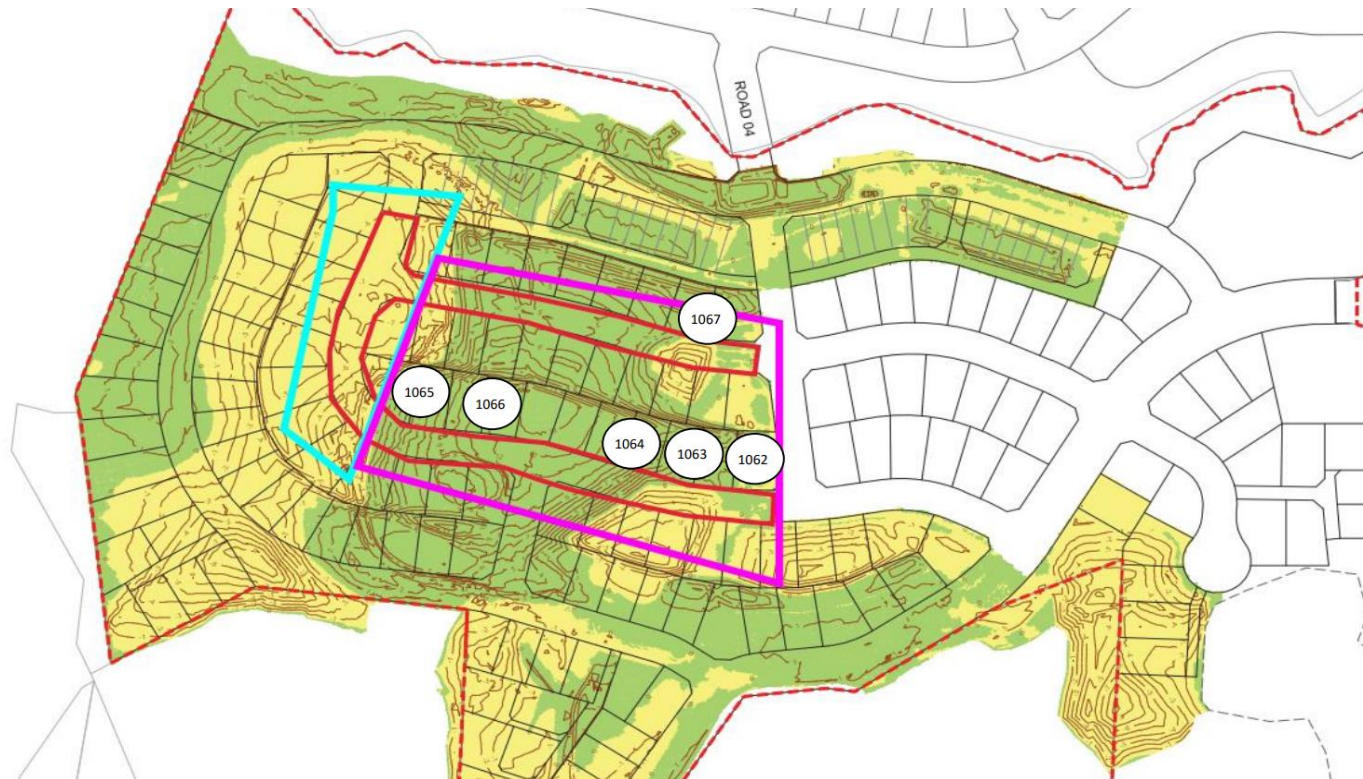
**Report No: EFIL:ETAM23W00292**  
**Issue No:1**  
*This report replaces all previous issues of report no. EFIL:ETAM23W00292*

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

L Walker

Approved Signatory: Liam Walker  
 Assistant Manager  
 IANZ Site Number: 105  
 Date of Issue: 9/03/2023





# 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

## 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 <sup>3</sup>	Oven Water Content %	Dry Density t/m <sup>3</sup>	Solid Density t/m <sup>3</sup>	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									174	152	150	143						
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:

# 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

ACCREDITED  
  
 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 Site Number: 105  
 Date of Issue: 10/03/2023



**SITE PLAN** (NOT TO SCALE)

## APPENDIX E: MONITORING RESULTS

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## APPENDIX F: PRODUCER STATEMENT – CONSTRUCTION REVIEWS (PS4)

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23 August 2022

Our ref: 773-AKLGE206639-BH

WFH Properties Limited

Attention: WFH Properties

**Geotechnical Observation of Retaining Walls 311 and 312 construction at Millwater Precinct 6, Stage 1 and 2, Orewa West (Building Consent No. BCO10301029-3)**

This letter is to confirm the scope of work relating to the attached Producer Statement (PS4 – Construction Review, Mass Block Wall – Walls 311 and 312, Geotechnical).

Tetra Tech Coffey carried out regular site visits to Millwater between November 2020 and June 2022 to observe the construction of Mass Block retaining walls 311 and 312 within Precinct 6 of the Millwater Subdivisional Development.

Mass Block Wall 311 extended over 188 lineal meters with a maximum retained height of 3.0m, founded on a 2.0m deep, 6.0m wide engineered fill undercut key from chainage 35-170m to maintain adequate global stability factors of safety. Between chainage 0-35m and 170-188, the wall was founded within engineered fill placed in the subdivision fill areas.

Mass Block Wall 312 extended over 171 lineal meters with a maximum retained height of 3.0m, founded on a 2.0m deep and 6.0m wide engineered fill undercut key from chainage 0-40m and 130-155m. Between chainage 40-130 the wall was founded within engineered fill.

During the course of construction, we carried out near daily site visits to observe and test the undrained shear strength of the wall foundation soils, monitor aggregate and clay fill placement and compaction, geogrid and geotextile placement, wall drainage construction, facing block placement and pedestrian barrier installation in accordance with Tetra Tech Coffey's Geotechnical Design Report dated 6 April 2020 (Ref: AKLGE206639-AL Rev.1).

On the basis of our construction observations and in-situ soil and aggregate testing, we are satisfied that the site works undertaken to construct Mass Block Retaining Walls 311 and 312 were in accordance with our Geotechnical Design Report dated 6 April 2020 (Ref: AKLGE206639-AL Rev.1), the ground conditions were also generally consistent with those that formed the basis of the recommendation presented in the report.

Accordingly, we attach our PS4 certificate for the above-mentioned works.

For and on behalf of Tetra Tech Coffey

Prepared By:

Reviewed and Authorised By:



**Tasman Lambert Andrews**  
Graduate Engineering Geologist



**Chris Armstrong**  
Principal Geotechnical Engineer  
CMEngNZ, CPEng

Attachments – Producer Statement - Construction Review (PS4)

# 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<sup>2</sup>

**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<sup>3</sup>). 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](http://www.acenz.org.nz)  
[www.engineeringnz.org](http://www.engineeringnz.org)



association of  
consulting and  
engineering



## APPENDIX G: GEOWEB SUPPLIER LETTER

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03/10/2023

**GEOFABRICS**  
Sustainable solutions

Karl Lloyd  
JG Civil  
180 Foundry Road  
Silverdale

Dear Karl,

**Re: Project – A2592 Millwater – Precinct 6 Orewa West**

This is to acknowledge that I visited Millwater - Precinct 6 Orewa West site on the 16<sup>th</sup> of June 2023 and 25<sup>th</sup> of July 2023 to inspect the installation of Geoweb GW30V4 (100mm) on slopes 601 (6m vertical height) and 312 (3.5m vertical height).

On both slopes the correct strength Geoweb tendons were installed at 3 per panel and ATRA Tendon clips every 6 cells as per Presto Evaluation PR21338. Both the specified TP-93 tendons and higher strength TP-255 were used for this project which is acceptable. I observed the use of ATRA keys for all the Geoweb panel to panel connections that followed the guidance in the Geoweb Slope Protection System Installation Guideline.

The only areas of the installation that could not be observed were:

1. The earth anchors as these were already installed however the anchor spacings were as the Presto Evaluation.
2. Placement of the topsoil infill

Let me know if you have any questions or need something else.

Yours Sincerely



Markus Wunderlich

Sales Engineer – Upper North Island